

INSTALL IT. ENSURE SAFETY.

# ArmaProtect™

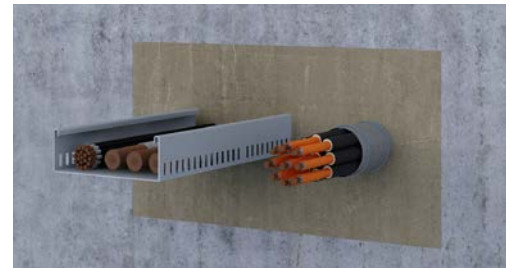
## Firestop Handbook (UL Systems)

Armacell's dedicated firestop products are designed to provide fire-safe circumstances in the event of a fire emergency.

[www.armacell.com](http://www.armacell.com)



Enhancing  
safety levels to  
protect property  
and save lives



 **armacell**<sup>®</sup>  
ArmaProtect™



# ArmaProtect

## The new firestop portfolio from Armacell

- Comprehensive firestop range for almost all applications
- Globally approved and tested as a system (ETA, UL)
- Meeting the requirements of installers on the construction site

Armacell, a global leader in flexible foam for the equipment insulation market and a leading provider of engineered foams, presents a new firestop portfolio. The new ArmaProtect range is designed to provide safe conditions in the event of a fire. The products are certified in numerous combinations and configurations, making the ArmaProtect firestop range a one-stop-shop solution. They are easy to install, inspect and maintain.

### Fire safety is top priority

The requirements for fire protection are increasing. Regulated by building codes, buildings are sub-divided in fire compartments. In the event of a fire, they keep fire and smoke contained in a limited area for a given amount of time. Fire ratings typically range from 30 to 120 or even up to 240 minutes

ArmaProtect firestop products reliably seal off penetrations in walls, floors or service shafts and keep escape routes free of smoke and toxic gases. This gives occupants valuable time to leave the building and rescue teams unhindered access for evacuation.

### One-stop-shop solution

Whether flexible walls, rigid wall or rigid floors with cable and pipe penetrations – Armacell offers specifiers and installers compliant solutions for almost all firestop penetrations. The range includes intumescent firestop wraps, firestop collars, coated firestop boards, intumescent firestop sealants and mortars. The new ArmaProtect portfolio is an

ideal addition to ArmaFlex Protect, Armacell's unique firestop solution which combines high fire resistance, condensation control and thermal insulation in a single product.

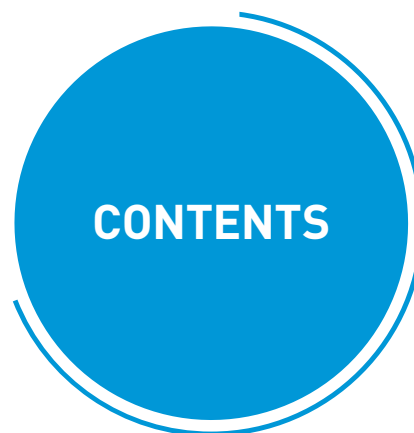
### Increasing overall fire safety in a building

*"In a fire, building services have a considerable impact on safety in buildings. Pipes, ducts and electrical cables penetrate fire compartments and thus form a path along which flames and smoke can spread. With the components of our new ArmaProtect firestop range, cables, pipes as well as mixed and multiple penetrations in fire walls and floors can be sealed reliably", explains Dr. Christoph Aubauer, Global Product Manager for passive fire protection at Armacell. "With our new ArmaProtect Firestop range we enhance the safety level in buildings to protect property and save lives."*

### Globally approved and tested as a system

All ArmaProtect products have been globally tested in accordance with EN and UL test standards the strict requirements of European Technical Assessment (ETA) and UL Solutions. They offer specifiable, reliable and flexible solutions for fire protection applications in residential, commercial and industrial buildings. To search for and select the suitable firestop system, Armacell offers the ArmaProtect Fire Stop System Selector on its website. Here, specifiers and installers also find ETAs, DOPs, technical data sheets, safety data sheets and application videos.





## Enhancing safety levels to protect property and save lives

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# ENHANCING SAFETY LEVELS TO PROTECT PROPERTY AND SAVE LIVES.

PASSIVE FIRE PROTECTION (PFP) products and systems are designed to provide fire-safe circumstances in the event of a fire emergency. Often built as part of the building component, PFP measures are not visible to building users and hence often overlooked as a fire protection measure.







## PFP SYSTEMS INCLUDE

### // Building construction

- Fire protection to the load bearing structure
- The building envelope, e.g. fire rated external walls, curtain walls etc.

### // Building services

- Firefighting shafts and stairwells
- Fire rated service ducts and shafts
- Fire rated cable coatings
- Fire rated elevators for emergency use only

### // Ventilation systems

- Fire rated ductwork including fire dampers
- Fire rated air transfer grilles (mechanical or intumescent)

### // Compartmentation

- Partitions and floors
- Fire rated doors
- Service shafts
- Suspended ceilings
- Fire rated glazing
- Fire shutters
- Industrial fire shutters and curtains
- Cavity barriers
- Linear gap seals
- Penetration seals for pipes, cables and other services, also known as firestop systems

## COMPARTMENTATION

Regulated by building codes in many countries, buildings are sub-divided into "fire compartments" and in some cases also smoke compartments. In the event of a fire emergency in a building, the strategy is to keep the fire and smoke contained within a limited area of the building (the fire compartment) for a given amount of time (referred to as the fire rating). Fire ratings are country-dependent and typically ranges between 30 and 120 minutes (partly even up to 240 minutes).

Properly designed and installed, PFP systems complement fire compartments to provide multiple levels of fire safety, such as

- Providing building users sufficient time to safely make their way to a means of egress and escape from the building
- Keeping escape routes free from smoke and other toxic gasses, and
- Allowing emergency responders to safely rescue building users from the fire scene and attempt to extinguish the fire

Fire and flames cause severe harm but a key concern for humans is the inhalation of smoke and other toxic gasses. For example, if there is a hole as small as 10 mm (0.4") in diameter penetrating a fire rated floor or ceiling between

the two rooms and a fire is to occur in a room, it would take less than 3 minutes for the adjacent room to be filled with smoke. In this situation, you would not be able to see your own hand even if placed just 45 cm (18") in front of you. Incapacitation and physical impairment due to smoke inhalation occurs even faster.

Apart from being a safety issue for humans, smoke can also cause severe damage to assets and equipment, for example in hospitals and data centres.



Compartmentation contributes to a holistic fire safety strategy, and firestop systems is an integral measure to be considered.



Buildings are equipped with mechanical and electrical systems to provide comfort, safety and security. Services connected to these appliances run across buildings and penetrate fire rated walls, floors and service shafts, compromising the fire compartmentation strategy.

Firestop systems are designed to seal penetrations of such services, including:

- Insulated and non-insulated combustible pipes
- Insulated and non-insulated non-combustible pipes
- Single cables and cable bundles
- Cable trays
- Linear Joints and ducts

These systems should be tested according to local governing fire standards and installed in line with the details shown in the fire test report.



At Armacell, safety comes first and maximum reliability is essential. As a systems solutions provider, we know firestop system requirements and standards and offer global support. This table provides an indicative overview of fire test standards for firestop systems globally.

WITH  
ARMACELL  
YOU'RE ALWAYS  
ON THE  
SAFE SIDE.

Standard	Description	Geographic coverage
EN 1366-3	Penetration seals	Europe
EN 1366-4	Linear joints	Europe
EN 13501-2	Fire classification of construction products and building elements	Europe
ISO 834	Fire resistance tests	Europe
UL 263	Fire tests of building construction and materials	Asia, Middle East, USA
UL 1479 (ASTM E 814)	Fire test of through-penetration firestops	Asia, Middle East, USA
UL 2079 (ASTM E 1966)	Tests for fire resistance of building joint systems	Asia, Middle East, USA
ASTM E814-13	Standard test method for fire tests of penetration firestop systems	Asia, Middle East, USA

## European standards

The European Standards applicable to firestop systems are EN1366-3, EN1366-4 and EN13501-2. Fire rating is measured as EI (integrity and insulation) for a specific time duration, and written as EI 60, EI 90, EI 120, EI 180 or EI 240.

- E rating (integrity, "E" from French "Étanchéité"): This is the ability of a test component to stop fire from spreading to an unexposed side as a result of penetration of flames or smoke.
- I rating (insulation, "I" from French "Isolation"): This is the ability of a test component to restrict the temperature rise of the non-heated side to below specified levels during the fire, which is not more than +140 °C and up to +180 °C.

## UL 1479 for Through-penetration firestops

This method exposes test samples of penetration firestops to a fire for a standard period of time and temperature and to an application of a hose stream. Ratings are then established based on the length of time the firestop is able to resist before the first development of through-openings or flaming on the unexposed surface, the acceptable limitation of thermal transmission and acceptable performance under the application of the hose stream test.

Two ratings are established for each penetration firestop system:

- F rating (F = fire): based upon flame occurrence on the unexposed side of the test sample and acceptable hose stream performance
- T rating (T = temperature) based on temperature rise and flame occurrence on the unexposed side of the test sample and acceptable hose stream performance.

## UL 2079 for fire resistance of building joint systems

These tests are applicable to joint systems of various materials and construction intended for use in linear openings between adjacent fire resistive structures. The fire endurance ratings for joint systems are intended to register performance during the period of fire exposure and are not intended to be interpreted as having determined the acceptability of the joint systems for use before or after fire exposure.

The intent of these methods is to develop data to assist others in determining the suitability of the joint systems where fire resistance is required. These requirements are intended to evaluate the length of time that the types of joint systems specified will contain a fire during a predetermined test exposure. The test evaluates the joint system's resistance to heat and, in some instances, to a hose stream, while carrying an applied load if the assembly is load bearing.





# ARMAPROTECT FIRESTOP SOLUTIONS



## ArmaProtect CM

Firestop mortar for mixed fire seals in walls and floors

- Blank openings
- Mixed and multiple services
- Cables, cable bundles and cable trays
- Conduit and conduit bundles
- Non-combustible and combustible pipes



## ArmaProtect MM20

Firestop mortar for mixed fire seals in walls and floors

- Cables, cable bundles and cable trays
- Combustible pipes
- Busbars
- Climasplit



## ArmaProtect CB ArmaProtect ABLC, ArmaProtect ABLF

Ablative coated fireboard system for mixed fire seals in walls and floors with firestop coating and firestop filler mastic

- Blank openings
- Mixed and multiple services
- Cables, cable bundles and cable trays
- Conduit and conduit bundles
- Non-combustible and combustible pipes



## ArmaProtect CU

Firestop cushions for wall and floor openings

- Temporary or permanent sealing
- Cables and cable trays



## ArmaProtect FW1

Firestop wrap for fire seals in walls and floors

- Cable bundles up to Ø150mm
- Combustible pipes up to Ø160mm



## ArmaProtect FW2

Firestop wrap for fire seals in walls and floors

- Non-combustible pipes up to Ø323.9mm with combustible insulation
- Composite pipes
- Conduits and conduit bundles



## ARMAPROTECT FIRESTOP SYSTEMS:

- are easy to install and highly reliable.
- have been globally tested.
- are certified in numerous combinations and configurations, making the range a “one-stop-shop” solution
- are easy to inspect and to maintain.

Large,  
global  
approved  
range

Excellent fire  
performance



### ArmaProtect FW3

Firestop wrap for fire seals in walls and floors

- Combustible pipes  $\varnothing \leq 160\text{mm}$  (without combustible insulation)
- Combustible pipes  $\varnothing \leq 110\text{mm}$  (with combustible insulation)
- Multi-layer composite pipes  $\varnothing \leq 110\text{mm}$

### ArmaProtect CT

Cable tube for fire seals in walls and floors

- Blank openings
- Cables and cable bundles
- Conduit and conduit bundles
- Combustible pipes
- HVAC split-line combinations
- Ideally for retrofitting applications



### ArmaProtect EXPS

Intumescent firestop sealant for mixed fire seals in walls and floors

- Blank openings
- Cables and cable bundles
- Conduit and conduit bundles
- Non-combustible and combustible pipes

### ArmaProtect FC1 and FC2

Firestop collar for fire seals in walls and floors

- For sealing of combustible pipes without insulation up to  $\varnothing 160\text{ mm}$  (FC1) and  $\varnothing 400\text{ mm}$  (FC2), respectively

### ArmaProtect EFC1 and EFC2




Endless firestop collar for fire seals in walls and floors

- Combustible pipes  $\varnothing \leq 160\text{ mm}$  (with and without sound insulation),  $\varnothing \leq 110\text{ mm}$  (with combustible insulation)
- Non-combustible pipes  $\varnothing \leq 108\text{ mm}$  (with combustible insulation)
- Multi-layer composite pipes  $\varnothing \leq 110\text{ mm}$

## SOLUTIONS WITH EN TESTING (ETA)



### For small to large openings

See relevant ETA for further installation details.

	SMALL	MEDIUM	LARGE
<b>EXCEPTIONAL SOLUTION</b> 	ArmaProtect CT <ul style="list-style-type: none"> <li>Pre-installed device</li> <li>Clean installation</li> <li>Easy re-penetration</li> <li>Openings up to Ø116mm</li> <li>Up to EI 120</li> </ul>	ArmaProtect CB <ul style="list-style-type: none"> <li>Easy re-penetration and maintenance</li> <li>Cable, pipe, mixed and multiple penetrations</li> <li>Up to EI 240</li> <li>Openings up to 1.4m x 2.0m or 1.2m x 2.4m, respectively</li> </ul>	
<b>SUPERIOR SOLUTION</b> 	ArmaProtect EXPS <ul style="list-style-type: none"> <li>Up to EI 120</li> <li>Openings up to Ø160mm</li> </ul> ArmaProtect ABLF <ul style="list-style-type: none"> <li>Up to EI 90</li> <li>Openings up to Ø160mm</li> </ul>		
<b>STANDARD SOLUTION</b> 	ArmaProtect CM <ul style="list-style-type: none"> <li>Cable, pipe, mixed and multiple penetrations</li> <li>Up to EI 240</li> <li>Openings up to 1.2m x 2.0m</li> </ul>		

### For pipe penetrations

See relevant ETA for further installation details.

	SMALL TO MEDIUM PIPE DIAMETER	LARGE PIPE DIAMETER
<b>EXCEPTIONAL SOLUTION</b> 	ArmaProtect EFC1 and EFC2 <ul style="list-style-type: none"> <li>Flexible and clean installation</li> <li>Problem solver for special applications on job site</li> <li>Combustible pipes Ø ≤ 160 mm (with and without sound insulation), Ø ≤ 110 mm (with combustible insulation)</li> <li>Non-combustible pipes Ø ≤ 108 mm (with combustible insulation)</li> <li>Multi-layer composite pipes Ø ≤ 110 mm</li> <li>Up to EI 240</li> </ul>	ArmaProtect FC2 <ul style="list-style-type: none"> <li>Pre-formed product</li> <li>Clean installation</li> <li>Combustible pipes Ø ≤ 400mm (without insulation)</li> <li>Up to EI 120</li> </ul>
<b>SUPERIOR SOLUTION</b> 	ArmaProtect FC1 <ul style="list-style-type: none"> <li>Pre-formed product</li> <li>Clean installation</li> <li>Combustible pipes Ø ≤ 160mm (without insulation)</li> <li>Up to EI 240</li> </ul> ArmaProtect FW3 <ul style="list-style-type: none"> <li>Flexible and clean installation</li> <li>Combustible pipes Ø ≤ 160mm (without combustible insulation)</li> <li>Multi-layer composite pipes Ø ≤ 110mm (with combustible insulation)</li> <li>Up to EI 120</li> </ul>	ArmaProtect FW2 <ul style="list-style-type: none"> <li>Flexible and clean installation</li> <li>Non-combustible pipes up to Ø323.9mm (with combustible insulation)</li> <li>Up to EI 120</li> </ul>

#### European Technical Assessments:

ETA-21/1024, ETA-21/1025, ETA-21/1026, ETA-21/1099, ETA-22/0060, ETA-22/0061, ETA-22/0062, ETA-22/0063, ETA-22/0064





## SOLUTIONS WITH UL TESTING (ACC. TO UL 1479 / ASTM E814)

### For small to large openings

See relevant UL systems for further installation details.

	SMALL	MEDIUM	LARGE
<b>EXCEPTIONAL SOLUTION</b> 	ArmaProtect CT <ul style="list-style-type: none"> <li>Pre-installed device</li> <li>Clean installation</li> <li>Easy re-penetration</li> <li>Openings up to Ø116mm</li> <li>Up to 3 h F rating</li> </ul>	ArmaProtect CU <ul style="list-style-type: none"> <li>Pre-formed product</li> <li>Clean installation</li> <li>Easy re-penetration</li> <li>For temporary and temporary use</li> <li>Openings up to 400mm x 200mm</li> <li>Up to 3 h F rating</li> </ul>	
<b>SUPERIOR SOLUTION</b> 	ArmaProtect FW1 <ul style="list-style-type: none"> <li>Flexible and clean installation</li> <li>Combustible pipes up to Ø160mm</li> <li>Cable bundles up to Ø150mm</li> <li>Up to 3 h fire rating</li> </ul> <hr/> ArmaProtect FW2 <ul style="list-style-type: none"> <li>Flexible and clean installation</li> <li>Non-combustible pipes up to Ø159mm</li> <li>Composite pipes</li> <li>Conduits and conduit bundles</li> <li>Up to 3 h fire rating</li> </ul>	ArmaProtect CB <ul style="list-style-type: none"> <li>Easy re-penetration and maintenance</li> <li>Also tested for bus bars and ducts</li> <li>Up to 3 h F rating</li> <li>Openings up to 0.6m x 0.4m</li> </ul>	
<b>STANDARD SOLUTION</b> 		ArmaProtect CM <ul style="list-style-type: none"> <li>Up to 3 h F rating</li> <li>Openings up to 0.6m x 0.4m</li> </ul>	ArmaProtect MM 20 <ul style="list-style-type: none"> <li>Up to 3 h F rating</li> <li>Openings up to 0.4mm x 0.4mm</li> </ul>

### For pipe penetrations

See relevant UL systems for further installation details.

	COMBUSTIBLE PIPES	NON-COMBUSTIBLE PIPES
<b>SUPERIOR SOLUTION</b> 	ArmaProtect FW1 <ul style="list-style-type: none"> <li>Flexible and clean installation</li> <li>Combustible pipes up to Ø160mm</li> <li>Also tested for cable bundles up to Ø150mm</li> <li>Up to 3 h fire rating</li> </ul>	ArmaProtect FW2 <ul style="list-style-type: none"> <li>Flexible and clean installation</li> <li>Non-combustible pipes up to Ø159mm</li> <li>PE/AL/PE composite pipe up to Ø63mm</li> <li>Also tested for PE-HD conduits up to Ø100mm (conduits Ø≤ 32mm), PE-HD conduits up to Ø50mm with speed pipe bundles and clima split bundles</li> <li>Up to 3 h fire rating</li> </ul>



## ArmaProtect Firestop Solutions (UL)<sup>1</sup>



**Arma-  
Protect CM  
Firestop  
Mortar**



**Arma-  
Protect  
MM20**





**ArmaProtect CB Firestop Coated Board System**

				in floor up to 3h fire rating	in rigid wall up to 3h fire rating	in rigid wall up to 2h fire rating	in drywall (flexible wall) up to 3h fire rating	in drywall (flexible wall) up to 2h fire rating
FIRE RATING	1h fire rating	x	x	x	x	x	x	x
	2h fire rating	x	x	x	x	x	x	x
	3h fire rating	x	x	x	x		x	
BASE MATERIAL	Concrete floor	x	x	x				
	Drywall (flexible wall)	x					x	x
	Rigid wall	x	x		x	x		
PENETRATION	Cables	x	x	x	x	x		x
	Cable bundles	x	x	x	x	x		x
	Cable trays	x	x	x	x	x		x
	Combustible pipes			x	x	x	x	x
	Non-combustible pipes		x	x	x	x		x
	Multi-layer composite pipes			x		x		x
	Conduits	x		x	x	x		x
	Conduits bundles	x		x	x	x		x
	Clima split		x	x	x	x		x
	Speed pipes/ fibre glass			x		x		x
	Busbars		x	x				x
	Ducts			x	x	x		x
	Mixed penetration		x	x	x	x		x
	Multiple penetration	x	x	x	x	x		x
OPENING	Blank opening			x		x		x
	Small opening (approx. up to 200 mm x 200 mm)	x	x	x	x	x	x	x
	Medium opening (approx. up to 400 mm x 400 mm)	x	x	x	x	x		x
	Large opening (≥ approx. 400 mm x 400 mm)	x	x	x	x	x		x

<sup>1</sup> See relevant UL systems for further installation details



## ArmaProtect Firestop Solutions (UL)<sup>1</sup>

						
		ArmaProtect™ CT Firestop Cable Tube in floor up to 3h fire rating	ArmaProtect™ CT Firestop Cable Tube in rigid wall up to 3h fire rating	ArmaProtect™ CT Firestop Cable Tube in rigid wall up to 2h fire rating	ArmaProtect™ CT Firestop Cable Tube in drywall (flexible wall) up to 2h fire rating	ArmaProtect™ CU Firestop Cushions
FIRE RATING	1h fire rating	x	x	x	x	x
	2h fire rating	x	x	x	x	x
	3h fire rating	x	x	x	x	x
BASE MATERIAL	Concrete floor	x				x
	Drywall (flexible wall)				x	
	Rigid wall		x	x		x
PENETRATION	Cables	x	x	x	x	
	Cable bundles	x	x	x	x	
	Cable trays					x
	Non-combustible pipes	x		x	x	x
	Conduits	x		x		
	Conduits bundles	x		x		
	Clima split	x	x	x		
OPENING	Small opening (approx. up to 200 mm x 200 mm)	x	x	x	x	x
	Medium opening (approx. up to 400 mm x 400 mm)					x
	Large opening (≥ approx. 400 mm x 400 mm)					x

<sup>1</sup> See relevant UL systems for further installation details





## ArmaProtect Firestop Solutions (UL)<sup>1</sup>



**ArmaProtect FW<sup>1</sup>  
Firestop Wrap**



**ArmaProtect™ FW<sup>2</sup>  
Firestop Wrap**

		FW1 application in floor up to 3h fire rating	FW1 application in rigid wall up to 3h fire rating	FW1 application in drywall (flexible wall) up to 2h fire rating	FW2 application in floor up to 3h fire rating	FW2 application in floor up to 2h fire rating	FW2 application in rigid wall up to 3h fire rating	FW2 application in drywall (flexible wall) up to 3h fire rating
FIRE RATING	1h fire rating	x	x	x	x	x	x	x
	2h fire rating	x	x	x	x	x	x	x
	3h fire rating	x	x		x		x	
BASE MATERIAL	Concrete floor	x	x		x			
	Drywall (flexible wall)			x	x			x
	Rigid wall						x	
PENETRATION	Cables	x						
	Cable bundles	x						
	Cable trays							
	Combustible pipes	x	x	x				
	Non-combustible pipes				x	x	x	x
	Multi-layer composite pipes					x		x
	Conduits				x	x	x	x
	Conduits bundles				x	x	x	x
OPENING	Clima split				x	x	x	x
	Small opening (approx. up to 200 mm x 200 mm)	x	x	x	x	x	x	

<sup>1</sup> See relevant UL systems for further installation details



ArmaProtect Firestop Solutions (UL)<sup>1</sup>



ArmaProtect™  
ACRS  
for use in  
Joint System



ArmaProtect™  
ABLC  
for use in  
Joint System

FIRE RATING	1h fire rating	x	x
	2h fire rating	x	x
	3h fire rating	x	x
BASE MATERIAL	Concrete floor	x	x
	Dry wall	x	x
	Solid wall	x	x
	Shift wall		
JOINTS	Bottom-of-wall joint	x	x
	Head-of-wall joint	x	x
	Floor joint	x	x
	Wall joint	x	x

<sup>1</sup> See relevant UL systems for further installation details





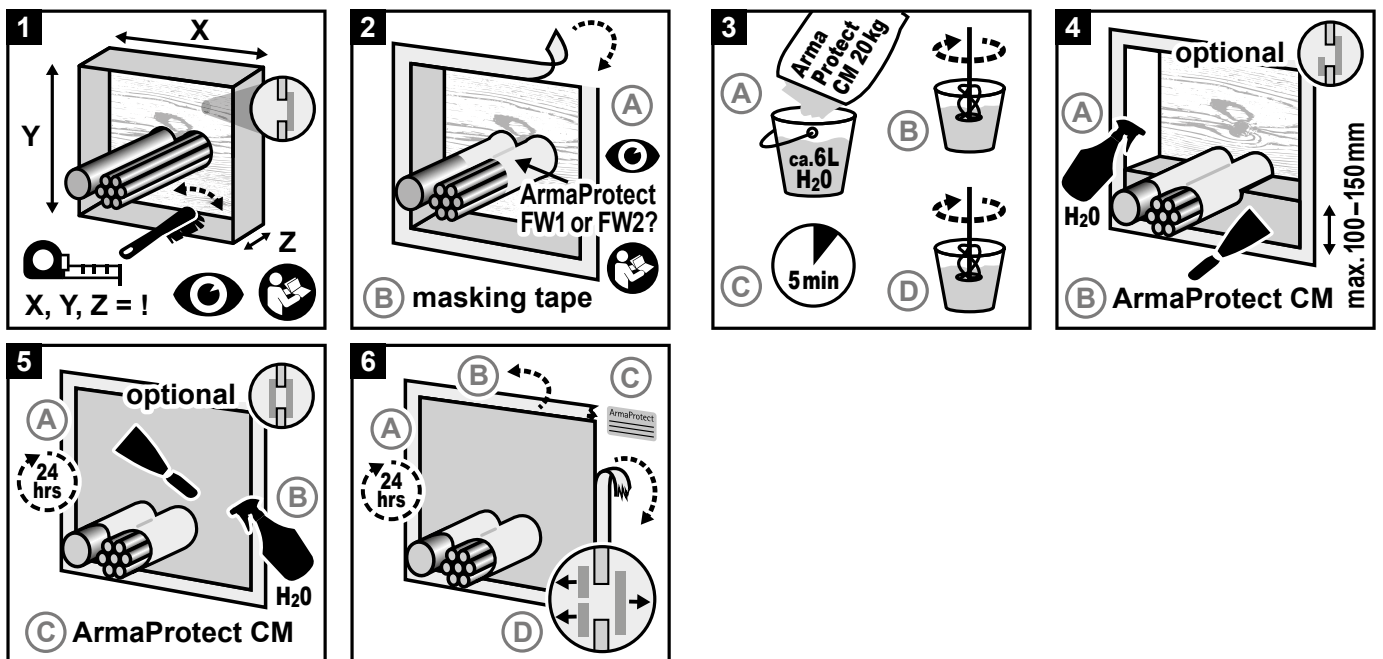


# ArmaProtect CM Firestop mortar

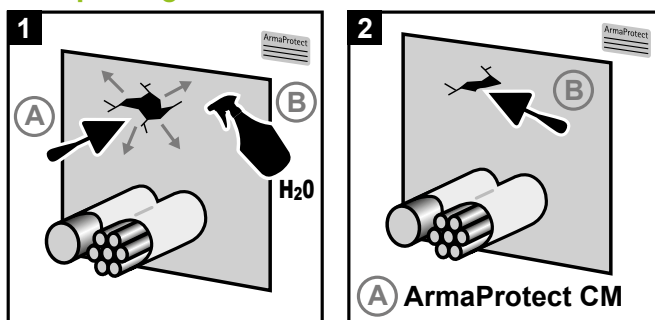
## INSTRUCTIONS FOR USE

Before you begin, ensure surfaces are solid and free of any adhesion-reducing substances such as dust. Absorbent surfaces should be pre-wet with water. The mortar consistency needs to be adapted so that all components are filled without cavities.

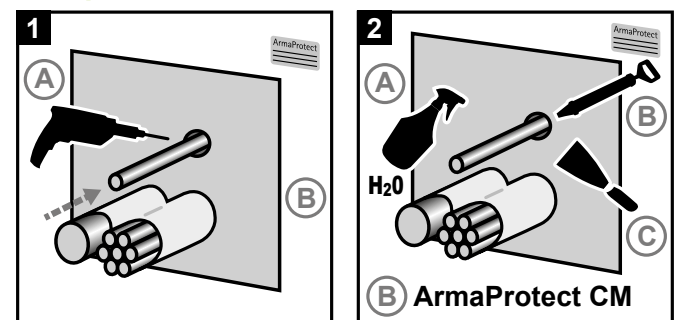
### // Wall installation



### // Repairing cracks

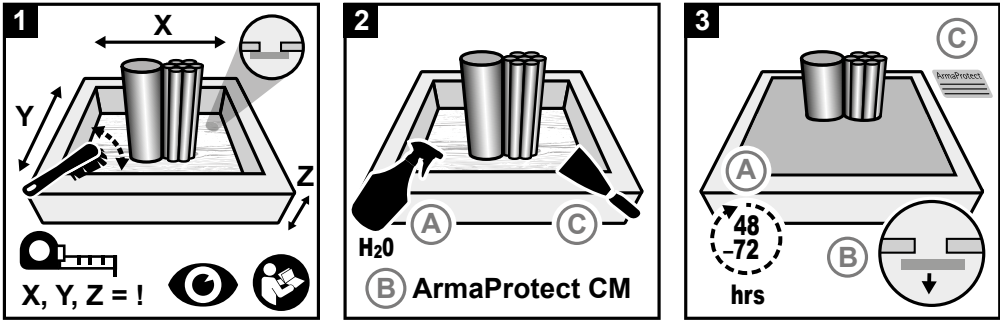


### // Repenetration





// Floor installation



// Consumption guide

Approximate consumption [kg] - calculated for installation thickness of 150 mm

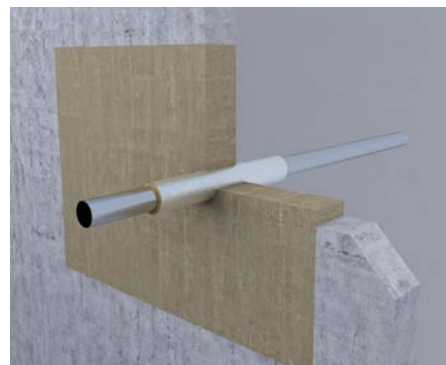
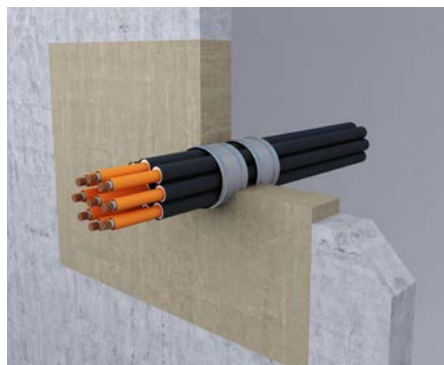
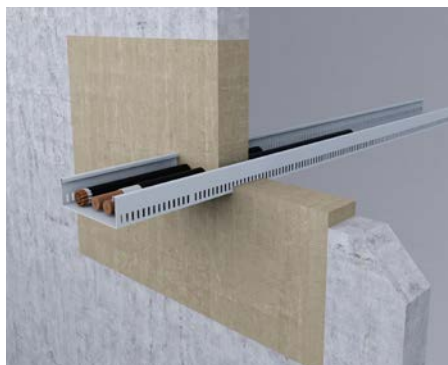
Maximum sealing size [m <sup>2</sup> ]	0% services	30% servces	60% services
0.01	1.50	1.05	0.60
0.02	3.00	1.10	1.20
0.03	4.50	3.15	1.80
0.05	7.50	5.25	3.00
0.10	15.00	10.50	6.00
0.20	30.00	21.00	12.00
0.30	45.00	31.50	18.00
0.50	75.00	52.50	30.00
1.00	150.00	105.00	60.00

Take note of potential material loss during application at the job site.



# MAIN APPLICATIONS

## ACC. ETA-22/0064



### In drywalls<sup>1</sup>

Base material	Drywall
Base material thickness	≥ 100 mm
Seal thickness	≥ 100 mm
Maximum seal size (wall)	550 mm x 600 mm
Penetrants	
<ul style="list-style-type: none"> <li>Cables ≤ Ø 80 mm<sup>2</sup></li> <li>Cable bundles ≤ Ø 150 mm (with cables ≤ Ø 21 mm)<sup>2</sup></li> <li>Cable trays<sup>2</sup></li> <li>Plastic conduits ≤ Ø 32 mm (with cables ≤ Ø 21 mm)<sup>3</sup></li> <li>Plastic conduit bundles ≤ Ø 100 mm (conduits ≤ Ø 32 mm, with cables ≤ Ø 21 mm)<sup>3</sup></li> <li>Plastic conduits ≤ Ø 32 mm (with cables ≤ Ø 21 mm)<sup>3</sup></li> <li>PE lines "speed pipes" (24 x ≤ Ø 7.0 mm, 7 x ≤ Ø 10.0 mm, 5 x ≤ Ø 12.0 mm)<sup>1</sup></li> </ul>	up to EI 120 <sup>1</sup>

<sup>1</sup> See ETA-22/0064 for further installation details.

<sup>2</sup> For cables > 21 mm and cable bundles use 2 x 2-layers ArmaProtect FW2, 125 mm outside seal.

<sup>3</sup> Use 2 x 2-layers ArmaProtect FW2, 50 mm inside seal / 75 mm outside seal.

### In solid walls and concrete floors<sup>1</sup>

Base material	Concrete wall, aerated concrete wall, masonry wall, concrete floor
Base material thickness	≥ 150 mm (wall) ≥ 150 mm (floor)
Seal thickness	≥ 150 mm (wall) ≥ 150 mm (floor)
Maximum seal size (wall)	1200 mm x 1200 mm
Maximum seal size (floor)	1200 mm x 2000 mm
Penetrants	
<ul style="list-style-type: none"> <li>Cables ≤ Ø 80 mm<sup>2</sup></li> <li>Cable bundles ≤ Ø 100 mm (with cables ≤ Ø 21 mm)<sup>3</sup></li> <li>Cable trays<sup>1</sup></li> <li>Plastic conduits ≤ Ø 63 mm (with cables ≤ Ø 21 mm)<sup>4</sup></li> <li>Plastic conduit bundles ≤ Ø 100 mm (conduits ≤ Ø 32 mm, with cables ≤ Ø 21 mm)<sup>5</sup></li> <li>PE lines "speed pipes" (24 x ≤ Ø 7.0 mm, 7 x ≤ Ø 10.0 mm, 5 x ≤ Ø 12.0 mm)<sup>1</sup></li> <li>Non-combustible pipe with mineral wool insulation (steel pipes ≤ Ø 323.9 mm, copper pipes ≤ Ø 88.9 mm)<sup>1</sup></li> <li>Non-combustible pipe with FEF insulation (steel pipes ≤ Ø 168.3 mm, copper pipes ≤ Ø 108 mm)<sup>1</sup></li> <li>Multi-layer composite pipes ≤ Ø 63 mm<sup>1</sup></li> <li>Combustible pipes ≤ Ø 160 mm<sup>1</sup></li> <li>HVAC split-line-combinations<sup>1</sup></li> </ul>	up to EI 120 <sup>1</sup>

<sup>1</sup> See ETA-22/0064 for further installation details.

<sup>2</sup> For cables ≤ 50 mm use 2 x 2-layers ArmaProtect FW2, 125 mm outside seal, for cables > 50 mm use 2 x 2-layers ArmaProtect FW2, 125 mm (EI 90) or 150 mm (EI 120) outside seal.

<sup>3</sup> Use 2 x 1-layer ArmaProtect FW2, 125 mm outside seal.

<sup>4</sup> Use 2 x 2-layers ArmaProtect FW2.



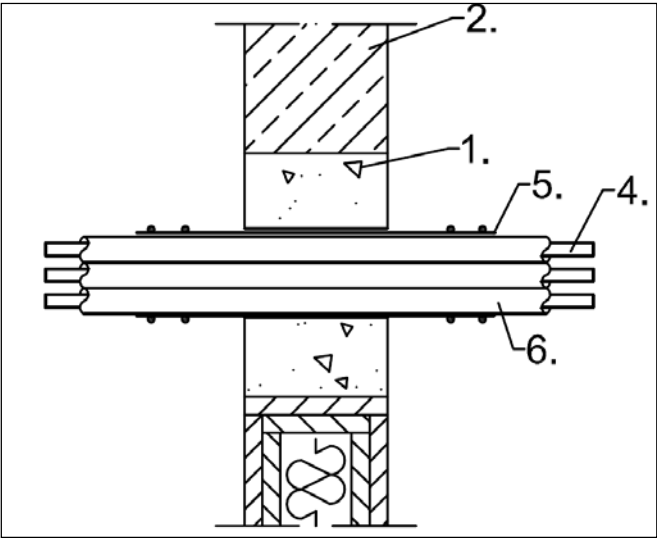
In solid walls and concrete floors<sup>1</sup>

Base material	Concrete wall, aerated concrete wall, masonry wall, concrete floor
Base material thickness	≥ 240 mm (wall) ≥ 200 mm (floor)
Seal thickness	≥ 240 mm (wall) ≥ 240 mm (floor)
Maximum seal size (wall)	600 mm x 600 mm
Maximum seal size (floor)	600 mm x 600 mm
Penetrants	
• Cables ≤ Ø 80 mm <sup>1</sup>	up to EI 240 <sup>1</sup>
• Cable bundles ≤ Ø 100 mm (with cables ≤ 21 mm) <sup>1</sup>	
• Cable trays <sup>1</sup>	

<sup>1</sup> See ETA-22/0064 for further installation details.

// Typical ETA approved systems<sup>1</sup>

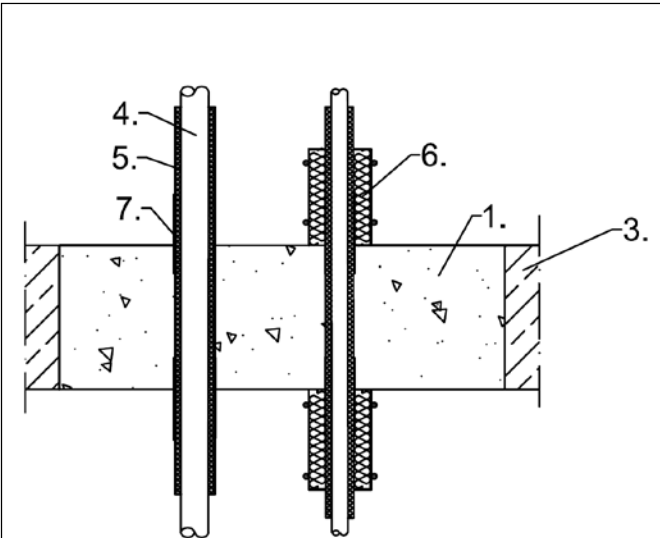
Wall application



Legend

- 1. ArmaProtect CM
- 2. Rigid wall
- 4. Cable
- 5. ArmaProtect FW2
- 6. Plastic conduits

Floor application



Legend

- 1. ArmaProtect CM
- 3. Rigid floor
- 4. Non-combustible pipe
- 5. FEF insulation
- 6. Protection insulation made of mineral fibre mats / shells
- 7. ArmaProtect FW2

<sup>1</sup> See ETA 22/0064 for further installation details.



# OTHER APPROVED APPLICATIONS

## ACC. ETA-22/0064

### ArmaProtect CT firestop cable tube (150 mm length) in ArmaProtect CM penetration for retrofitting in walls<sup>1</sup>

#### Penetrants

- Cables  $\leq \varnothing 50$  mm<sup>1</sup>
- Cable bundles  $\leq \varnothing 107$  mm (with cables  $\leq \varnothing 21$  mm)<sup>1</sup>
- Plastic conduits  $\leq \varnothing 32$  mm (with cables  $\leq \varnothing 14$  mm)<sup>1</sup>
- HVAC split line combinations<sup>1</sup>

up to EI 90<sup>1</sup><sup>1</sup> See ETA-22/0064 for further installation details.

## UL APPROVED SYSTEMS

### // Typical UL approved systems<sup>1</sup>

#### Penetrants

- Cables trays
- PE-HD conduit bundles

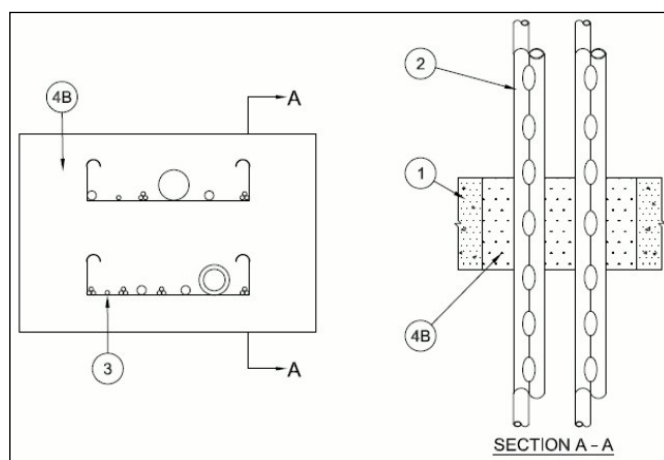
 $\leq 300$  mm width $\leq \varnothing 100$  mm (conduits  $\leq 32$  mm)<sup>1</sup> See relevant UL system for further installation details.

### // Selected exemplary UL approved systems

#### System No. F-A-4025 (cable tray in floor opening)

ANSI/UL 1479 (ASTM E814)

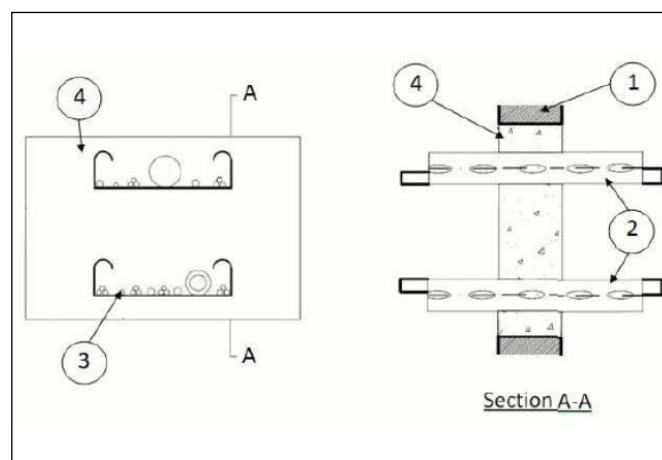
- F rating - 3 hours
- T rating - 1 hour



#### System No. W-J-4107 (cable tray in wall opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 2 hours
- T rating - 2 hours

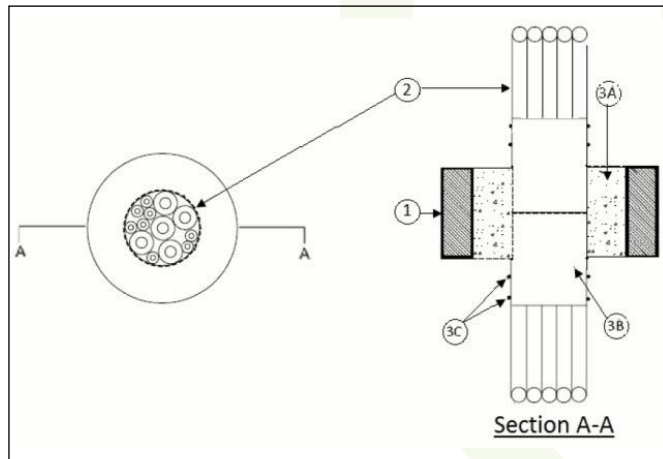





**System No. F-A-8061 (PE-HD bundle in floor opening)**

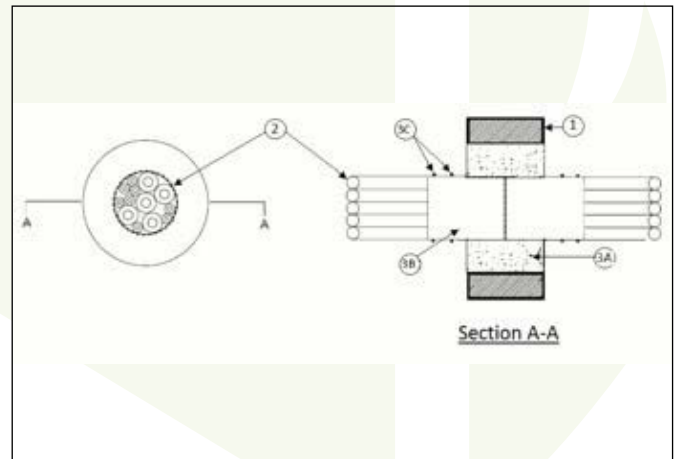
ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 2 hours


**System No. W-J-8090 (PE-HD bundle in floor opening)**

ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 1 hour





## ArmaProtect CM for use in Through-Penetration Firestop Systems<sup>1</sup>

System No.	Application	Services	Additional product	F rating	T rating
F-A-4025	Concrete floor	Cable tray, max two, nom 12 in. (300 mm) wide or smaller by max 2-3/8 in. (60 mm) deep		3 Hr	1 Hr
F-A-8061	Concrete floor	PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect FW2	3 Hr	2 Hr
F-A-8062	Concrete floor	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect FW2	3 Hr	3 Hr
F-A-8064	Concrete floor	Cable tray, max 11-3/4 in. (300 mm) wide by 2-3/8 in. (60 mm) deep	ArmaProtect FW2	3 Hr	1 1/2 Hr
W-J-4107	Concrete wall	Cable tray, max two, nom 12 in. (300 mm) wide by max 2-3/8 in. (60 mm)		2 Hr	2 Hr
W-J-8090	Concrete wall	1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect FW2	3 Hr	1 Hr
W-J-8091	Concrete wall	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect FW2	3 Hr	2 Hr
W-J-8093	Concrete wall	Cable tray, max 11-3/4 in. (300 mm) wide by 2-3/8 in. (60mm)	ArmaProtect FW2	3 Hr	1 Hr

<sup>1</sup> See relevant UL systems for further installation details, see Annex



## TECHNICAL DATA - ARMAPROTECT CM FIRESTOP MORTAR

Brief description	ArmaProtect CM is a cementitious-based firestop mortar used to maintain the fire resistance performance of fire penetrations in walls and floors.
Material type	Cementitious based firestop mortar.
Additional material information	6 - 7 l water + 20 kg dry mortar ≈ 20 l ready-to-use wet mortar ≈ 20 l volume after hardening
Product colour range	Grey
Product range	Available as a 20 kg bag of mortar. 50 bags on a pallet.
Applications	Firestop mortar for mixed fire seals in walls and floors for blank openings, mixed and multiple services, cables, cable bundles and cable trays and non-combustible and combustible pipes.
Installation	For professional use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.
Declaration of Performance (DoP)	ArmaProtect CM

### Approvals and compliance

Specification compliance	<ul style="list-style-type: none"> <li>ETA-22/0064 acc. EN 1366-3</li> <li>UL acc. UL 1479 (ASTM E814)</li> </ul>
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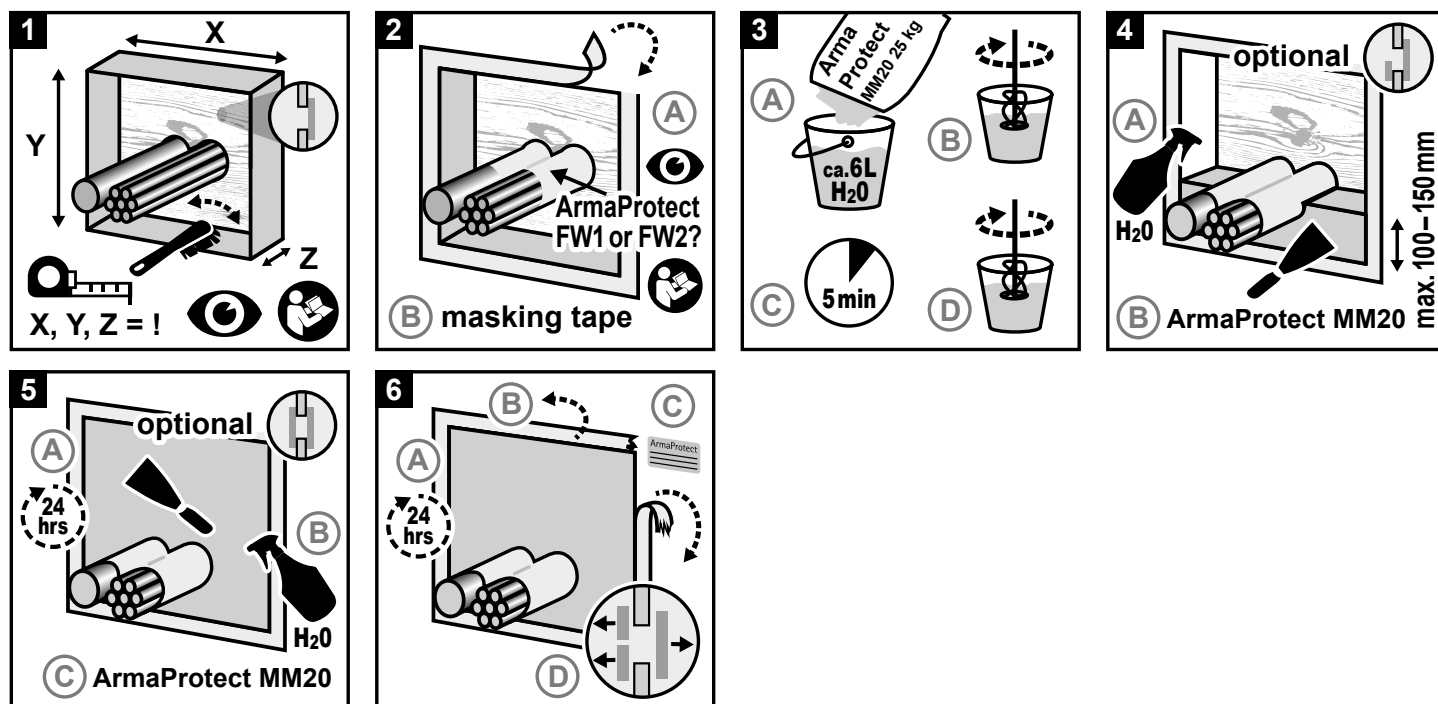
Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	5 °C to 200 °C (41 °F to 392 °F)	
Application temperature	5 °C to 25 °C (41 °F to 77 °F)	
Storage and transportation temperature	5 °C to 25 °C (41 °F to 77 °F)	
<b>Mechanical properties</b>		
Dry bulk density	ca. 900 kg/m <sup>3</sup>	EN 998-2
Bulk density	1200 ± 100 kg/m <sup>3</sup> (fresh mortar)	EN 998-2
Pressure resistance	M 2.5	EN 998-2
<b>Fire performance</b>		
Reaction to fire	Class A1	EN 13501-1
Resistance to fire	See Annex	
<b>Health and environment</b>		
Emission of dangerous substances	No dangerous substances.	ETAG 026-02
<b>Other technical features</b>		
Durability and serviceability	Use category type Z <sub>1</sub>	EOTA TR 024
Cure time	Fully cured after approximately 28 days.	
Safety information	Please refer to the safety data sheet available on our website.	
Shelf life	Can be kept for at least 12 months unopened if stored properly.	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost.	



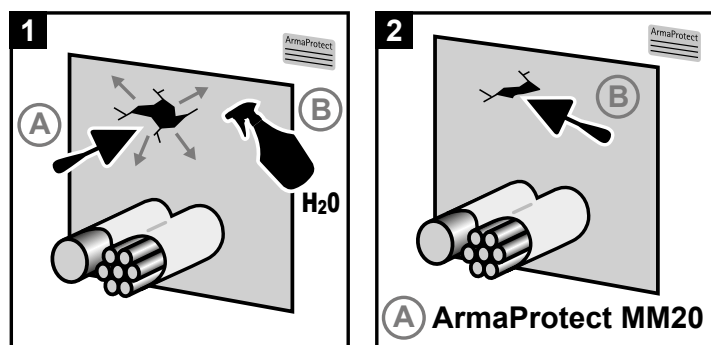
# INSTRUCTIONS FOR USE

Before you begin, ensure surfaces are solid and free of any adhesion-reducing substances such as dust. Absorbent surfaces should be pre-wet with water. The mortar consistency needs to be adapted so that all components are filled without cavities.

## // Wall installation

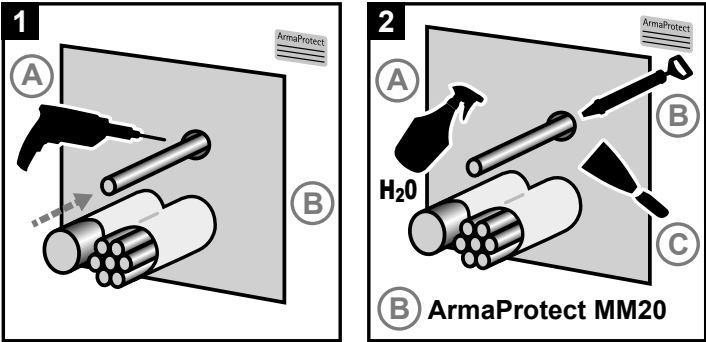


## // Repairing cracks

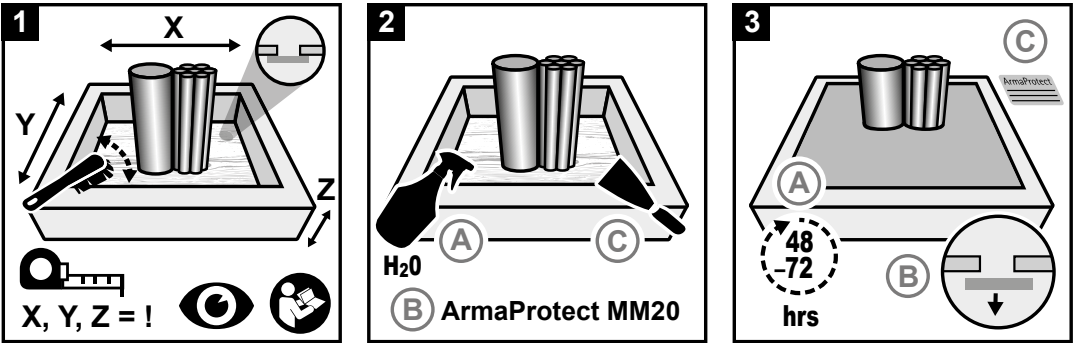




// Repenetration



// Floor installation



// Consumption guide

Approximate consumption [kg] - calculated for installation thickness of 150 mm

Maximum sealing size [m²]	0% services	30% services	60% services
0.01	0.90	0.63	0.36
0.02	1.80	1.26	0.72
0.03	2.71	1.89	1.08
0.05	4.51	3.16	1.80
0.10	9.02	6.32	3.61
0.20	18.05	12.63	7.22
0.30	27.07	18.95	10.83
0.50	45.12	31.58	18.05
1.00	90.23	63.16	36.09

Take note of potential material loss during application at the job site.



# UL APPROVED SYSTEMS

## // Typical UL approved systems<sup>1</sup>

### Penetrants

- Cables trays
- Busbars
- PVC or PE pipes
- Climasplits

≤ 500 mm width

≤ 300 mm width

≤ 110 mm dia

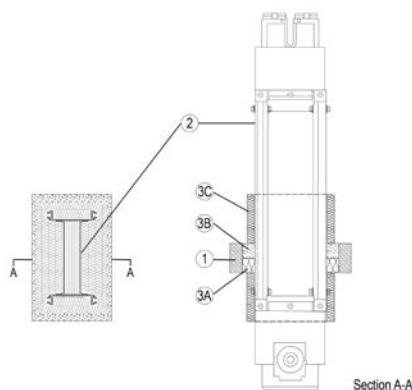
≤ 50 mm dia

## // Selected exemplary UL approved systems

### System No. C-AJ-6057 (busbar in wall and floor opening)

ANSI/UL 1479 (ASTM E814)

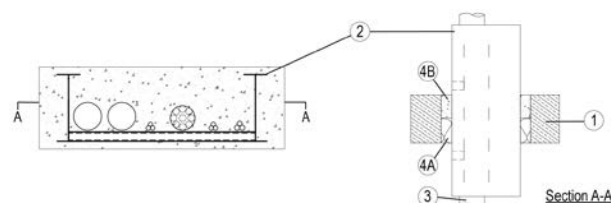
- F rating - 3 hours
- T rating - 1 hour



### System No. F-A-4028 (cable tray in floor opening)

ANSI/UL 1479 (ASTM E814)

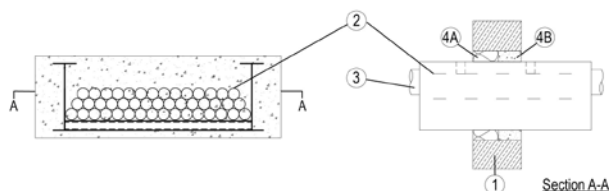
- F rating - 3 hours
- T rating - 1 hour



### System No. W-J-4112 (cable tray in wall opening)

ANSI/UL 1479 (ASTM E814)

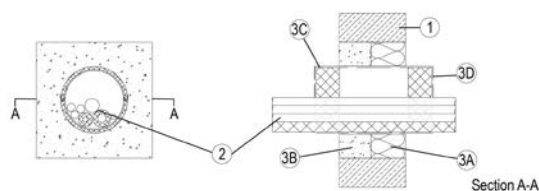
- F rating - 2 hours
- T rating - 1/2 hour



### System No. W-J-8099 (climasplit in wall opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 1 1/2 hours







## ArmaProtect MM20 for use in Through-Penetration Firestop Systems<sup>1</sup>

System No.	Application	Services	Additional product	F rating	T rating
C-AJ-6057	Concrete wall and floor	Aluminium or Copper Busbar with max dimensions 11¾ in. (300 mm) by 11¾ in. (300 mm).		3 Hr	1 Hr
F-A-2377	Concrete floor	PVC pipe, 4¼ in (110mm) diam, ⅛ in. (3.2 mm) wall thickness PE pipe, Nom 4¼ in (110mm) diam, ⅛ in. (3.4 mm) wall thickness PVC and PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW1	3 Hr	3 Hr
F-A-4028	Concrete floor	Cable tray, max max 2¾ in. (68 mm) depth		3 Hr	1 Hr
F-A-4030	Concrete floor	Cable tray, Nom 13¾ in. (350 mm) wide by max 4 in. (101.6mm) deep		3 Hr	1 Hr
F-A-8066	Concrete floor	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	Armaprotect CT, ArmaProtect ABLC	3 Hr	1½ Hr
W-J-2379	Concrete wall	PVC pipe, 4¼ in (110mm) diam, ⅛ in. (3.2 mm) wall thickness PE pipe, Nom 4¼ in (110mm) diam, ⅛ in. (3.4 mm) wall thickness PVC and PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW1	3 Hr	2 Hr
W-J-4110	Concrete wall	Cable tray, Nom 19⅝ in. (500 mm) wide by max 6⅜ in. (163 mm) deep		1½ Hr	0 Hr
W-J-4112	Concrete wall	Cable tray, Nom 19¾ in. (500 mm) wide by max 4 in. (102 mm) deep		2 Hr	½ Hr
W-J-8099	Concrete wall	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	Armaprotect CT, ArmaProtect ABLC	3 Hr	1½ Hr

<sup>1</sup> See relevant UL systems for further installation details, see Annex



Brief description	ArmaProtect MM20 is a fibre-free dry firestop mortar used to maintain the fire resistance performance of fire penetrations in wall and floors.
Material type	Fibre-free dry mortar.
Additional material information	4.0–5.0 l water + 25 kg dry mortar ≈ 15–18 l ready-to-use wet mortar ≈ 15–18 l volume after hardening.
Product colour range	Grey
Product range	Available as a 25 kg bag of mortar.
Applications	Firestop mortar for mixed fire seals in walls and floors, cables, cable bundles and cable trays and combustible pipes.
Installation	For professional use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.
Declaration of Performance (DoP)	ArmaProtect MM20

#### Approvals and compliance

Specification compliance	<ul style="list-style-type: none"> <li>UL acc. UL 1479 (ASTM E814)</li> </ul>
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Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	5 °C to 200 °C (41 °F to 392 °F)	
Application temperature	5 °C to 25 °C (41 °F to 77 °F)	
Storage and transportation temperature	5 °C to 25 °C (41 °F to 77 °F)	
<b>Mechanical properties</b>		
Dry bulk density	1.75 KG/DM3 ± 10 %	EN 998-2
Bulk density	2000 kg/m3 ± 10 %	EN 998-2
Pressure resistance	M 20	EN 998-2
<b>Fire performance</b>		
Reaction to fire	Class A1	EN 13501-1
Resistance to fire	See Annex	
<b>Health and environment</b>		
Emission of dangerous substances	No dangerous substances.	ETAG 026-02
<b>Other technical features</b>		
Cure time	Fully cured after approximately 28 days.	
Safety information	Please refer to the safety data sheet available on our website.	
Shelf life	Can be kept for at least 12 months unopened if stored properly.	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost.	
Approved UL Systems	C-AJ-6057, F-A-2377, F-A-4028, F-A-4030, F-A-8066, W-J-2379, W-J-4110, W-J-4112, W-J-8099.	



# ArmaProtect CB

## Coated firestop board system

### INSTRUCTIONS FOR USE

The recommended application temperature is between 5 °C and 25 °C and relative humidity of less than 85%. Ensure that surfaces to be coated are free of impurities and old coatings.

- ArmaProtect ABLC: Use brush, roller or airless sprayer (nozzle orifice > 0.48mm / 0.019").
- ArmaProtect ABLF: Use spatula.

**1**

X, Y, Z = !

**2**

ArmaProtect ABLC, FW1, FW2?

≥ 20 mm

masking tape

**3**

ArmaProtect ABLC

**4**

optional: ArmaProtect CB

**5**

ArmaProtect ABLF

**6**

**7**

ArmaProtect ABLF

1 loose mineral wool

2 ABLF

**8**

ArmaProtect ABLC

mm ?

**9**

optional: ArmaProtect FW1 or FW2

### // Consumption guide

Solid content (per weight): 66 - 68%

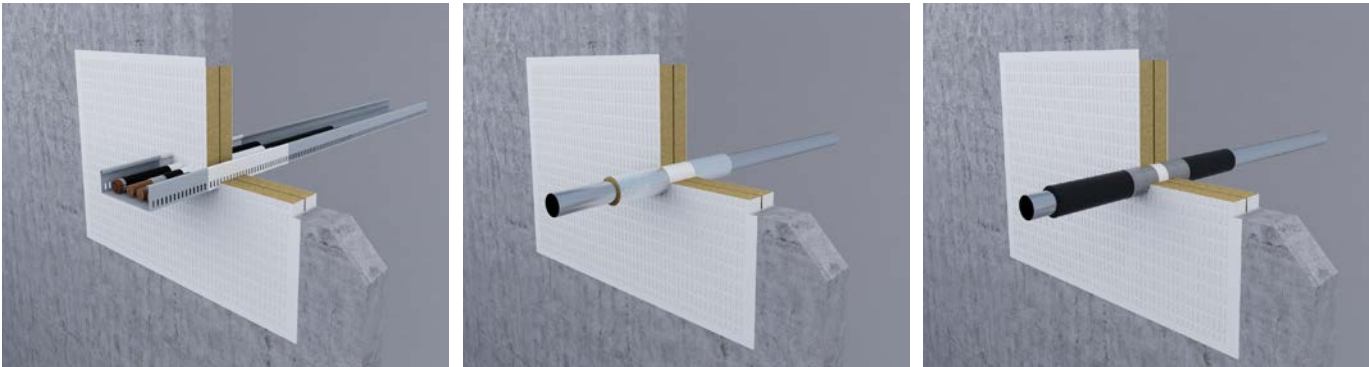
Applied material	Wet film material	Dry film material
1,000 g/m <sup>2</sup>	ca. 900 µm	ca. 500 µm
2,000 g/m <sup>2</sup>	ca. 1,800 µm	ca. 1,000 µm
3,200 g/m <sup>2</sup>	ca. 2,700 µm	ca. 1,600 µm
4,000 g/m <sup>2</sup>	ca. 3,600 µm	ca. 2,000 µm

Take note of potential material loss during application at the job site.



# MAIN APPLICATIONS

## ACC. ETA-22/0063



**Single board system (1 x mineral wool board 60 mm, 2 side coated)<sup>1</sup>**

Base material	Drywall, concrete wall, aerated concrete wall, masonry wall, concrete floor
Base material thickness	≥ 100 mm (wall) ≥ 125 mm (floor)
Seal thickness	≥ 60 mm (wall) ≥ 60 mm (floor)
Maximum seal size (wall)	1175 mm x 1200 mm
Maximum seal size (floor)	1200 mm x 2400 mm or 800 x ∞
Penetrants	up to EI 90 <sup>1</sup>
<ul style="list-style-type: none"><li>• Cables ≤ Ø 80 mm<sup>2</sup></li><li>• Cable bundles ≤ Ø 100 mm (with cables ≤ Ø 21 mm)<sup>2</sup></li><li>• Cable trays<sup>2</sup></li><li>• Plastic conduits ≤ Ø 32 mm (with cables ≤ Ø 21 mm)<sup>2</sup></li><li>• Plastic conduit bundles ≤ Ø 100 mm (conduits ≤ Ø 32 mm, with cables ≤ Ø 21 mm)<sup>2</sup></li><li>• PE lines "speed pipes" (24 x ≤ Ø 7.0 mm, 7 x ≤ Ø 10.0 mm, 5 x ≤ Ø 12.0 mm)<sup>1</sup></li><li>• Non-combustible pipe with mineral wool insulation (steel pipes ≤ Ø 219.1 mm, copper pipes ≤ Ø 88.9 mm)<sup>1</sup></li><li>• Non-combustible pipe with FEF insulation (steel pipes ≤ Ø 170 mm, copper pipes ≤ Ø 108 mm)<sup>1</sup></li><li>• Multi-layer composite pipes ≤ Ø 63 mm<sup>1</sup></li><li>• Combustible pipes ≤ Ø 110 mm<sup>1</sup></li><li>• HVAC split-line-combinations<sup>1</sup></li></ul>	

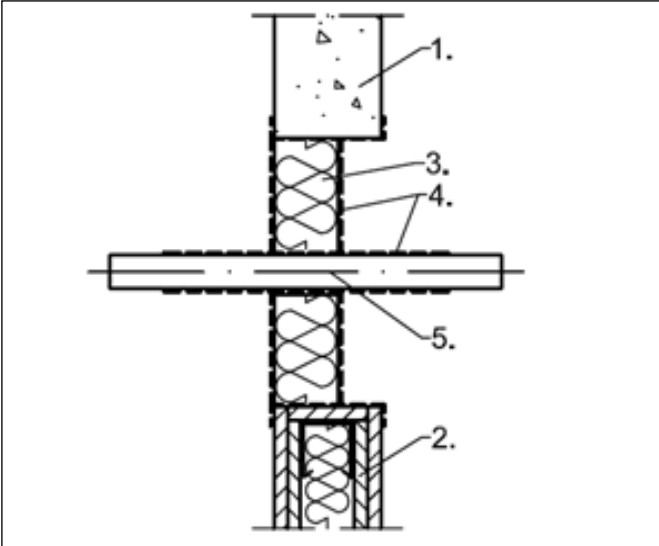
<sup>1</sup> See ETA-22/0063 for further installation details.

<sup>2</sup> Cables / cable bundles / cable trays to be coated with ArmaProtect ABLC or wrapped with ArmaProtect FW2, see further details in the ETA-22/0063



// Typical ETA approved systems<sup>1</sup>

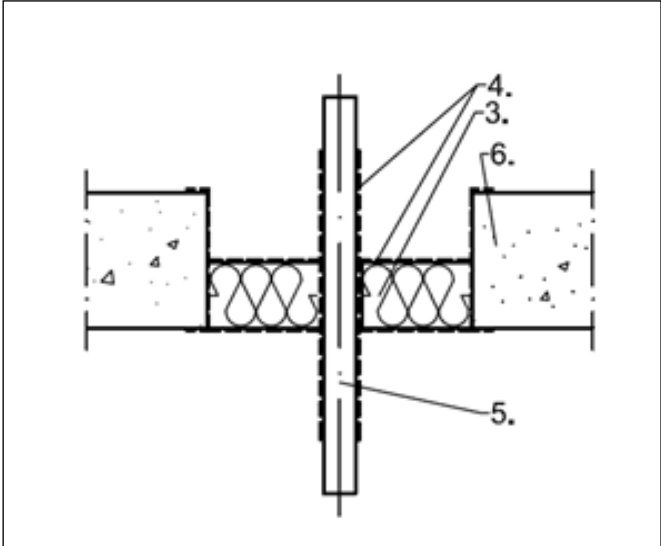
Wall application



Legend

- 1. Rigid wall  $\geq 100$  mm
- 2. Flexible wall  $\geq 100$  mm
- 3. Mineral wool board
- 4. ArmaProtect ABLC Firestop coating
- 5. Cable

Floor application



Legend

- 3.. Mineral wool board
- 4. ArmaProtect ABLC Firestop coating
- 5. Cable
- 6. Rigid floor  $\geq 125$  mm

Double board system (2 x mineral wool board 60mm, 1 side coated)<sup>1</sup>

Base material	Drywall, concrete wall, aerated concrete wall, masonry wall, concrete floor
Base material thickness	$\geq 100$ mm (wall) $\geq 150$ mm (floor)
Seal thickness	$\geq 120$ mm (wall) $\geq 150$ mm (floor)
Maximum seal size (wall)	1400 mm x 2000 mm
Maximum seal size (floor)	1400 mm x 2000 mm
Penetrants	up to EI 120 <sup>1</sup>
<ul style="list-style-type: none"><li>• Cables <math>\leq \varnothing 80</math> mm<sup>2</sup></li><li>• Cable bundles <math>\leq \varnothing 100</math> mm (with cables <math>\leq \varnothing 21</math> mm)<sup>2</sup></li><li>• Cable trays<sup>2</sup></li><li>• Plastic conduits <math>\leq \varnothing 32</math> mm (with cables <math>\leq \varnothing 21</math> mm)<sup>2</sup></li><li>• Plastic conduit bundles <math>\leq \varnothing 100</math> mm (conduits <math>\leq \varnothing 32</math> mm, with cables <math>\leq \varnothing 21</math> mm)<sup>2</sup></li><li>• PE lines "speed pipes" (24 x <math>\leq \varnothing 7.0</math> mm, 7 x <math>\leq \varnothing 10.0</math> mm, 5 x <math>\leq \varnothing 12.0</math> mm)<sup>2</sup></li><li>• Non-combustible pipe with mineral wool insulation (steel pipes <math>\leq \varnothing 323.9</math> mm, copper pipes <math>\leq \varnothing 108</math> mm)<sup>1</sup></li><li>• Non-combustible pipe with FEF insulation (steel pipes <math>\leq \varnothing 170</math> mm, copper pipes <math>\leq \varnothing 108</math> mm)<sup>1</sup></li><li>• Multi-layer composite pipes <math>\leq \varnothing 63</math> mm<sup>1</sup></li><li>• Combustible pipes <math>\leq \varnothing 160</math> mm<sup>1</sup></li><li>• HVAC split-line-combinations<sup>1</sup></li></ul>	

<sup>1</sup> See ETA-22/0063 for further installation details.

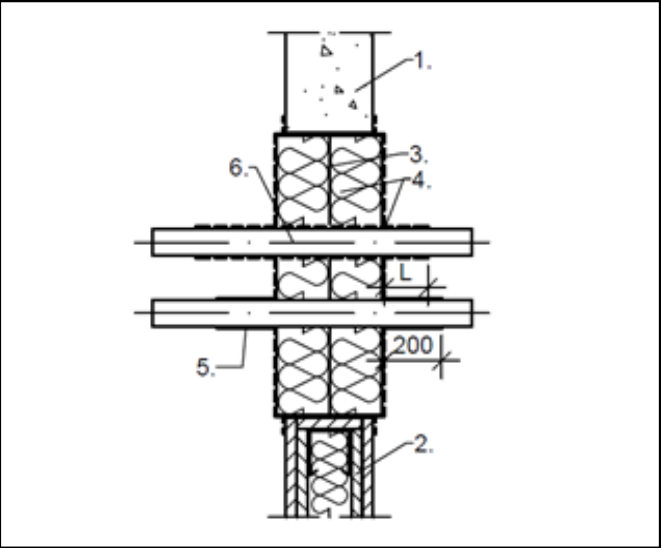
<sup>2</sup> Cables / cable bundles / cable trays to be coated with ArmaProtect ABLC or wrapped with ArmaProtect FW2, see further details in the ETA-22/0063.

<sup>1</sup> See ETA 22/0063 for further installation details.



// Typical ETA approved systems<sup>1</sup>

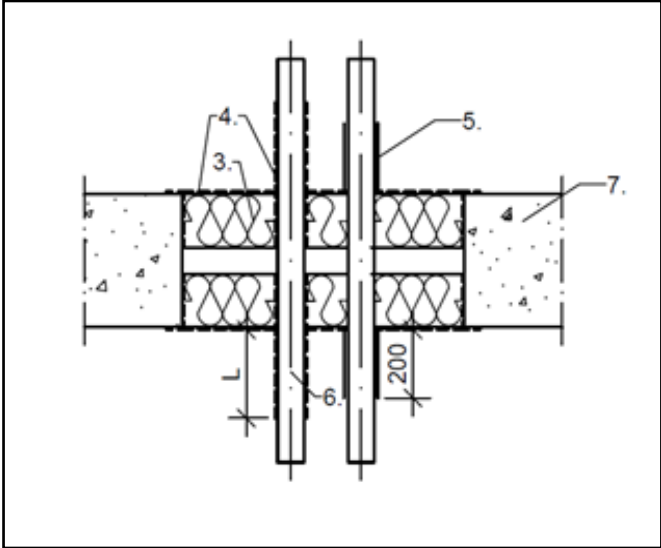
Wall application



Legend

- 1. Rigid wall ≥100 mm
- 2. Flexible wall ≥100 mm
- 3. Mineral wool board
- 4. ArmaProtect ABLC Firestop coating
- 5. ArmaProtect FW2 Firestop wrap
- 6. Cable

Floor application



Legend

- 3. Mineral wool board
- 4. ArmaProtect ABLC Firestop coating
- 5. ArmaProtect FW2 Firestop wrap
- 6. Cable
- 7. Rigid floor ≥150 mm

Quadruple board system (4 x mineral wool board 60 mm, 1 side coated)<sup>1</sup>

Base material	Concrete wall, aerated concrete wall, masonry wall, concrete floor
Base material thickness	≥ 240 mm (wall) ≥ 200 mm (floor)
Seal thickness	≥ 240 mm (wall) ≥ 240 mm (floor)
Maximum seal size (wall)	600 mm x 600 mm
Maximum seal size (floor)	600 mm x ∞
Penetrants	up to EI 240 <sup>1</sup>
<ul style="list-style-type: none"><li>• Cables ≤ Ø 80 mm<sup>2</sup></li><li>• Cable bundles ≤ Ø 100 mm (with cables ≤ Ø 21 mm)<sup>2</sup></li><li>• Cable trays<sup>2</sup></li></ul>	

<sup>1</sup> See ETA-22/0063 for further installation details.  
<sup>2</sup> Cables / cable bundles / cable trays to be wrapped with ArmaProtect FW2, see further details in the ETA-22/0063.

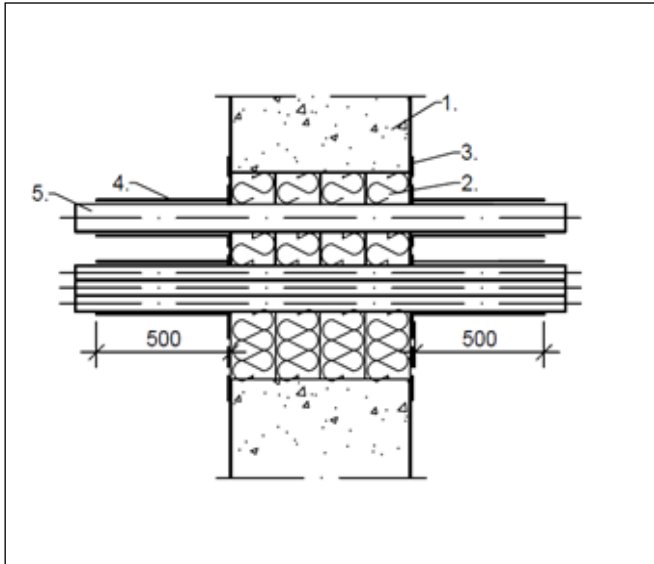
<sup>1</sup> See ETA 22/0063 for further installation details.





## // Typical ETA approved systems<sup>1</sup>

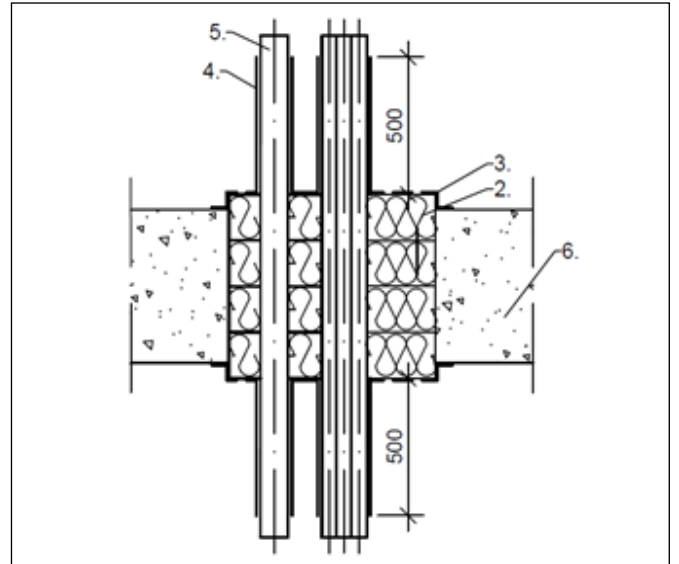
### Wall application



#### Legend

1. Rigid wall  $\geq 240$  mm
2. Mineral wool board
3. ArmaProtect ABLC Firestop coating
4. ArmaProtect FW2 Firestop wrap
5. Cable

### Floor application



#### Legend

2. Mineral wool board
3. ArmaProtect ABLC Firestop coating
4. ArmaProtect FW2 Firestop wrap
5. Cable
6. Rigid floor  $\geq 200$  mm

<sup>1</sup> See ETA 22/0063 for further installation details.



# OTHER APPROVED SYSTEMS

## ACC. ETA-22/0063



Sealing system made of mineral wool and ArmaProtect ABLF Firestop Filler<sup>1</sup>

Base material	Concrete wall, aerated concrete wall, masonry wall, concrete floor
Base material thickness	≥ 100 mm (wall) ≥ 150 mm (floor)
Seal thickness	≥ 100 mm (wall) ≥ 150 mm (floor)
Maximum seal size (wall)	500 mm x 200 mm (rectangular) Ø 350 mm (round)
Maximum seal size (floor)	350 mm x 350 mm (rectangular) Ø 160 mm (round)
Penetrants	up to EI 90 <sup>1</sup>
<ul style="list-style-type: none"><li>• Cables ≤ Ø 21 mm<sup>1</sup></li><li>• Cable bundles ≤ Ø 100 mm (with cables ≤ Ø 21 mm)<sup>1</sup></li><li>• Plastic conduits ≤ Ø 32 mm (with cables ≤ Ø 21 mm)<sup>2</sup></li><li>• Plastic conduit bundles ≤ Ø 70 mm (conduits ≤ Ø 16 - 50 mm, with cables ≤ Ø 21 mm)<sup>2</sup></li><li>• Plastic conduit bundles ≤ Ø 100 mm (conduits ≤ Ø 32 mm, with cables ≤ Ø 21 mm)<sup>2</sup></li><li>• Metal conduits ≤ Ø 16 mm (with cables ≤ Ø 14 mm) and ≤ Ø 50 mm (with cables ≤ Ø 21 mm)<sup>2</sup></li><li>• Combustible pipes ≤ Ø 32 mm<sup>1</sup></li><li>• Combustible pipes ≤ 219.1 mm (with mineral wool insulation)<sup>1</sup></li><li>• HVAC split-line-combinations<sup>1</sup></li></ul>	

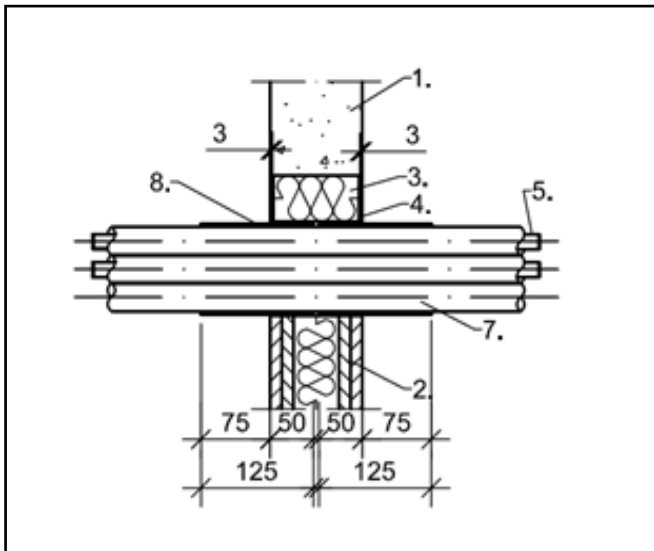
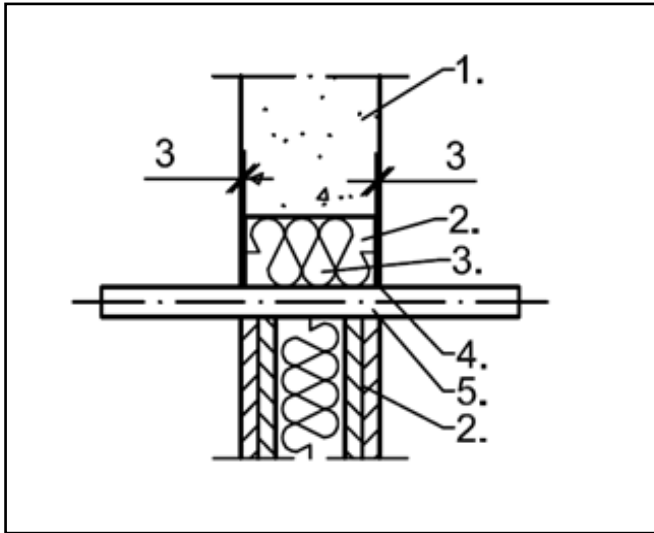
<sup>1</sup> See ETA-22/0063 for further installation details.  
<sup>2</sup> Plastic conduits/plastic conduit bundles to be wrapped with ArmaProtect FW2, see further details in the ETA-22/0063.

<sup>1</sup> See ETA 22/0063 for further installation details.

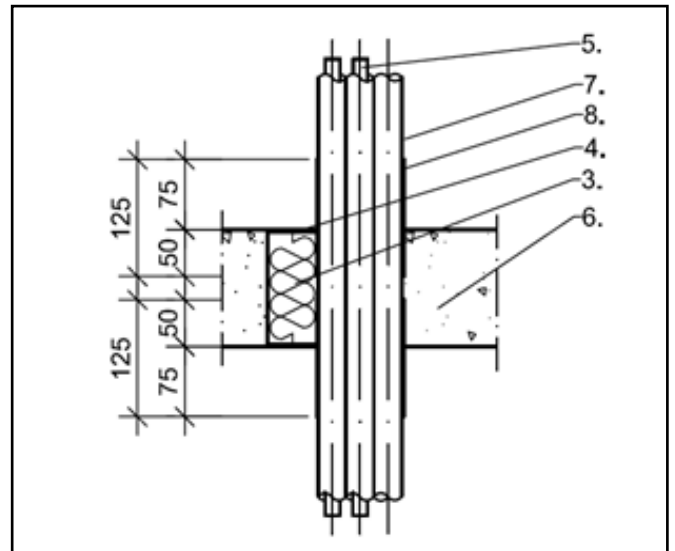
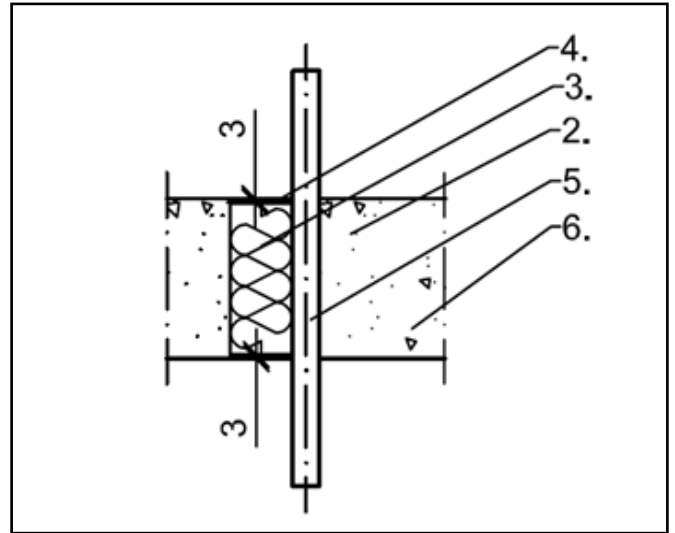


## // Typical ETA approved systems<sup>1</sup>

### Wall application



### Floor application



#### Legend

1. Rigid wall  $\geq 100$  mm
2. Flexible wall  $\geq 100$  mm
3. Loose mineral wool
4. ArmaProtect ABLF Firestop filler
5. Cable
6. Rigid floor  $\geq 150$  mm
7. Conduits
8. ArmaProtect FW2 Firestop wrap



# UL APPROVED SYSTEMS

## // Typical UL approved systems<sup>1</sup>

Penetrants	
• Blank openings	≤ 400 mm x 600 mm
• Cable trays	≤ 500 mm width
• Cable bundles	≤ Ø 150 mm
• PE-HD conduit bundles	≤ Ø 100 mm (conduits Ø ≤ 32 mm)
• Copper tubes	≤ Ø 32 mm
• Waveguides	≤ Ø 63 mm
• Speed pipe bundles	
• Bus bars	
• Steel pipes	≤ Ø 323.9 mm
• Copper pipes	≤ Ø 159 mm
• PE/Al/PE composite pipes	≤ Ø 32 mm
• PVC pipes	≤ Ø 110 mm
• PE pipes	≤ Ø 110 mm
• PP-HT pipes	≤ Ø 100 mm
• PP pipes	≤ Ø 75 mm
• AB/PVC pipes	≤ Ø 75 mm
• Clima split bundles	
• Ducts	up to 400 mm x 300 mm (rectangular) up to Ø 300 mm (round)

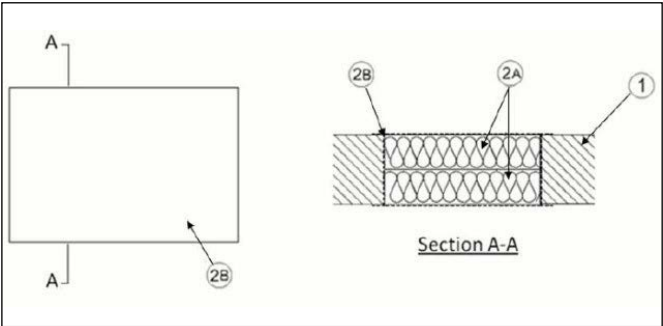
<sup>1</sup>See relevant UL system for further installation details.

## // Selected exemplary UL approved systems

### System No. C-AJ-0181 (blank floor opening)

ANSI/UL 1479 (ASTM E814)

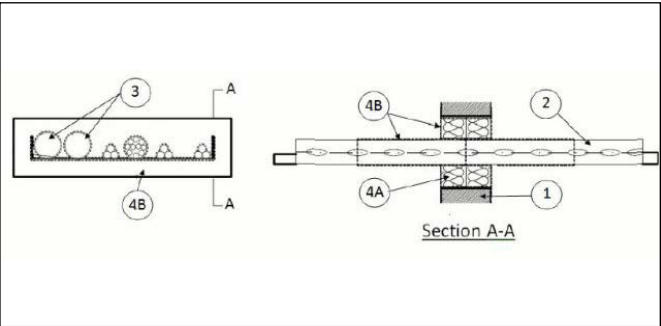
- F rating - 3 hours
- T rating - 3 hours



### System No. W-J-4106 (cable tray in wall opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 2 hours





## ArmaProtect ABLC for use in Through-Penetration Firestop Systems<sup>1</sup>

System No.	Application	Services	Additional product	F rating	T rating
C-AJ-0181	Concrete wall and floor	Blank opening, rectangular with max dimensions of 15-3/4 in. (400 mm) by 10-5/8 in. (270 mm)		3 Hr	3 Hr
C-AJ-1753	Concrete wall and floor	Pipes/tubes, max 6-1/4 in. (159 mm) diameter Schedule 5 (or heavier) steel pipe or max 6-1/4 in. (159 mm) diameter Type M (or heavier) copper tubing		3 Hr	0 Hr
C-AJ-1754	Concrete wall and concrete floor	Pipes/Tubes, max 3-1/2 in. (89 mm) diameter Schedule 10 (or heavier) steel pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect CT	3 Hr	1/2 Hr
C-AJ-1757	Concrete wall and concrete floor	Pipes/Tubes, nominal 12-3/4 in. (323.9 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe		3 Hr	0 Hr
C-AJ-2927	Concrete wall and concrete floor	Pipes/tubes, nominal 1-1/4 in (32 mm) diameter, 1/8 in. (3 mm) wall thickness PE/AL/PE composite plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW2	3 Hr	3 Hr
C-AJ-2928	Concrete wall and floor	Pipes/tubes, nominal 1-1/4 in (32 mm) diameter, 1/16 in. (1.9 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW1	3 Hr	3 Hr
C-AJ-2929	Concrete wall and floor	Pipes/tubes, nominal 4-1/4 in (110 mm) diam 1/8 in. (3.4 mm) wall thickness PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW1	3 Hr	3 Hr
C-AJ-2930	Concrete wall and floor	Pipes/tubes, nominal 4-1/4 in. (110 mm) diam (or smaller) 3/8 in. (10 mm) wall thickness Aluminium composite pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems		3 Hr	3 Hr
C-AJ-2931	Concrete wall and floor	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect CT	3 Hr	3 Hr
C-AJ-4118	Concrete wall and floor	Cable Tray, max 4 in (100 mm) wide by 2-3/8 in. (60 mm) deep		3 Hr	2 Hr
C-AJ-8329	Concrete wall and concrete floor	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect FW2	3 Hr	3 Hr



## ArmaProtect ABLC for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
F-A-0046	Concrete floor	Blank opening, rectangular with max dimensions of 15-3/4 in. (400 mm) by 23-5/8 in. (600 mm).		3 Hr	2 Hr
F-A-1209	Concrete floor	Pipes/tubes, nominal 1-1/4 in. (32 mm) diameter (or smaller) Type M (or heavier) copper tube or nominal 1-1/4 in. (32 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe		3 Hr	0 Hr
F-A-1210	Concrete floor	Duct, rectangular, max 7-7/8 in. (200 mm) by 4 in. (100 mm) galvanized steel duct		3 Hr	2 Hr
F-A-1211	Concrete floor	Duct, rectangular, max. 15-3/4 in. (400 mm) by 11-3/4 in. (300 mm) galvanized steel duct		3 Hr	1/2 Hr
F-A-1213	Concrete floor	Duct, round, 11-3/4 in. (300 mm) galvanized steel duct		3 Hr	1 1/2 Hr
F-A-2373	Concrete floor	Pipes/tubes, nominal 1-1/4 in (32mm) diameter, 1/8 in. (3 mm) wall thickness PE/AL/PE composite plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW2	2 Hr	1 Hr
F-A-2374	Concrete floor	Pipes/tubes, nominal 4 in (100mm) diameter, 1/8 in. (2.7 mm) wall thickness PP-HT pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.or vented (drain, waste or vent) piping systems	ArmaProtect FW1	3 Hr	1 1/2 Hr
F-A-2375	Concrete floor	Pipes/tubes, nominal 4-1/4 in (110mm) diameter, 1/8 in. (2.7 mm) wall thickness PE/AL/PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems		3 Hr	1 1/2 Hr
F-A-2376	Concrete floor	Pipes/tubes, nominal 3 in (76 mm) diameter, 1/8 in. (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW1	3 Hr	2 Hr
F-A-2378	Concrete floor	Pipes/tubes, nominal 4-1/4 in (110mm) diam 1/8 in. (3,2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system	ArmaProtect FW1	3 Hr	3 Hr
F-A-2383	Concrete floor	Pipes/tubes, nominal 2.95 in (75 mm) diam 0.14 in (3.6 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		3 Hr	2 Hr





## ArmaProtect ABLC for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
F-A-2384	Concrete floor	Pipes/tubes, nominal 2.95 in (75 mm) diam 0.14 in (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
F-A-2385	Concrete floor	Pipes/tubes, nominal 2.95 in (75 mm) diam 0.18 in (4.5 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		2 Hr	2 Hr
F-A-3081	Concrete floor	Cables, single or tight bundle of cables to be installed within the opening on a cable tray. Aggregate cross-sectional area of cables in opening to have a visual fill of min 0% to max 50%		3 Hr	1 Hr
F-A-3082	Concrete floor	Single hollow optic cable (waveguide) with max diam 2-1/2 in. (63 mm)		3 Hr	1 1/2 Hr
F-A-3084	Concrete floor	Cables bundle of 5-3/8" (137 mm) diameter		3 Hr	1/2 Hr
F-A-3083	Concrete floor	Cable bundle of 6" (150 mm) diameter	ArmaProtect FW1	3 Hr	1 1/2 Hr
F-A-4024	Concrete floor	Cables, aggregate cross-sectional area of cables in cable tray not to exceed 39 percent of the cross-sectional area of the cable tray based on a max 2-5/8 in. (68 mm) cable loading depth within the tray		3 Hr	1 1/2 Hr
F-A-4027	Concrete floor	Cables, aggregate cross-sectional area of cables in cable tray not to exceed 13 percent of the cross-sectional area of the cable tray based on a max 2-3/4 in. (68 mm) cable loading depth within the tray		3 Hr	1 Hr
F-A-4029	Concrete floor	Cable tray, nom 13-3/4 in. (350 mm) wide by max 4 in. (101.6 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. (2.3 mm) thick aluminium		3 Hr	1 1/2 Hr
F-A-5080	Concrete floor	Pipes/tubes, nominal 6-1/4 in (159 mm) diameter, Schedule M copper pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW2	3 Hr	3 Hr
F-A-5081	Concrete floor	Pipes/tubes, nominal 5 in. (125 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe		3 Hr	3 Hr



## ArmaProtect ABLC for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
F-A-8060	Concrete floor	Max 1/C 148 mm diameter (or smaller), copper conductor cable with XLPE insulation and HDPE jacket, nominal 1-1/2 in (37mm) diameter PE-HD SRV-G 7x10 tc 'speed pipe' for use in closed (process or supply) piping systems and nominal 2-1/4 in. (56 mm) diameter HD 240 synthetic rubber hydraulic hose for use in closed (process or supply) piping systems	ArmaProtect FW2	3 Hr	2 Hr
F-A-8063	Concrete floor	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect FW2	3 Hr	1 Hr
F-A-8065	Concrete floor	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect FW2	3 Hr	3 Hr
F-A-8066	Concrete floor	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect MM20	3 Hr	1 1/2 Hr
W-J-0034	Concrete wall	Blank opening, rectangular or circular with max dimensions of 2.1 in. (52 mm)		2 Hr	2 Hr
W-J-1328	Concrete wall	Pipes/tubes, nominal 5/8 in. (17 mm) diameter (or smaller) Schedule 40 (or heavier) steel pipe		3 Hr	3 Hr
W-J-1329	Concrete wall	Pipes/tubes, nominal 1-1/4 in. (32 mm) diameter (or smaller) Type M (or heavier) copper tube or nominal 1-1/4 in. (32 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe		3 Hr	1/2 Hr
W-J-1330	Concrete wall	Duct, rectangular, max 7-7/8 in. (200 mm) by 4 in. (100 mm) galvanized steel duct		3 Hr	1 1/2 Hr
W-J-1331	Concrete wall	Duct, rectangular, max 15-3/4 in. (400 mm) by 11-3/4 in. (300 mm) galvanized steel duct		3 Hr	1 Hr
W-J-1333	Concrete wall	Duct, round, max 11-3/4 in. (300 mm) galvanized steel duct		3 Hr	0 Hr
W-J-1334	Concrete wall	Pipes/tubes, nominal 4 in. (100 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe		3 Hr	0 Hr
W-J-2376	Concrete wall	Cables bundle of 5-3/8" (137 mm) diameter		3 Hr	1 1/2 Hr
W-J-2377	Concrete wall	Nominal 4 in (100mm) diameter, 1/8 in. (2.7 mm) wall thickness PP-HT pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.	ArmaProtect FW1	3 Hr	3 Hr



## ArmaProtect ABLC for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
W-J-2378	Concrete wall	Pipes/tubes, nominal 3 in (75 mm) diameter, 1/8 in. (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW1	3 Hr	3 Hr
W-J-2380	Concrete wall	Pipes/tubes, nominal 4-1/4 in (110mm) diam, 1/8 in. (3,2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW1	3 Hr	2 Hr
W-J-3274	Concrete wall	Cables, single or tight bundle of cables to be installed within the opening on a cable tray. Aggregate cross-sectional area of cables in opening to have a visual fill of min 0% to max 21.73%		3 Hr	2 Hr
W-J-3275	Concrete wall	Single hollow optic cable (waveguide) with max diam 2-1/2 in. (63 mm)		3 Hr	1 Hr
W-J-3276	Concrete wall	Bundle of 5-3/8" (137 mm) diameter of the following types and sizes of cables may be used: A. Max 20/C No. 5/8" (16.2 mm) diameter (or smaller), copper conductor cable with PE insulation and PE jacket.	ArmaProtect CT	3 Hr	1-1/2 Hr
W-J-4106	Concrete wall	Cable tray, max 20 in. (500 mm) wide by max 2-3/8 in. (60 mm) deep		3 Hr	2 Hr
W-J-4109	Concrete wall	Cable tray, nominal 19-5/8 in. (500 mm) wide by max 6-3/8 in. (163 mm) deep		3 Hr	1/2 Hr
W-J-4111	Concrete wall	Cable tray, nominal 3-3/4 in. (350 mm) wide by max 6-3/8 in. (163 mm) deep		3 Hr	1 Hr
W-J-4114	Concrete wall	Cable tray, max 4 in. (100 mm) wide by max 2-3/8 in. (60 mm) deep		2 Hr	1 1/2 Hr
W-J-5210	Concrete wall	Pipes/tubes, nominal 6-1/4 in (159mm) diameter, Schedule M copper pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW2	3 Hr	0 Hr
W-J-5211	Concrete wall	Pipes/tubes, nominal 5 in. (125 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe		3 Hr	1 1/2 Hr



## ArmaProtect ABLC for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
W-J-8089	Concrete wall	Max 1/C 148 mm diameter (or smaller), copper conductor cable with XLPE insulation and HDPE jacket, nominal 1-1/2 in (37mm) diameter PE-HD SRV-G 7x10 tc 'speed pipe' for use in closed (process or supply) piping systems and nominal 2-1/4 in. (56 mm) diameter HD 240 synthetic rubber hydraulic hose for use in closed (process or supply) piping systems	ArmaProtect FW2	2 Hr	1 1/2 Hr
W-J-8092	Concrete wall	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect FW2	2 Hr	1/2 Hr
W-J-8094	Concrete wall	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect FW2	3 Hr	1 1/2 Hr
W-J-8095	Concrete wall	Pipe/tubes, max 4-3/8 in. (110 mm) diameter (or smaller), 1/8 in. (2.7 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems and max. 2-3/8 in. (60 mm) diameter cable bundle without separation	ArmaProtect FW1	2 Hr	1 Hr
W-J-8096	Concrete wall	Cables and conduits max. 2-3/8 in. (100 mm) diameter semicircle bundles	ArmaProtect CT ML	2 Hr	2 Hr
W-J-8097	Concrete wall	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect FW2	2 Hr	1 1/2 Hr
W-J-8098	Concrete wall	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, with cables	ArmaProtect FW2	2 Hr	1 1/2 Hr
W-J-8099	Concrete wall	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect MM20	3 Hr	1 1/2 Hr
W-L-0065	Dry wall (light partition wall)	Blank opening, rectangular with max size of framed opening to be 15-3/4 in. (400 mm) high by 19-5/8 in. (500 mm) wide		2 Hr	2 Hr
W-L-1606	Dry wall (light partition wall)	Pipes/tubes, max 3-1/2 in. (89 mm) diameter Schedule 10 (or heavier) steel pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems		2 Hr	1/2 Hr
W-L-1607	Dry wall (light partition wall)	Pipes/tubes, nominal 6-1/4 in. (159 mm) diameter (or smaller) Type M (or heavier) copper tube or nominal 6-1/4 in. (159 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe		2 Hr	0 Hr



## ArmaProtect ABLC for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
W-L-2819	Dry wall (light partition wall)	Pipes/tubes, 1-1/4 in (32mm) diameter, 1/16 in. (1.9 mm) wall thickness PVC plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems		2 Hr	1 1/2 Hr
W-L-2820	Dry wall (light partition wall)	Pipes/tubes, nom 4-3/8 in (110mm) diameter, 1/8 in. (2.7 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW1	2 Hr	1 1/2 Hr
W-L-2822	Dry wall (light partition wall)	Pipes/tubes, nominal 1 in (50mm) diameter, PE-HD plastic pipe 'Speed-Pipe' bundle for use in closed (process or supply) piping systems	ArmaProtect FW2	2 Hr	2 Hr
W-L-2823	Dry wall (light partition wall)	Pipes/tubes, nominal 2-1/2 in (63mm) diameter, 3/16 in. (4.5 mm) wall thickness multi-layer PE/AL/PE composite pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW2	1 Hr	0 Hr
W-L-2824	Dry wall (light partition wall)	Pipes/tubes, nominal 1-1/4 in (32mm) diameter, 3/16 in. (4.5 mm) wall thickness multi-layer PE/AL/PE composite pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect FW2	2 Hr	1 Hr
W-L-2825	Dry wall (light partition wall)	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect FW2	2 Hr	2 Hr
W-L-3479	Dry wall (light partition wall)	Cable bundle of max 4" (100 mm) diameter		2 Hr	1 Hr
W-L-3480	Dry wall (light partition wall)	Cable bundle of max 4-3/4" (120 mm) diameter	ArmaProtect CT	2 Hr	3/4 Hr
W-L-4109	Dry wall (light partition wall)	Cable tray, max 20 in. (500 mm) wide by max 2-3/8 in. (60 mm) deep		2 Hr	1 Hr
W-L-4110	Dry wall (light partition wall)	Cable tray, max 4 in. (100 mm) wide by max 2-3/8 in. (60 mm) deep	ArmaProtect MM20	2 Hr	1 1/2 Hr
W-L-4111	Dry wall (light partition wall)	Cable tray, max 4 in. (100 mm) wide by max 2-3/8 in. (60 mm) deep		2 Hr	1 1/2 Hr
W-L-7326	Dry wall (light partition wall)	Duct, rectangular, max 7-7/8 in. (200 mm) by 4 in. (100 mm) galvanized steel duct		2 Hr	2 Hr
W-L-7327	Dry wall (light partition wall)	Duct, rectangular, max 15-3/4 in. (400 mm) by 11-3/4 in. (300 mm) galvanized steel duct min. 18 AWG (1 mm)		2 Hr	1 Hr



## ArmaProtect ABLC for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
W-L-7328	Dry wall (light partition wall)	Duct, round, max 11-3/4 in. (300 mm) diameter galvanized steel duct, Min. 18 gauge (1 mm)		2 Hr	0 Hr
W-L-8136	Dry wall (light partition wall)	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect FW2	2 Hr	1 1/2 Hr
W-L-8137	Dry wall (light partition wall)	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect FW2	2 Hr	1 Hr
W-L-8138	Dry wall (light partition wall)	Pipe/tubes, max 4-3/8 in. (110 mm) diameter (or smaller), 1/8 in. (2.7 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems and max. 2-3/8 in. (60 mm) diameter cable bundle without separation	ArmaProtect FW1	2 Hr	1 Hr

<sup>1</sup> See relevant UL systems for further installation details, see Annex



## ArmaProtect ABLF for use in Through-Penetration Firestop Systems<sup>1</sup>

System No.	Application	Services	Additional product	F rating	T rating
F-A-2379	Concrete floor	Pipes/tubes, nominal 1-1/2 in (40 mm) diam 0.15 in (3.7 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		3 Hr	0 Hr
F-A-2380	Concrete floor	Pipes/tubes, nominal 1-1/2 in (40 mm) diam 0.12 in (3.0 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
F-A-2381	Concrete floor	Pipes/tubes, nominal 1-1/2 in (40 mm) diam 0.15 in (3.7 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
F-B-4010	Concrete floor	Cable tray, max two, nom 12 in. (300 mm) wide by max 2-3/8 in. (60 mm)	ArmaProtect CU	3 Hr	1 1/2 Hr
W-J-1335	Concrete wall	Pipes/tubes, max 3-1/2 in. (89 mm) diameter Schedule 10 (or heavier) steel pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect CT	2 Hr	2 Hr
W-J-2381	Concrete wall	Pipes/tubes, nominal 1 1/4 in (32 mm) diam 0.15 in (3.7 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-J-2382	Concrete wall	Pipes/tubes, nominal 1-1/4 in (32 mm) diam 0.12 in (3.0 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.		3 Hr	3 Hr
W-J-2383	Concrete wall	Pipes/tubes, nominal 1 1/4 in (32 mm) diam 0.15 in (3.7 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	0 Hr
W-J-2385	Concrete wall	Pipes/tubes, nominal 2.95 in (75 mm) diam 0.18 in (4.5 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		2 Hr	2 Hr
W-J-2386	Concrete wall	Pipes/tubes, nominal 2.95 in (75 mm) diam 0.14 in (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-J-2387	Concrete wall	Pipes/tubes, nominal 2.95 in (75 mm) diam 0.17 in (4.3 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		1/2 Hr	1/2 Hr





## ArmaProtect ABLF for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
W-L-2826	Dry wall (light partition wall)	Pipes/tubes, nominal 1-1/4 in (32 mm) diam 0.15 in (3.7 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-L-2827	Dry wall (light partition wall)	Pipes/tubes, nominal 1-1/4 in (32 mm) diam 0.12 in (3.0 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-L-2828	Dry wall (light partition wall)	Pipes/tubes, nominal 1-1/4 in (32 mm) diam 0.15 in (3.7 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	0 Hr
W-L-2830	Dry wall (light partition wall)	Pipes/tubes, nominal 2.95 in (75 mm) diam 0.18 in (4.5 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		2 Hr	2 Hr
W-L-2831	Dry wall (light partition wall)	Pipes/tubes, nominal 2.95 in (75 mm) diam 0.14 in (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-L-2832	Dry wall (light partition wall)	Pipes/tubes, nominal 2.95 in (75 mm) diam 0.17 in (4.3 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		1/2 Hr	1/2 Hr

<sup>1</sup> See relevant UL systems for further installation details, see Annex



## TECHNICAL DATA - ARMAPROTECT CB COATED BOARD SYSTEM

Brief description	ArmaProtect CB is an ablative coated board system to maintain the fire resistance performance of fire penetrations in walls and floors.
Material type	Mineral wool board with ablative firestop coating and ablative firestop filler mastic.
Additional material information	The entire system as well as the separate components (coated board, ablative firestop coating and ablative firestop filler mastic) are halogen- and solvent-free.
Product colour range	White
Special features	In a cured state, the ablative firestop coating (ArmaProtect ABLC) and ablative firestop filler mastic (ArmaProtect ABLF) are resistant against humidity, frost-dew-change and UV radiation.
Product range	Coated boards are packed as 4 pieces in a box. The length x width x height of the boards are as follows: - One-side coated board: 1000 mm x 600 mm x 60 mm with dry-film thickness of 0.7 mm - Two-side coated board: 1000 mm x 600 mm x 60 mm with dry-film thickness of 0.7 mm ArmaProtect ABLC ablative firestop coating is available in pails of 12.5 kg and 15 kg. ArmaProtect ABLF ablative firestop filler mastic is available as 310 ml cartridges with 12 cartridges packed in a carton.
Applications	Ablative coated board system for mixed fire seals in walls and floors for blank openings, mixed and multiple services, cables, cable bundles and cable trays and non-combustible and combustible pipes.
Installation	For professional use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.
Declaration of Performance (DoP)	ArmaProtect CB

### Approvals and compliance

Specification compliance	<ul style="list-style-type: none"> <li>ETA-22/0063 acc. EN 1366-3</li> <li>UL acc. UL 1479 (ASTM E814)</li> </ul>
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Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	-40°C to +70°C (-40°F to 158°F)	
Application temperature	5°C to 25°C (41°F to 77°F)	
Storage and transportation temperature	ArmaProtect CB Coated firestop board: 5°C to 25°C (41°F to 77°F) ArmaProtect ABLC Firestop coating: 5°C to 25°C (41°F to 77°F) ArmaProtect ABLF Firestop filler mastic: 5°C to 25°C (41°F to 77°F)	
<b>Mechanical properties</b>		
Density	ArmaProtect ABLC Firestop coating: 1.34 - 1.48 g/cm³ (at 20 °C) ArmaProtect ABLF Firestop filler mastic: 1.34 - 1.48 g/cm³ (at 20 °C)	
<b>Fire performance</b>		
Reaction to fire	Class E	EN 13501-1
Resistance to fire	See Annex	
<b>Health and environment</b>		
Emission of dangerous substances	No dangerous substances.	ETAG 026-02
Volatile organic compounds (VOC) content	ArmaProtect ABLC Firestop coating: < 50 g/l ArmaProtect ABLF Firestop filler mastic: < 50 g/l	GS-11, Green Seal Standard
<b>Other technical features</b>		
Durability and serviceability	Use category type X.	EOTA TR 024
Cure time	Dust-dry: > 4 h (23 °C / 65% relative humidity) 2nd layer: > 8 h (23 °C / 65% relative humidity) Fully cured: > 4 d (23 °C / 65% relative humidity)	
Safety information	Please refer to the safety data sheet available on our website.	
Shelf life	Can be kept for at least 18 months if unopened and stored properly. <sup>1</sup>	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost.	

<sup>1</sup> ArmaProtect ABLC Firestop coating and ArmaProtect ABLF Firestop filler mastic only.

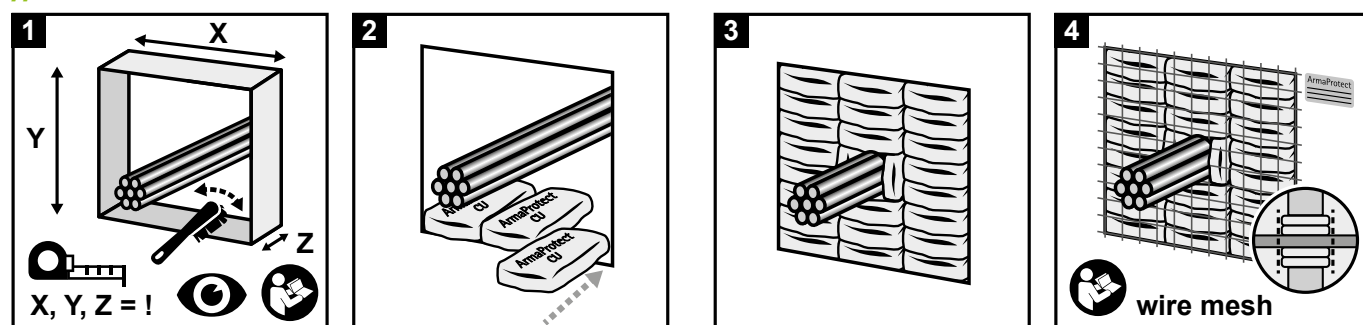


# ArmaProtect CU

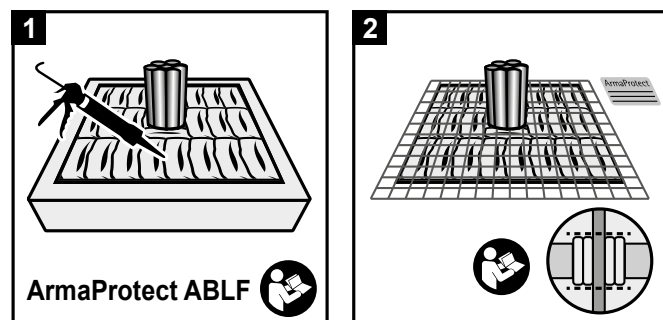
## Firestop cushion

### INSTRUCTIONS FOR USE

#### // Wall installation



#### // Floor installation



#### // Consumption guide

Product	Size (mm)	Consumption
ArmaProtect CU Firestop cushion large	300 x 200 x 100	ca. 50 pieces / m <sup>2</sup>
ArmaProtect CU Firestop cushion medium	300 x 200 x 40	ca. 120 pieces / m <sup>2</sup>
ArmaProtect CU Firestop cushion small	200 x 150 x 40	For small openings and for filling in between and around cables



# UL APPROVED SYSTEMS

## // Typical UL approved systems<sup>1</sup>

### Penetrants

- Cable trays  $\leq 300$  mm width

<sup>1</sup>See relevant UL system for further installation details.

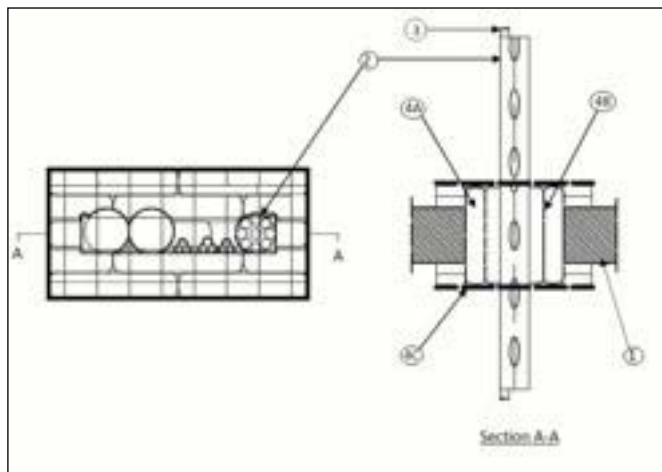


## // Selected exemplary UL approved systems

### System No. F-B-410 (cable tray in floor opening)

ANSI/UL 1479 (ASTM E814)

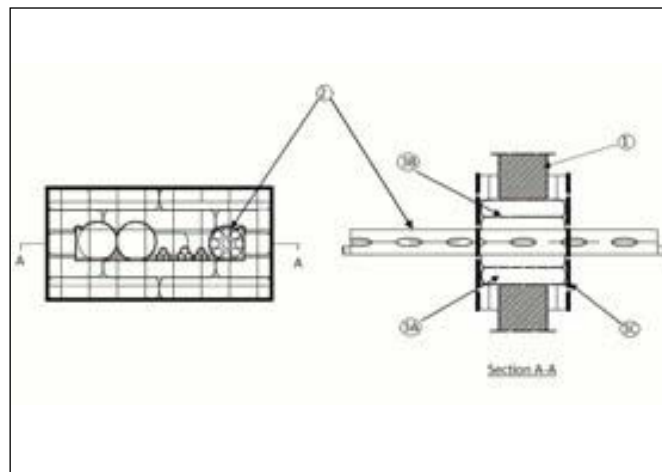
- F rating - 3 hours
- T rating - 1½ hours



### System No. W-J-4113 (cable tray in wall opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 3 hours





ArmaProtect CU for use in Through-Penetration Firestop Systems<sup>1</sup>

System No.	Application	Services	Additional product	F rating	T rating
F-B-4010	Concrete floor	Cable tray, max two, nom 12 in. (300 mm) wide by max 2-3/8 in. (60 mm)	ArmaProtect ABLF	3 Hr	1 1/2 Hr
W-J-4113	Concrete wall	Cable tray, max two, nom 12 in. (300 mm) wide by max 2-3/8 in. (60 mm)		3 Hr	3 Hr

<sup>1</sup> See relevant UL systems for further installation details, see Annex



## TECHNICAL DATA - ARMAPROTECT CU FIRESTOP CUSHION

Brief description	ArmaProtect CU is a cushion-based firestop product that maintains the fire resistance performance of fire penetrations in walls and floors.
Material type	Non-combustible glass fabric with mineral wool filling.
Product colour range	Grey
Special features	Dust- and fibre-free installation.
Product range	ArmaProtect CU Firestop cushions are available in 3 sizes - small, medium and large.
Applications	Firestop cushions for fire seals in walls and floors for temporary or permanent sealing of cables and cable trays in wall and floor openings.
Installation	For professional use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.

### Approvals and compliance

Specification compliance	<ul style="list-style-type: none"> <li>UL acc. UL 1479 (ASTM E814)</li> </ul>
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Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	-40°C to 70°C (-40°F to 158°F)	
Application temperature	5°C to 25°C (41°F to 77°F)	
Storage and transportation temperature	5°C to 25°C (41°F to 77°F)	
<b>Mechanical properties</b>		
Density	50 - 60 kg/m <sup>3</sup>	
<b>Fire performance</b>		
Reaction to fire	Class A1	EN 13501-1
Melting point	≥ 1000 °C (1832 °F)	
<b>Health and environment</b>		
Emission of dangerous substances	No dangerous substances.	ETAG 026-02
<b>Other technical features</b>		
Shelf life	No shelf life.	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost.	

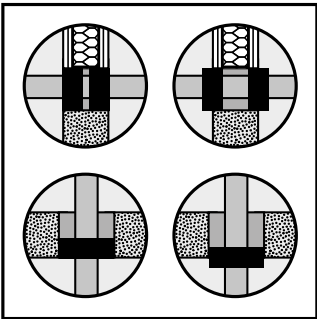
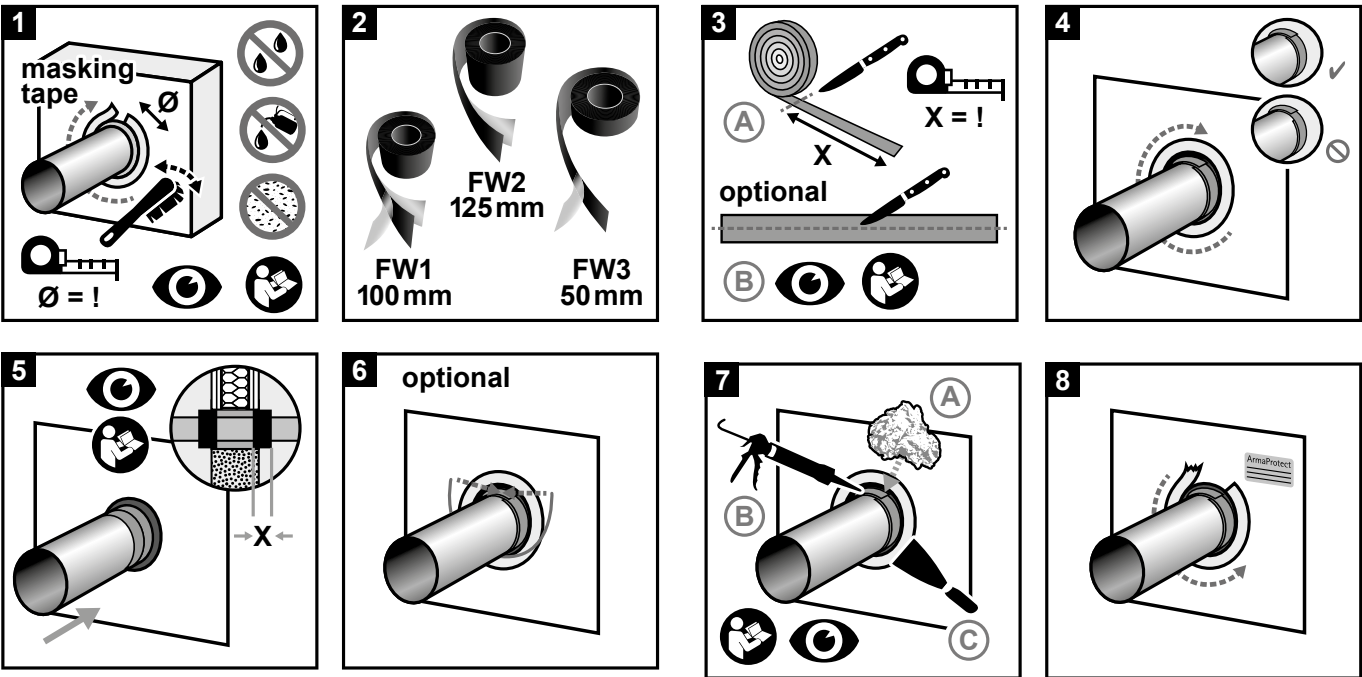


# ArmaProtect FW1

## Firestop wrap

### INSTRUCTIONS FOR USE

Ensure that surfaces are dry and free of dust and grease.



#### // Consumption guide

Check consumption of ArmaProtect Firestop Wrap FW1 based on the pipe diameter and number of layers required. The table below provides an estimation for one layer of wrap based on the outside diameter of the pipe, conduit or conduit bundle. To avoid wastage, review the number of layers required and the potential need of overlapping the firestop wrap according to third party published listings or national approvals / assessments before cutting.

Diameter of pipe / conduit / conduit bundle [mm]	Approximate length for one layer of firestop wrap [mm]
32	110
40	140
50	170
63	215
75	255
90	310
110	370
125	425
140	480
160	550



# UL APPROVED SYSTEMS

## // Typical UL approved systems<sup>1</sup>

### Penetrants

• Cable bundles	≤ Ø 150mm
• PVC pipes	≤ Ø 160mm
• PE pipes	≤ Ø 160mm
• PP-HT	≤ Ø 100mm

<sup>1</sup>See relevant UL system for further installation details.

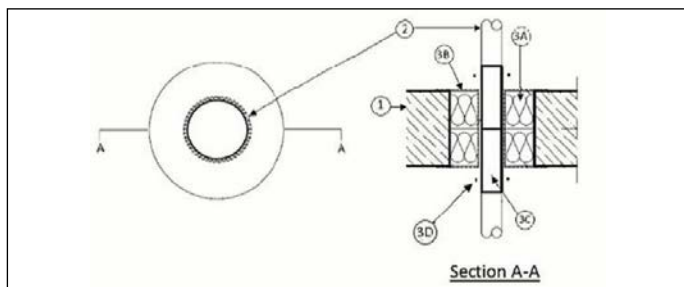


## // Selected exemplary UL approved systems

### System No. C-AJ-2929 (PE pipe in floor opening)

ANSI/UL 1479 (ASTM E814)

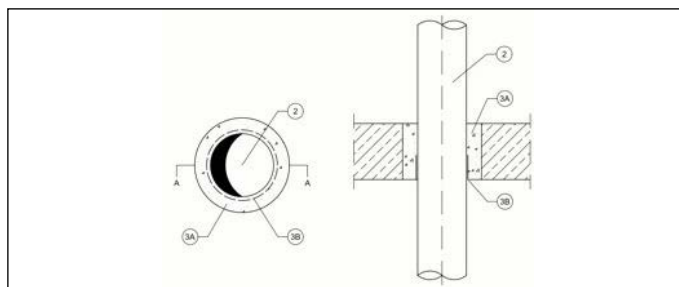
- F rating - 3 hours
- T rating - 3 hours



### System No. F-A-2386 (PE pipe in floor opening)

ANSI/UL 1479 (ASTM E814)

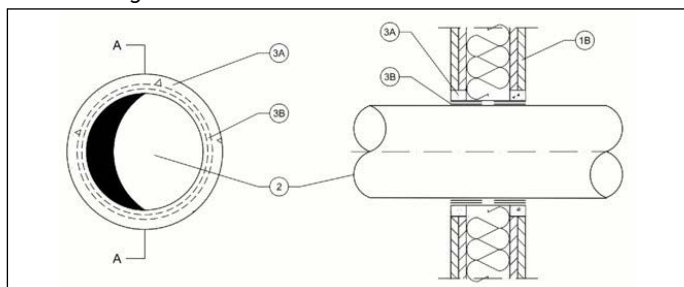
- F rating - 3 hours
- T rating - 3 hours



### System No. W-L-2387 (PVC pipe in wall opening)

ANSI/UL 1479 (ASTM E814)

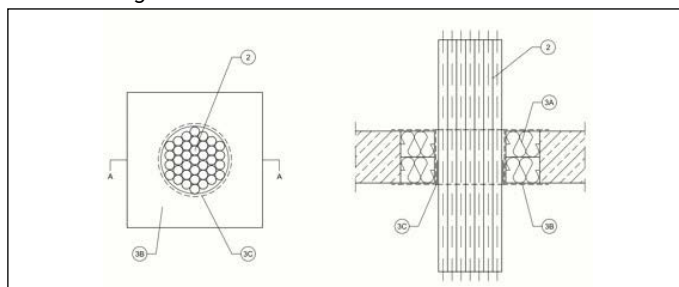
- F rating - 3 hours
- T rating - 3 hours



### System No. F-A-3083 (cable bundle in floor opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 1-1/2 hours







## ArmaProtect FW1 for use in Through-Penetration Firestop Systems<sup>1</sup>

System No.	Application	Services	Additional product	F rating	T rating
C-AJ-2928	Concrete wall and floor	Pipes/tubes, nominal 1-1/4 in (32 mm) diameter, 1/16 in. (1.9 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	3 Hr
C-AJ-2929	Concrete wall and floor	Pipes/tubes, nominal 4-1/4 in (110 mm) diam 1/8 in. (3.4 mm) wall thickness PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	3 Hr
F-A-2374	Concrete floor	Pipes/tubes, nominal 4 in (100mm) diameter, 1/8 in. (2.7 mm) wall thickness PP-HT pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	1 1/2 Hr
F-A-2376	Concrete floor	Pipes/tubes, nominal 3 in (76 mm) diameter, 1/8 in. (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	2 Hr
F-A-2377	Concrete floor	Pipes/tubes, nominal 4-1/4 in (110mm) diam, 1/8 in. (3,2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. or nom 4-1/4 in (110mm) diam, 1/8 in. (3,4 mm) wall thickness PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.	ArmaProtect MM20	3 Hr	3 Hr
F-A-2378	Concrete floor	Pipes/tubes, nominal 4-1/4 in (110mm) diam 1/8 in. (3,2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system	ArmaProtect ABLC	3 Hr	3 Hr
F-A-2382	Concrete floor	Pipes/tubes, nominal 2-1/2 in (63 mm) diam 0.19 in (4.7 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
F-A-2386	Concrete floor	Pipes/tubes, nominal 4.3 in (110 mm) diam 0.26 in (6.6 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
F-A-2387	Concrete floor	Pipes/tubes, nominal 4.3 in (110 mm) diam 0.21 in (5.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr



## ArmaProtect FW1 for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
F-A-2388	Concrete floor	Pipes/tubes, nominal 4.3 in (110 mm) diam 0.25 in (6.3 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
F-A-2389	Concrete floor	Pipes/tubes, nominal 4.3 in (110 mm) diam 0.26 in (6.6 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
F-A-2390	Concrete floor	Pipes/tubes, nominal 6.3 in (160 mm) diam 0.37 in (9.5 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
F-A-2391	Concrete floor	Pipes/tubes, nominal 6.3 in (160 mm) diam 0.3 in (7.7 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		2 Hr	2 Hr
F-A-2392	Concrete floor	Pipes/tubes, nominal 6.3 in (160 mm) diam 0.36 in (9.1 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
F-A-2393	Concrete floor	Pipes/tubes, nominal 4.3 in (110 mm) diam 0.48 in (12.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		2 Hr	2 Hr
F-A-3083	Concrete floor	Cable bundle of 6" (150 mm) diameter	ArmaProtect ABLC	3 Hr	1 1/2 Hr
W-J-2377	Concrete wall	Pipes/tubes, nominal 4 in (100mm) diameter, 1/8 in. (2.7 mm) wall thickness PP-HT pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system	ArmaProtect ABLC	2 Hr	2 Hr
W-J-2378	Concrete wall	Pipes/tubes, nominal 3 in (75 mm) diameter, 1/8 in. (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	3 Hr
W-J-2379	Concrete wall	Pipes/tubes, nominal 4-1/4 in (110 mm) diam 1/8 in. (3.2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems and nominal 4-1/4 in (110 mm) diam 1/8 in. (3.4 mm) wall thickness PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect MM20	3 Hr	2 Hr



## ArmaProtect FW1 for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
W-J-2380	Concrete wall	Pipes/tubes, nominal 4-1/4 in (110mm) diam, 1/8 in. (3,2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	2 Hr
W-J-2384	Concrete wall	Pipes/tubes, nominal 2 in (50 mm) diam 0.19 in (4.7 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-J-2388	Concrete wall	Pipes/tubes, nominal 3.9 in (100 mm) diam 0.26 in (6.6 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-J-2389	Concrete wall	Pipes/tubes, nominal 3.9 in (100 mm) diam 0.2 in (5.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-J-2390	Concrete wall	Pipes/tubes, nominal 3.9 in (100 mm) diam 0.25 in (6.3 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	2 Hr
W-J-2391	Concrete wall	Pipes/tubes, nominal 3.9 in (100 mm) diam 0.26 in (6.6 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-J-2392	Concrete wall	Pipes/tubes, nominal 3.9 in (100 mm) diam 0.48 in (12.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-J-8095	Concrete wall	Pipe/tubes, max 4-3/8 in. (110 mm) diameter (or smaller), 1/8 in. (2.7 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems and max. 2-3/8 in. (60 mm) diameter cable bundle without separation	ArmaProtect ABLC	2 Hr	1 Hr
W-L-2819	Dry wall (light partition wall)	Pipe/tubes, nominal 1-1/4 in (32mm) diameter, 1/16 in. (1.9 mm) wall thickness PVC plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	2 Hr	1 1/2 Hr
W-L-2820	Dry wall (light partition wall)	Pipe/tubes, nominal 4-3/8 in (110mm) diameter, 1/8 in. (2.7 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	2 Hr	1 1/2 Hr



## ArmaProtect FW1 for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
W-L-2821	Dry wall (light partition wall)	Pipe/tubes, nominal 3 in (75mm) diameter, 1/8 in. (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems		2 Hr	2 Hr
W-L-2829	Dry wall (light partition wall)	Pipe/tubes, nominal 2 in (50 mm) diam 0.19 in (4.7 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-L-2833	Dry wall (light partition wall)	Pipe/tubes, nominal 3.9 in (100 mm) diam 0.26 in (6.6 mm) wall thickness PE pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-L-2834	Dry wall (light partition wall)	Pipe/tubes, nominal 3.9 in (100 mm) diam 0.2 in (5.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-L-2835	Dry wall (light partition wall)	Pipe/tubes, nominal 3.9 in (100 mm) diam 0.25 in (6.3 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	2 Hr
W-L-2836	Dry wall (light partition wall)	Pipe/tubes, nominal 3.9 in (100 mm) diam 0.26 in (6.6 mm) wall thickness PP pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-L-2837	Dry wall (light partition wall)	Pipe/tubes, nominal 3.9 in (100 mm) diam 0.48 in (12.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems		3 Hr	3 Hr
W-L-8138	Dry wall (light partition wall)	Pipe/tubes, max 4-3/8 in. (110 mm) diameter (or smaller), 1/8 in. (2.7 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems and max. 2-3/8 in. (60 mm) diameter cable bundle without separation	ArmaProtect ABLC	2 Hr	1 Hr

<sup>1</sup> See relevant UL systems for further installation details, see Annex



## TECHNICAL DATA - ARMAPROTECT FW1 FIRESTOP WRAP

Brief description	ArmaProtect FW1 is a fabric-based firestop wrap that helps to maintain the fire resistance performance of fire penetrations in walls and floors.
Material type	Glass filament fabric composite with insulation layer forming coating on the inside and the outside.
Product colour range	Red on the outside, anthracite on the inside.
Special features	Flexible and tear-resistant.
Product range	Firestop wrap roll with dimensions of 10m x 100mm x 1.5mm in a cardboard box.
Applications	Firestop wrap for fire seals in walls and floors for cable bundles, conduit bundles and combustible pipes.
Installation	For professional use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.

### Approvals and compliance

Specification compliance	<ul style="list-style-type: none"> <li>ETA-22/0063 and ETA-22/0064 acc. EN 1366-3</li> <li>UL 1479 (ASTM E814)</li> </ul>
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Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	-40°C to 70°C [-40°F to 158°F]	
Application temperature	5°C to 25°C (41°F to 77°F)	
Storage and transportation temperature	5°C to 25°C (41°F to 77°F)	
<b>Mechanical properties</b>		
Weight per unit area	2.0 g/m <sup>2</sup>	
<b>Fire performance</b>		
Reaction to fire	Class E	EN 13501-1
Resistance to fire	See Annex.	
<b>Health and environment</b>		
Emission of dangerous substances	No dangerous substances.	ETAG 026-02
<b>Other technical features</b>		
Durability and serviceability	Use category type X, Y <sub>1</sub> , Y <sub>2</sub> , Z <sub>1</sub> , Z <sub>2</sub>	EOTA TR 024
Safety information	Please refer to the safety data sheet available on our website.	
Shelf life	No shelf life.	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost.	

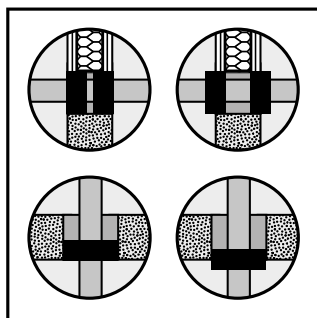
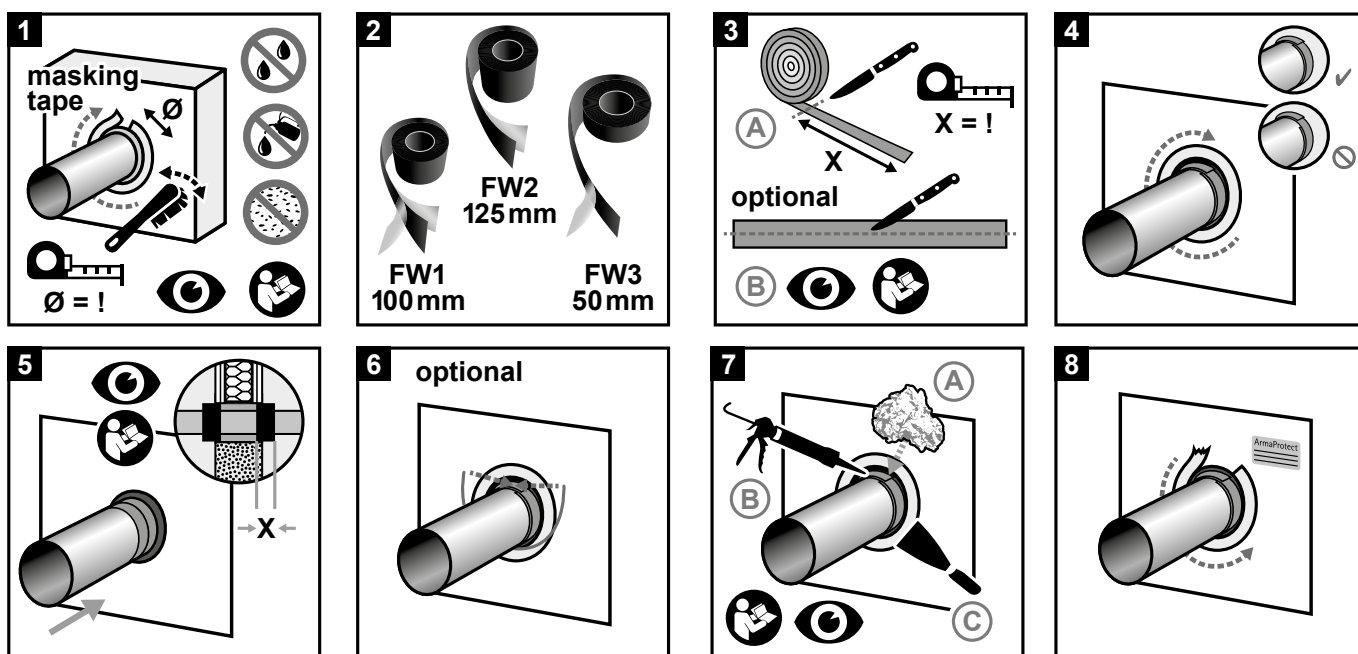


# ArmaProtect FW2

## Firestop wrap

### INSTRUCTIONS FOR USE

Ensure that surfaces are dry and free of dust and grease.



### // Consumption guide

Check consumption of ArmaProtect Firestop Wrap FW2 based on the pipe diameter and number of layers required. The table below provides an estimation for one layer of wrap based on the outside diameter of the pipe, conduit or conduit bundle. To avoid wastage, review the number of layers required and the potential need of overlapping the firestop wrap according to third party published listings or national approvals / assessments before cutting.

Diameter of pipe / conduit / conduit bundle [mm]	Approximate length for one layer of firestop wrap [mm]
32	110
40	140
50	170
63	215
75	255
90	310
110	370
125	425
140	480
160	550

<sup>1</sup> See ETA 21/1025 for further installation details.



# MAIN APPLICATIONS

## ACC. ETA-21/1026

### In drywalls, solid walls and concrete floors<sup>1</sup>

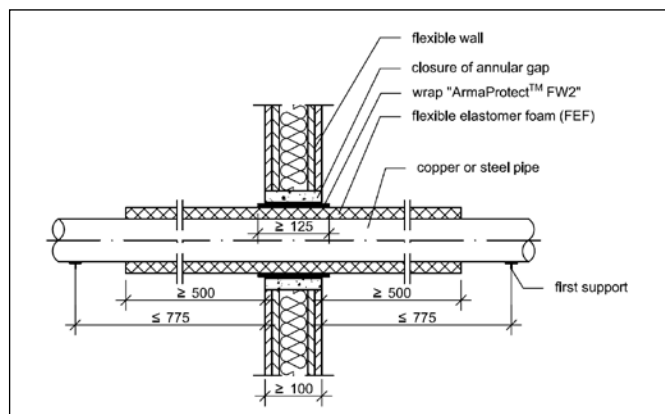
Base material	Drywall, concrete wall, aerated concrete wall, masonry wall, shaft wall, concrete floor
Base material thickness	$\geq 100$ mm (wall) $\geq 150$ mm (floor)
Seal thickness	$\geq 100$ mm (wall) $\geq 150$ mm (floor)
Penetrants	
Non-combustible pipe with insulation	up to EI 120-C/U <sup>1</sup>
• Steel pipes $\leq 323.9$ mm	
• Copper pipes $\leq 108.0$ mm	

<sup>1</sup> See ETA 21/1026 for further installation details.

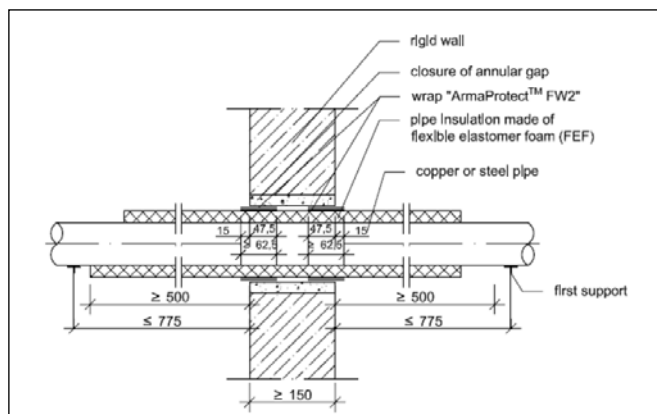


### // Typical ETA approved systems<sup>1</sup>

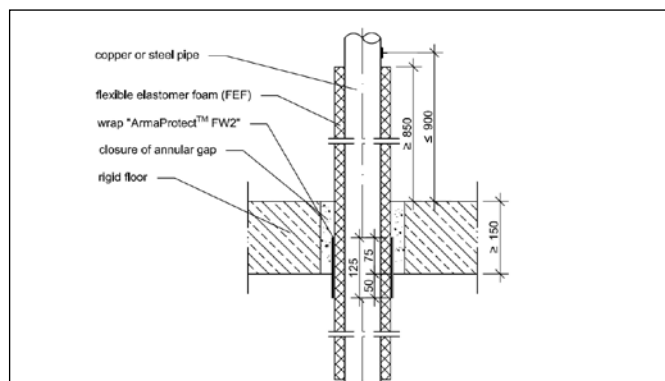
#### Wall application (drywall)



#### Wall application (solid wall)



#### Floor application



<sup>1</sup> See ETA 21/1026 for further installation details.



# UL APPROVED SYSTEMS

## // Typical UL approved systems<sup>1</sup>

Penetrants	
• PE-HD conduit bundles	≤ Ø 100 mm (conduits Ø ≤ 32 mm)
• PE-HD conduits with speed pipe bundles	≤ Ø 50 mm
• PE/AL/PE composite pipe	≤ Ø 63 mm
• Copper pipes	≤ Ø 159 mm
• Clima split bundles	
• Mixed penetration seals	

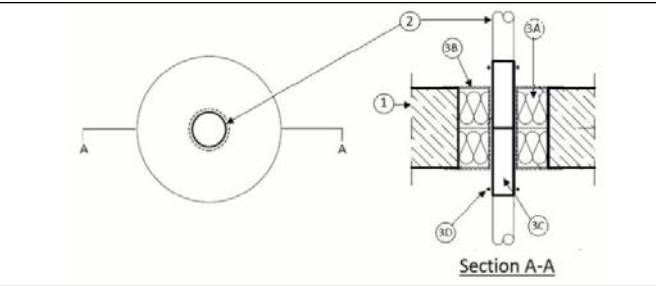
<sup>1</sup>See relevant UL system for further installation details.

## // Selected exemplary UL approved systems

### System No. C-AJ-2927 (composite pipe in floor opening)

ANSI/UL 1479 (ASTM E814)

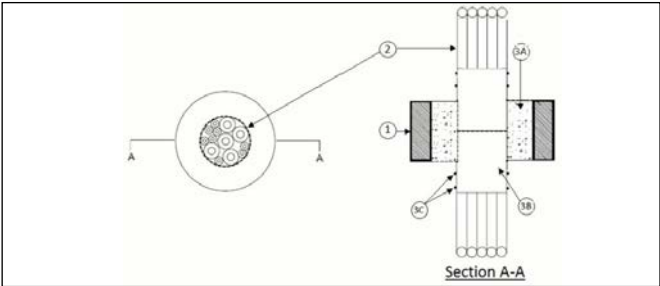
- F rating - 3 hours
- T rating - 3 hours



### System No. F-A-8061 (PE-HD bundle pipe bundle in floor opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 2 hours



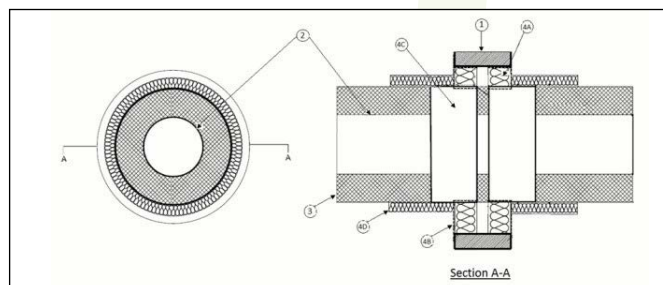




### System No. W-J-5210 (copper pipes in floor opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 0 hours



### System No. W-J-8093 (mixed penetration seal in wall opening)

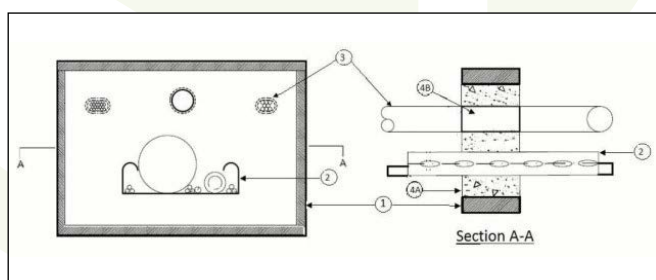
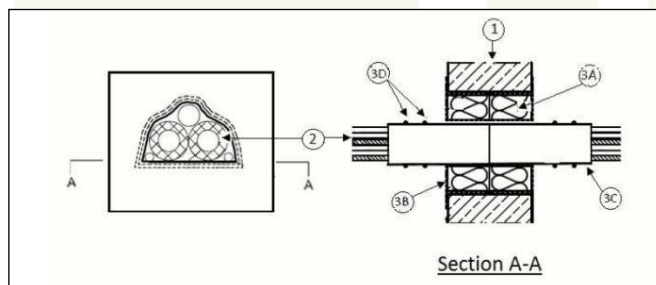
ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 1 hour

### System No. W-J-8092 (clima split bundle in floor opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 1/2 hours





## ArmaProtect FW2 for use in Through-Penetration Firestop Systems<sup>1</sup>

System No.	Application	Services	Additional product	F rating	T rating
C-AJ-2927	Concrete wall and concrete floor	Pipes/tubes, nominal 1-1/4 in (32 mm) diameter, 1/8 in. (3 mm) wall thickness PE/AL/PE composite plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	3 Hr
C-AJ-8329	Concrete wall and concrete floor	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect ABLC	3 Hr	3 Hr
F-A-2373	Concrete floor	Pipes/tubes, nominal 1-1/4 in (32mm) diameter, 1/8 in. (3 mm) wall thickness PE/AL/PE composite plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	2 Hr	1 Hr
F-A-5080	Concrete floor	Pipes/tubes, nominal 6-1/4 in (159 mm) diameter, Schedule M copper pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	3 Hr
F-A-8060	Concrete floor	Max 1/C 148 mm diameter (or smaller), copper conductor cable with XLPE insulation and HDPE jacket, nominal 1-1/2 in (37mm) diameter PE-HD SRV-G 7x10 tc 'speed pipe' for use in closed (process or supply) piping systems and nominal 2-1/4 in. (56 mm) diameter HD 240 synthetic rubber hydraulic hose for use in closed (process or supply) piping systems	ArmaProtect ABLC	3 Hr	2 Hr
F-A-8061	Concrete floor	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect CM	3 Hr	2 Hr
F-A-8062	Concrete floor	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect CM	3 Hr	3 Hr
F-A-8063	Concrete floor	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect ABLC	3 Hr	1 Hr
F-A-8064	Concrete floor	Cable Tray, max 11-3/4 in. (300 mm) wide by 2-3/8 in. (60 mm) deep	ArmaProtect CM	3 Hr	1 1/2 Hr
F-A-8065	Concrete floor	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect ABLC	3 Hr	3 Hr
W-J-2376	Concrete wall	Pipes/tubes, nominal 1-1/4 in (32mm) diameter, 1/8 in. (3 mm) wall thickness PE/AL/PE composite plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	2 Hr	0 Hr



## ArmaProtect FW2 for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
W-J-5210	Concrete wall	Pipes/tubes, nominal 6-1/4 in (159mm) diameter, Schedule M copper pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	0 Hr
W-J-8089	Concrete wall	Max 1/C 148 mm diameter (or smaller), copper conductor cable with XLPE insulation and HDPE jacket, nominal 1-1/2 in (37mm) diameter PE-HD SRV-G 7x10 tc 'speed pipe' for use in closed (process or supply) piping systems and nominal 2-1/4 in. (56 mm) diameter HD 240 synthetic rubber hydraulic hose for use in closed (process or supply) piping systems	ArmaProtect ABLC	2 Hr	1 1/2 Hr
W-J-8090	Concrete wall	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect CM	3 Hr	1 Hr
W-J-8091	Concrete wall	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect CM	3 Hr	2 Hr
W-J-8092	Concrete wall	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect ABLC	2 Hr	1/2 Hr
W-J-8093	Concrete wall	Cable Tray, max 11-3/4 in. (300 mm) wide by 2-3/8 in. (60mm) deep	ArmaProtect CM	3 Hr	1 Hr
W-J-8094	Concrete wall	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect ABLC	3 Hr	1 1/2 Hr
W-J-8097	Concrete wall	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect ABLC	2 Hr	1 1/2 Hr
W-J-8098	Concrete wall	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, with cables	ArmaProtect ABLC, ArmaProtect CT	2 Hr	1 1/2 Hr
W-L-2822	Dry wall (light partition wall)	Pipes/tubes, nominal 1 in (50mm) diameter, PE-HD plastic pipe 'Speed-Pipe' bundle for use in closed (process or supply) piping systems	ArmaProtect ABLC	2 Hr	2 Hr
W-L-2823	Dry wall (light partition wall)	Pipes/tubes, nominal 2-1/2 in (63mm) diameter, 3/16 in. (4.5 mm) wall thickness multi-layer PE/AL/PE composite pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	1 Hr	0 Hr



## ArmaProtect FW2 for use in Through-Penetration Firestop Systems<sup>1</sup> (cont.)

System No.	Application	Services	Additional product	F rating	T rating
W-L-2824	Dry wall (light partition wall)	Pipes/tubes, nominal 1-1/4 in (32mm) diameter, 3/16 in. (4.5 mm) wall thickness multi-layer PE/AL/PE composite pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	2 Hr	1 Hr
W-L-2825	Dry wall (light partition wall)	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect ABLC	2 Hr	2 Hr
W-L-8136	Dry wall (light partition wall)	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing cables	ArmaProtect ABLC	2 Hr	1 1/2 Hr
W-L-8137	Dry wall (light partition wall)	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect ABLC	2 Hr	1 Hr

<sup>1</sup> See relevant UL systems for further installation details, see Annex



## TECHNICAL DATA - ARMAPROTECT FW2 FIRESTOP WRAP

Brief description	ArmaProtect FW2 is a fabric-based firestop wrap that helps to maintain the fire resistance performance of fire penetrations in walls and floors.
Material type	Glass filament fabric composite with insulation layer forming coating on the inside.
Product colour range	Grey on the outside, anthracite on the inside.
Special features	Flexible and tear-resistant.
Product range	Firestop wrap roll with dimensions of 10m x 125mm x 1.5mm in a cardbox box.
Applications	Firestop wrap for fire seals in walls and floors for non-combustible pipes with combustible insulation, multi-layer composite pipes, conduits and conduit bundles.
Installation	For professional use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.
Declaration of Performance (DoP)	ArmaProtect FW2

### Approvals and compliance

Specification compliance	<ul style="list-style-type: none"> <li>ETA-21/1026 acc. EN 1366-3</li> <li>UL 1479 (ASTM E814)</li> </ul>
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Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	-40°C to 70°C [-40°F to 158°F]	
Application temperature	5°C to 25°C [41°F to 77°F]	
Storage and transportation temperature	5°C to 25°C [41°F to 77°F]	
<b>Mechanical properties</b>		
Weight per unit area	2.0 g/m <sup>2</sup>	
<b>Fire performance</b>		
Reaction to fire	Class E	EN 13501-1
Resistance to fire	See Annex	
<b>Health and environment</b>		
Emission of dangerous substances	No dangerous substances.	ETAG 026-02
<b>Other technical features</b>		
Durability and serviceability	Use category type X.	EOTA TR 024
Safety information	Please refer to the safety data sheet available on our website.	
Shelf life	No shelf life	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost.	

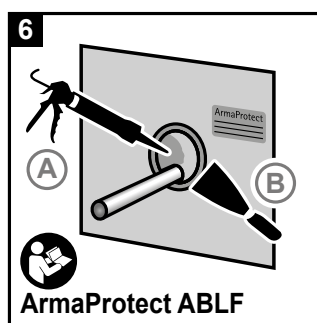
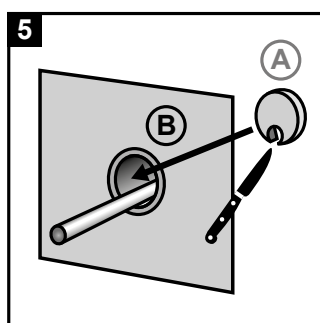
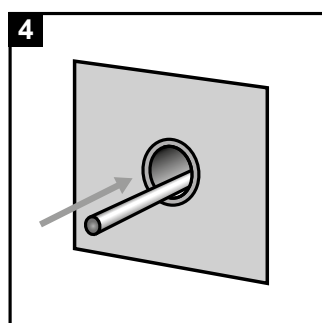
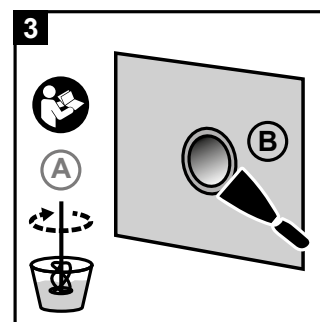
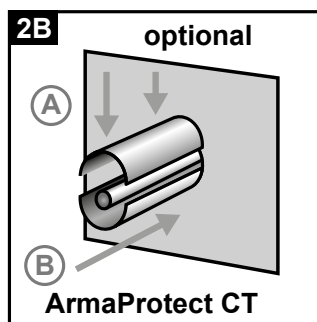
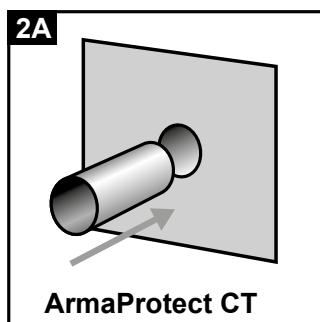
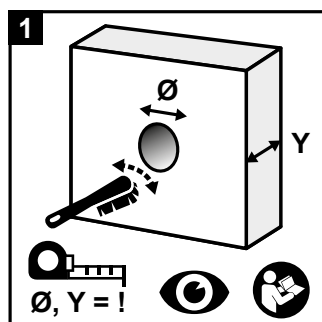


# ArmaProtect CT

## Firestop cable tube

### INSTRUCTIONS FOR USE

Ensure that surfaces are dry and free of dust and grease.





# MAIN APPLICATIONS

## ACC. ETA-22/0062



**in drywalls, solid walls and concrete floors<sup>1</sup>**

Base material	Drywall, concrete wall, aerated concrete wall, masonry wall, concrete floor
Base material thickness	≥ 100 mm (wall) ≥ 125 mm (floor)
Seal thickness	≥ 150 mm (wall)
Penetrants	
<ul style="list-style-type: none"><li>• Cables ≤ Ø 80 mm<sup>1</sup></li><li>• Cable bundles ≤ Ø 107 mm (with cables ≤ Ø 21 mm)<sup>1</sup></li><li>• Plastic conduits ≤ Ø 63 mm (with cables ≤ Ø 21 mm)<sup>1</sup></li><li>• Plastic conduit bundles ≤ Ø 107 mm (conduits ≤ Ø 32 mm, with cables ≤ Ø 21 mm)<sup>1</sup></li><li>• Wave guide cables ≤ Ø 28.5 mm<sup>1</sup></li><li>• PE lines "speed pipes" (24 x ≤ Ø 7.0 mm, 7 x ≤ Ø 10.0 mm, 5 x ≤ Ø 12.0 mm)<sup>1</sup></li><li>• Combustible pipes ≤ Ø 32 mm<sup>1</sup></li><li>• HVAC split-line-combinations<sup>1</sup></li></ul>	up to EI 120 <sup>1</sup>

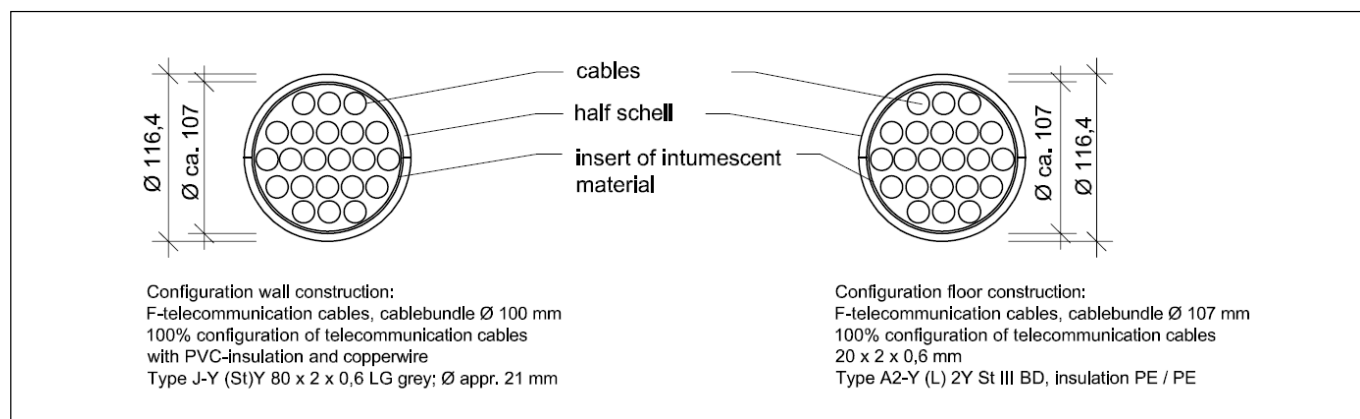
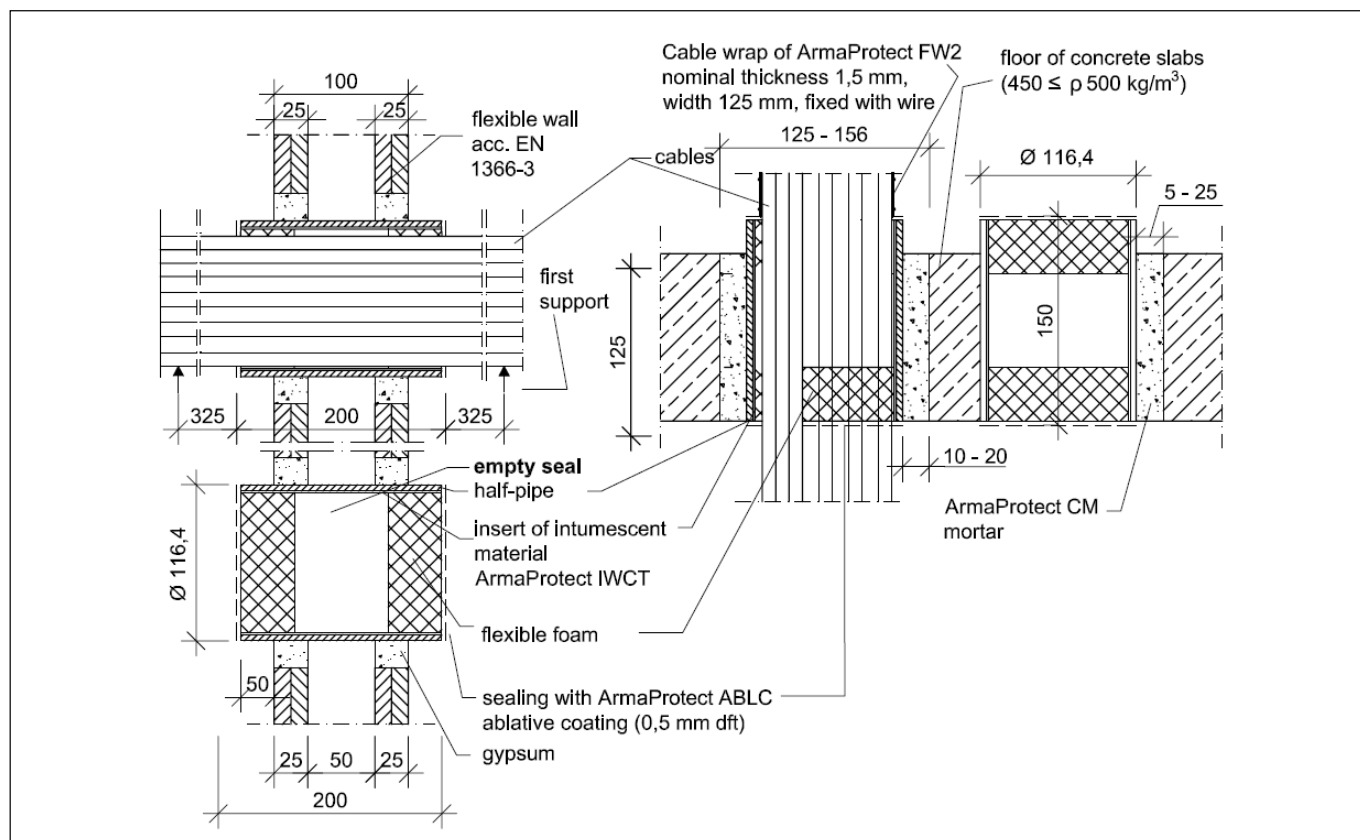
<sup>1</sup> See ETA 22/0062 for further installation details.



## // Typical ETA approved systems<sup>1</sup>

### Wall application

### Floor application



<sup>1</sup> See ETA 22/0062 for further installation details.





# UL APPROVED SYSTEMS

## // Typical UL approved systems<sup>1</sup>

### Penetrants

• Cable bundles	≤ Ø 137 mm (cables Ø ≤ 16.2 mm)
• PE-HD conduit bundles	≤ Ø 100 mm (conduits Ø ≤ 32 mm)
• Steel pipes	≤ Ø 89 mm
• Clima split bundles	

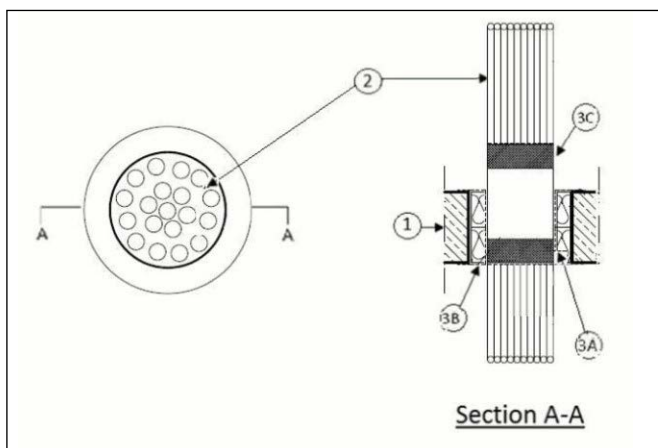
<sup>1</sup>See relevant UL system for further installation details.

## // Selected exemplary UL approved systems

### System No. F-A-3084 (cable bundle in floor opening)

ANSI/UL 1479 (ASTM E814)

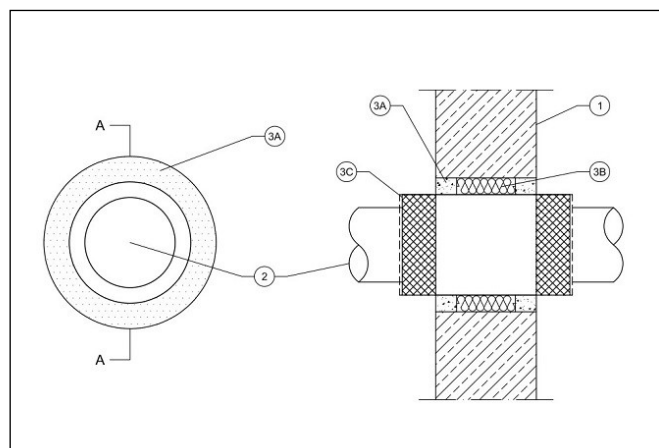
- F rating - 3 hours
- T rating - 1/2 hour



### System No. W-J-1335 (steel pipe in wall opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 2 hours
- T rating - 2 hours

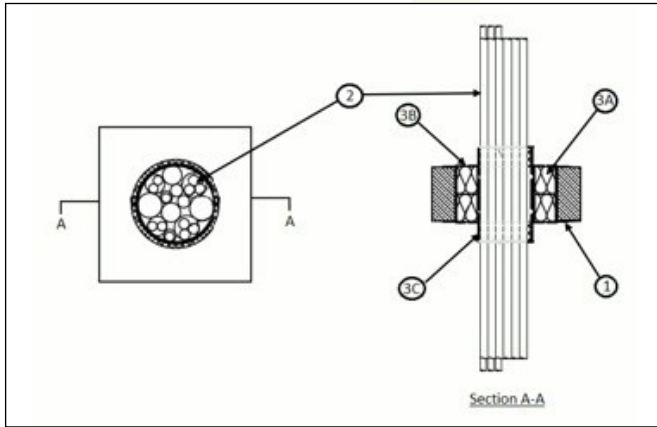




### System No. C-AJ-2931 (PE-HD conduit bundle in floor opening)

ANSI/UL 1479 (ASTM E814)

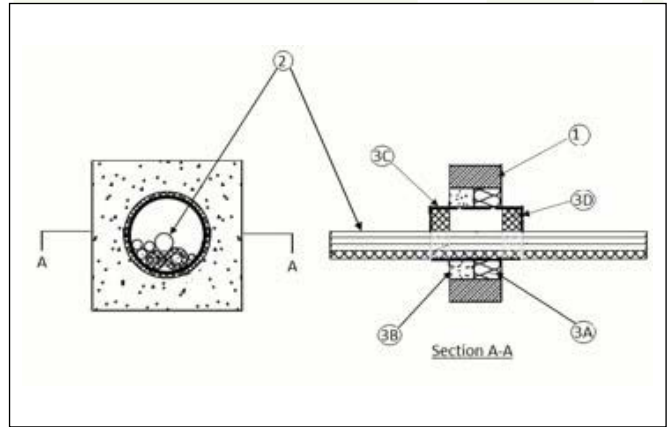
- F rating - 3 hours
- T rating - 3 hours



### System No. W-J-8099 (clima split bundle in wall opening)

ANSI/UL 1479 (ASTM E814)

- F rating - 3 hours
- T rating - 1½ hours





## ArmaProtect CT for use in Through-Penetration Firestop Systems<sup>1</sup>

System No.	Application	Services	Additional product	F rating	T rating
C-AJ-1754	Concrete wall and concrete floor	Pipes/Tubes, max 3-1/2 in. (89 mm) diameter Schedule 10 (or heavier) steel pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	3 Hr	1/2 Hr
C-AJ-2931	Concrete wall and concrete floor	1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty	ArmaProtect ABLC	3 Hr	3 Hr
F-A-3084	Concrete floor	Cable bundle of 5-3/8" (137 mm) diameter	ArmaProtect ABLC	3 Hr	1/2 Hr
F-A-8066	Concrete floor	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect ABLC	3 Hr	1 1/2 Hr
W-J-1335	Concrete wall	Pipes/tubes, max 3-1/2 in. (89 mm) diameter Schedule 10 (or heavier) steel pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLF	2 Hr	2 Hr
W-J-3276	Concrete wall	Cable bundle of 5-3/8" (137 mm) diameter	ArmaProtect ABLC	3 Hr	1 1/2 Hr
W-J-8099	Concrete wall	'Climasplit' bundle of max diam 2 in. (50 mm) or smaller	ArmaProtect ABLC, ArmaProtect MM20	3 Hr	1 1/2 Hr
W-L-1606	Dry wall (light partition wall)	Pipes/tubes, max 3-1/2 in. (89 mm) diameter Schedule 10 (or heavier) steel pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems	ArmaProtect ABLC	2 Hr	1/2 Hr
W-L-3480	Dry wall (light partition wall)	Cable bundle of max 4-3/4" (120 mm) diameter	ArmaProtect ABLC	2 Hr	3/4 Hr

<sup>1</sup> See relevant UL systems for further installation details, see Annex



## TECHNICAL DATA - ARMAPROTECT CT FIRESTOP CABLE TUBE

Brief description	ArmaProtect CT consists for two half shells with intumescent inlay and a soft foam plug. It is designed for use as small penetration seals in core drillings or as cast-in-solutions.
Material type	PVC cable tube half shells with intumescent fabric inlay. Closure are made of soft foam plugs.
Additional material information	Half-shells can be closed with a click lock.
Product colour range	Grey half shells with red inner lining.
Special features	Ideal as a retrofitting device.
Product range	Cable tubes including soft foam plugs are available in lengths of 150 mm (foam plug diameter: 60 mm, 90 mm and 116 mm), 200 mm (foam plug diameter: 90 mm and 116 mm) and 300 mm (foam plug diameter: 90 mm and 116 mm).
Applications	Firestop device for fire seals in walls and floors for blank openings, cables, cable bundles, combustible pipes and HVAC split-line combinations.
Installation	For professional use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.
Declaration of Performance (DoP)	ArmaProtect CT

### Approvals and compliance

Specification compliance • ETA 22/0062 acc. EN 1366-3 • UL acc. UL 1979 (ASTM E814)

<sup>1</sup> This is the footnote list relevant to the Approvals and compliance table.

Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	-40°C to 70°C [-40°F to 158°F]	
Application temperature	5°C to 25°C [41°F to 77°F]	
Storage and transportation temperature	5°C to 25°C [41°F to 77°F]	
<b>Fire performance</b>		
Reaction to fire	Class E	EN 13501-1
Resistance to fire	See Annex	
<b>Acoustic performance</b>		
Sound reduction	64 (-2;-6) dB Dn, e; Dn, w (C; Ctr)	
<b>Health and environment</b>		
Emission of dangerous substances	No dangerous substances.	ETA 22/0062
<b>Other technical features</b>		
Durability and serviceability	Use category type X.	EN 13501-1
Safety information	Please refer to the safety data sheet available on our website.	
Shelf life	No shelf life.	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost.	

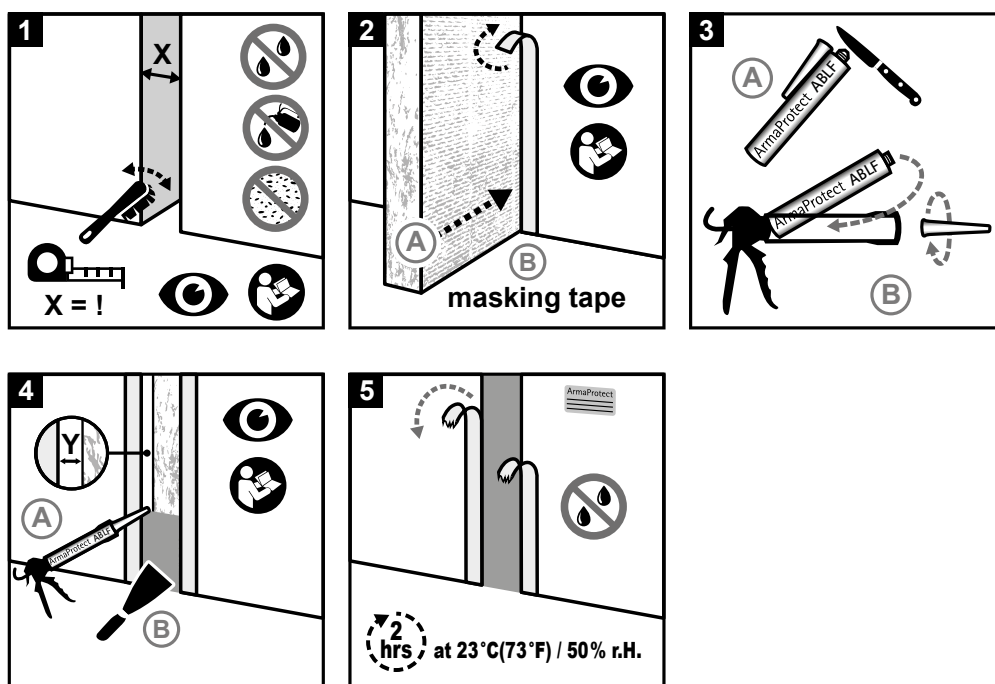


# ArmaProtect ABLF

## Firestop filler mastic

### INSTRUCTIONS FOR USE

Ensure that surfaces are dry and free of dust and grease.



### // Consumption guide

Joint dimensioning of 5 mm x 5 mm

Joint dimensioning of 10 mm x 10 mm

- approx. 12 linear meters with one 310 ml cartridge
- approx. 3 linear meters with one 310 ml cartridge

Take note of potential material loss during application at the job site.



# UL APPROVED SYSTEMS

## // Typical UL approved systems<sup>1</sup>

### Joints

- Wall joints for concrete walls
- Floor joints for concrete walls
- Head-of-wall joints for concrete wall
- Head-of-wall joints for fire-rated gypsum board/ stud wall assembly
- Bottom-of-wall joints for fire-rated gypsum board/ stud wall assembly

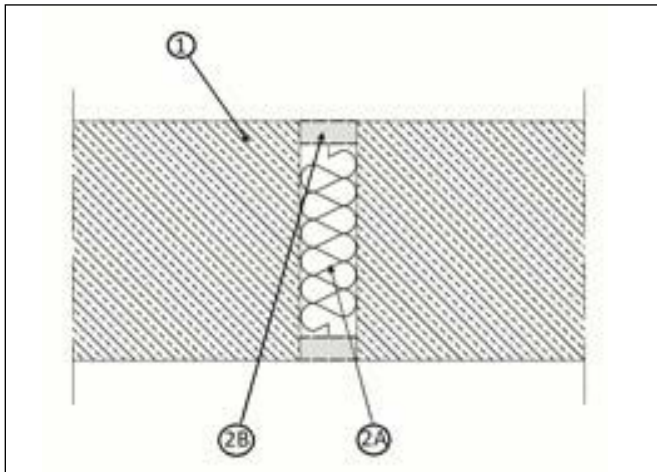
<sup>1</sup>See relevant UL system for further installation details.

## // Selected exemplary UL approved systems

### System No. FF-S-0052 (floor joint)

ANSI/UL 2079

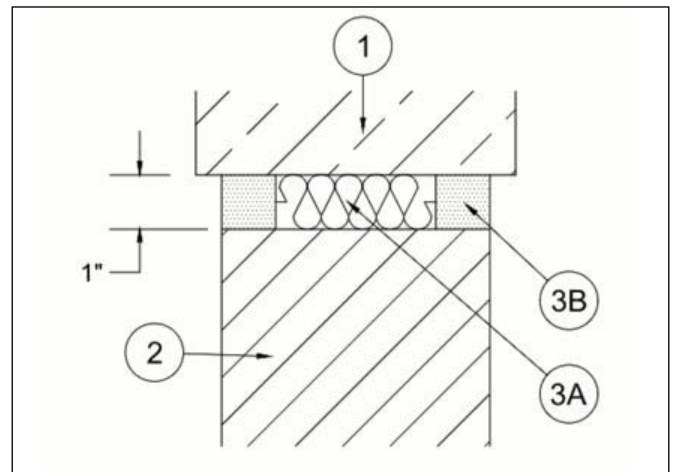
- F rating - 3 hours
- Joint width - maximum 1" (25 mm)



### System No. HW-S-0156 (head-of-wall joint)

ANSI/UL 2079

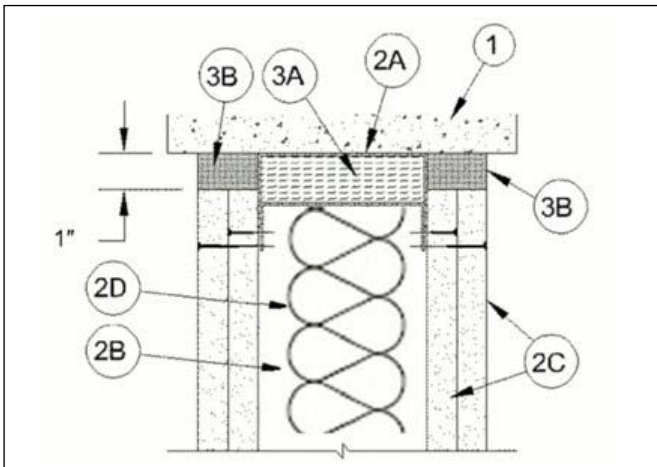
- F rating - 3 hours
- Joint width - maximum 1" (25 mm)



### System No. HW-S-0157 (head-of-wall joint)

ANSI/UL 2079

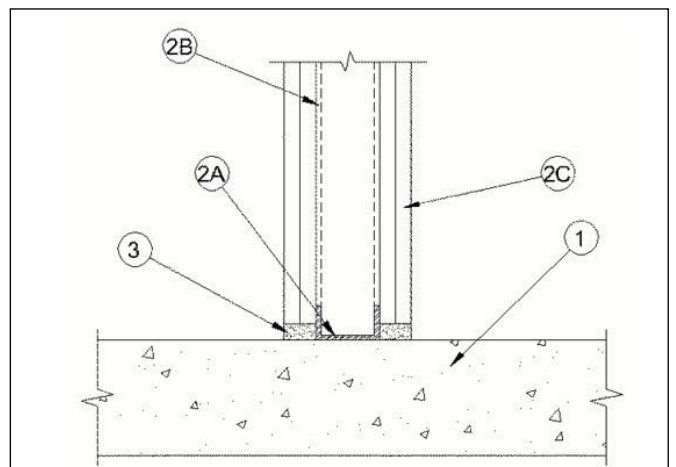
- F rating - 2 hours
- Joint width - maximum 1" (25 mm)



### System No. BW-S-0062 (bottom-of-wall joint)

ANSI/UL 2079

- F rating - 1 and 2 hours
- Joint width - maximum 1" (25 mm)





## ArmaProtect ABLF for use in Joint Systems<sup>1</sup>

System No.	Application	F rating	Joint Width
BW-S-0062	Bottom-of-wall joint	1 and 2 Hr	1 In. (25 mm) max
HW-S-0154	Head-of-wall joint	2 Hr	1 In. (25 mm) max
HW-S-0155	Head-of-wall joint	1 Hr	1 In. (25 mm) max
HW-S-0156	Head-of-wall joint	3 Hr	1 In. (25 mm) max
HW-S-0157	Head-of-wall joint	2 Hr	1 In. (25 mm) max
FF-S-0052	Floor joint	3 Hr	1 In. (25 mm) max
WW-S-0095	Wall joint	3 Hr	1 In. (25 mm) max

<sup>1</sup> See relevant UL systems for further installation details, see Annex



## TECHNICAL DATA - ARMAPROTECT ABLF FIRESTOP FILLER MASTIC

Brief description	ArmaProtect ABLF is an acrylic firestop filler mastic to maintain the fire resistance performance of structural firestop joints in walls and floors and sealing connections.
Material type	Acrylic firestop filler mastic
Additional material information	Paste-like consistency
Product colour range	White
Special features	For indoor and outdoor areas.
Product range	ArmaProtect ABLF ablative firestop filler mastic is available in 12.5 kg pails, 15 kg pails and also as 310 ml cartridge with 12 cartridges packed in a carton.
Applications	Flexible acrylic firestop filler mastic for structural joints in walls and floors in indoor and outdoor areas. For sealing connections and joints with moderate expansion stress and without constant exposure to moisture.
Installation	For professional use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.

### Approvals and compliance

Specification compliance	<ul style="list-style-type: none"> <li>UL acc. UL 2079 (ASTM E1966)</li> </ul>
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Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	-40 °C to 70 °C (-40 °F to 158 °F)	
Application temperature	5 °C to 25 °C (41 °F to 77 °F)	
Storage and transportation temperature	5 °C to 25 °C (41 °F to 77 °F)	
<b>Mechanical properties</b>		
Bulk density	1.34 - 1.48 g/cm³ (at 20 °C)	
<b>Fire performance</b>		
Reaction to fire	Class E	EN 13501-1
<b>Health and environment</b>		
Volatile organic compounds (VOC) content	<50 g/l	GS-11, Green Standard
Emission of dangerous substances	No dangerous substances.	ETA-22/0063
<b>Other technical features</b>		
Durability	Use category type X.	EOTA TR 024
Overpaintable [emulsion paints]	Passed	EN 13300
Safety information	Please refer to the safety datasheet available on our website.	
Shelf life	Can be kept for at least 18 months, if unopened and stored properly.	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost.	



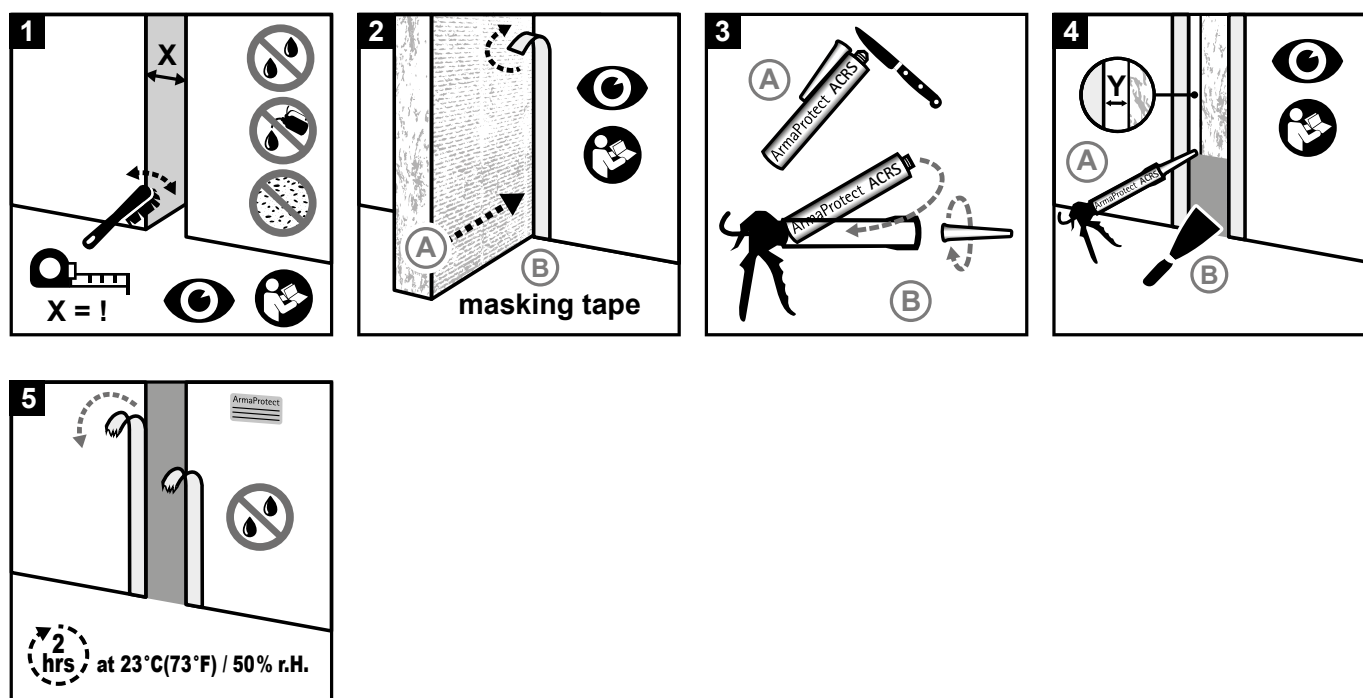


# ArmaProtect ACRS

## Firestop sealant

### INSTRUCTIONS FOR USE

Ensure that surfaces are dry and free of dust and grease.



### // Consumption guide

Joint dimensioning of 5 mm x 5 mm

- approx. 12 linear meters with one 310 ml cartridge
- approx. 24 linear meters with one 600 ml cartridge

Joint dimensioning of 10 mm x 10 mm

- approx. 3 linear meters with one 310 ml cartridge
- approx. 6 linear meters with one 600 ml cartridge

Take note of potential material loss during application at the job site.



# UL APPROVED SYSTEMS

## // Typical UL approved systems<sup>1</sup>

### Joints

- Wall joints for fire-rated gypsum board/ stud wall assembly
- Floor joints for fire-rated gypsum board/ stud wall assembly
- Head-of-wall joints for fire-rated gypsum board/ stud wall assembly
- Head-of-wall joints for fire-rated gypsum board/ stud wall assembly
- Bottom-of-wall joints for fire-rated gypsum board/ stud wall assembly

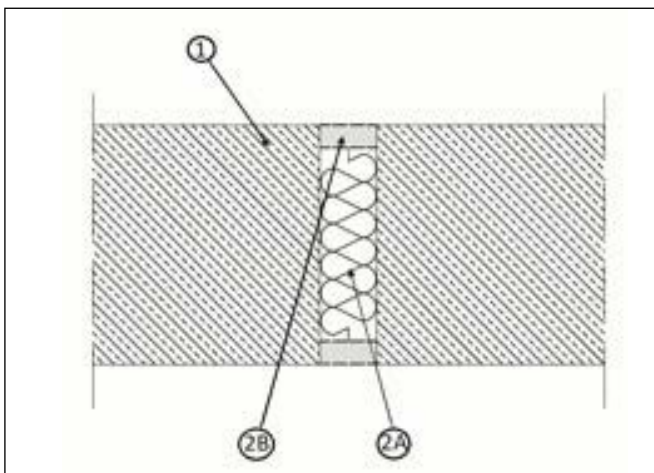
<sup>1</sup>See relevant UL system for further installation details.

## // Selected exemplary UL approved systems

### System No. FF-S-0053 (floor joint)

ANSI/UL 2079

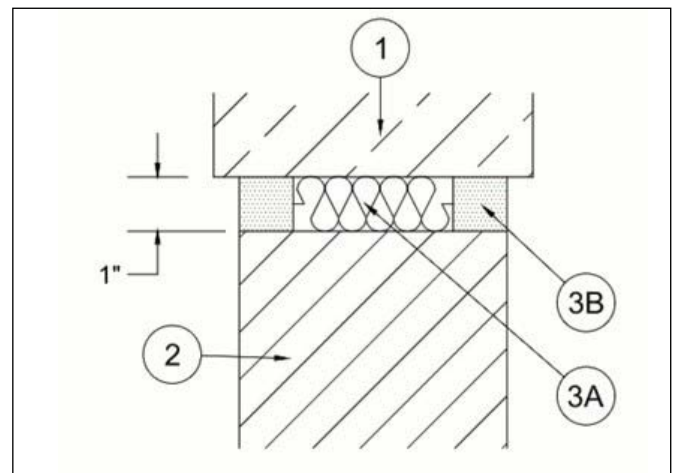
- F rating - 3 hours
- Joint width - maximum 1" [25 mm]



### System No. HW-S-0152 (head-of-wall joint)

ANSI/UL 2079

- F rating - 2 hours
- Joint width - maximum 1-1/5" [30 mm]

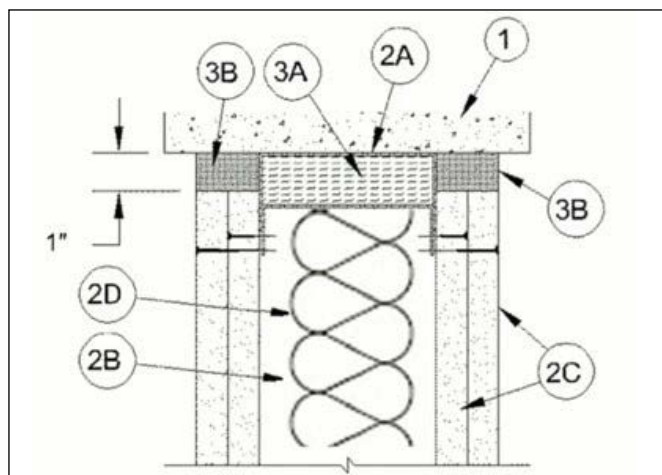




### System No. HW-S-0153 (head-of-wall joint)

ANSI/UL 2079

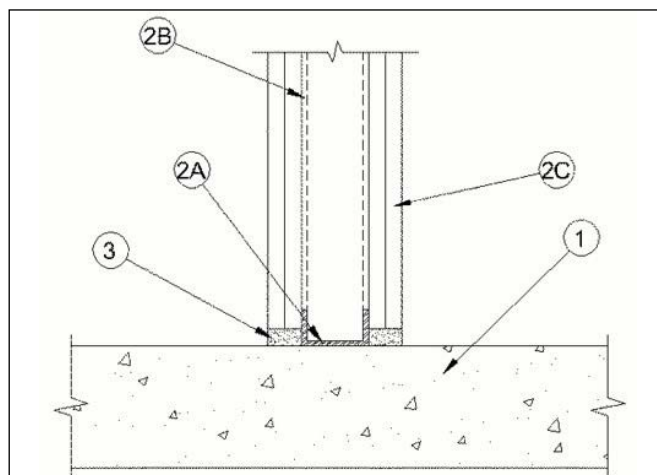
- F rating - 2 hours
- Joint width - maximum 1" (25 mm)



### System No. BW-S-0061 (bottom-of-wall joint)

ANSI/UL 2079

- F rating - 1 and 2 hours
- Joint width - maximum 1" (25 mm)





## ArmaProtect ACRS for use in Joint Systems<sup>1</sup>

System No.	Application	F rating	Joint Width
BW-S-0061	Bottom-of-wall joint	1 and 2 Hr	1 In. (25 mm) max
HW-S-0150	Head-of-wall joint	2 Hr	1 1/5 In. (30 mm) max
HW-S-0151	Head-of-wall joint	1 Hr	1 1/5 In. (30 mm) max
HW-S-0152	Head-of-wall joint	3 Hr	1 In. (25 mm) max
HW-S-0153	Head-of-wall joint	2 Hr	1 In. (25 mm) max
FF-S-0053	Floor joint	3 Hr	1 In. (25 mm) max
WW-S-0096	Wall joint	3 Hr	1 In. (25 mm) max

<sup>1</sup> See relevant UL systems for further installation details, see Annex



## TECHNICAL DATA - ARMAPROTECT ACRS FIRESTOP SEALANT

Brief description	ArmaProtect ACRS is an acrylic firestop sealant used to maintain the fire resistance performance of structural firestop joints in walls and floors and sealing connections.
Material type	Acrylic firestop sealant
Additional material information	Paste-like consistency
Product colour range	Light grey
Special features	For indoor and outdoor use.
Product range	ArmaProtect ACRS firestop sealant is available as 310 ml cartridge and 600 ml foil cartridge.
Applications	Flexible acrylic firestop sealant for structural joints in walls and floors in indoor and outdoor areas. For sealing connections and joints with moderate expansion stress and without constant exposure to moisture.
Installation	For industrial use only. Refer to third party published listings, national approvals / assessments and Armacell's product literature for specific application details as well as before handling this product.

### Approvals and compliance

Specification compliance	<ul style="list-style-type: none"> <li>UL acc. UL 2079 (ASTM E1966)</li> </ul>
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Property	Value/Assessment	Standard/Test method
<b>Temperature range</b>		
Operating temperature	-25 °C to 80 °C (-13 °F to 176 °F)	
Application temperature	5 °C to 25 °C (41 °F to 77 °F)	
Storage and transportation temperature	5 °C to 25 °C (41 °F to 77 °F)	
<b>Mechanical properties</b>		
Hardness (Shore A)	15 ± 5 units	
Bulk density	1.56 g/cm <sup>3</sup> ± 0.04 %	
Stability	≤ 2 mm	DIN EN ISO 7390
Mass loss	maximum of 15 %	ISO 10563
Skin formation	approximately 10 min (at 23 °C / 5% relative humidity)	
Motion absorption	approximately 7.5 %	
<b>Fire performance</b>		
Reaction to fire	Class E	EN 15651-1
<b>Health and environment</b>		
Emission of dangerous substances	No dangerous substances.	
<b>Other technical features</b>		
Durability	Passed	ISO 8339, ISO 9046, ISO 105961
Overpaintable (emulsion paints)	Passed	EN 13300
Safety information	Please refer to the safety datasheet available on our website.	
Shelf life	Can be kept for at least 18 months if unopened and stored properly.	
Storage	Store in a cool and dry place with an ambient temperature of 5 °C to 25 °C and protect from frost.	



## Certificate of compliance for ArmaProtect Firestop systems

### CERTIFICATE OF COMPLIANCE

**Certificate Number** 20211209-R40681  
**Report Reference** R40681  
**Issue Date** 2021-December-09

**Issued to:** ARMACELL GMBH  
ROBERT-BOSCH-STRASSE 10  
MUENSTER, 48153 Germany

**This certificate confirms that  
representative samples of** Firestop Devices  
ArmaProtect CT / CT ML

ArmaProtect CT Firestop Device for use in Through-  
Penetration Firestop System Nos. C-AJ-1754, C-AJ-2931,  
F-A-3084, F-A-8066, W-J-1335, W-J-3276, W-J-8098, W-J-  
8099, W-L-1606, W-L-3480, W-L-8139.

Have been investigated by UL in accordance with the  
Standard(s) indicated on this Certificate.

**Standard(s) for Safety:** ANSI/UL 1479, "Fire Tests of Penetration Firestops."  
**Additional Information:** See the UL Online Certifications Directory at  
<https://iq.ulprospector.com> for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program  
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>





## Certificate of compliance for ArmaProtect Firestop systems

# CERTIFICATE OF COMPLIANCE

**Certificate Number** 20211209-R40682  
**Report Reference** R40682  
**Issue Date** 2021-December-09

**Issued to:** ARMACELL GMBH  
ROBERT-BOSCH-STRASSE 10  
MUENSTER, 48153 Germany

**This certificate confirms that  
representative samples of** Fill, Void or Cavity Materials

Have been investigated by UL in accordance with the Standard(s)  
indicated on this Certificate.

**Standard(s) for Safety:** ANSI/UL 1479, "Fire Tests of Penetration Firestops,"  
ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems"

**Additional Information:** See the UL Online Certifications Directory at  
<https://iq.ulprospector.com> for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

See addendum page 2.

Bruce Mahrenholz, Director North American Certification Program  
UL LLC

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## Certificate of compliance for ArmaProtect Firestop systems

# CERTIFICATE OF COMPLIANCE

**Certificate Number** 20211209-R40682  
**Report Reference** R40682  
**Issue Date** 2021-December-09

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

ArmaProtect ABLC for use in Through-Penetration Firestop System Nos. C-AJ-0181, C-AJ-1753, C-AJ-1754, C-AJ-1757, C-AJ-2927, C-AJ-2928, C-AJ-2929, C-AJ-2931, C-AJ-2930, C-AJ-4118, C-AJ-8329, F-A-0046, F-A-1208, F-A-1209, F-A-1210, F-A-1211, F-A-1213, F-A-2373, F-A-2374, F-A-2375, F-A-2376, F-A-2378, F-A-2383, F-A-2384, F-A-2385, F-A-3081, F-A-3084, F-A-3082, F-A-3083, F-A-4024, F-A-4027, F-A-4029, F-A-5080, F-A-5081, F-A-8060, F-A-8063, F-A-8065, F-A-8066, F-B-4010, W-J-0033, W-J-0034, W-J-1328, W-J-1329, W-J-1330, W-J-1331, W-J-1333, W-J-1334, W-J-2376, W-J-2377, W-J-2378, W-J-2380, W-J-3274, W-J-3276, W-J-3275, W-J-4106, W-J-4109, W-J-4111, W-J-4114, W-J-5210, W-J-5211, W-J-8089, W-J-8092, W-J-8094, W-J-8099, W-J-8095, W-J-8096, W-J-8097, W-J-8098, W-L-0065, W-L-1606, W-L-1607, W-L-2819, W-L-2820, W-L-2822, W-L-2823, W-L-2825, W-L-2824, W-L-3480, W-L-3479, W-L-4109, W-L-4110, W-L-4111, W-L-7326, W-L-7327, W-L-7328, W-L-8136, W-L-8137, W-L-8138, W-L-8139.

ArmaProtect ABLC for use in Joint System Nos. FF-S-0052, WW-S-0095, HW-S-0154, HW-S-0155, HW-S-0156, HW-S-0157, BW-S-0062.

ArmaProtect ABLF for use in Through-Penetration Firestop System Nos. F-A-2379, F-A-2380, F-A-2381, W-L-2826, W-L-2827, W-L-2828, W-L-2830, W-L-2831, W-L-2832, W-J-2381, W-J-2382, W-J-2383, W-J-2385, W-J-2386, W-J-2387, W-J-1335.

ArmaProtect ACRS for use in Joint System Nos. FF-S-0053, WW-S-0096, HW-S-0150, HW-S-0151, HW-S-0152, HW-S-0153, BW-S-0061.

ArmaProtect CM for use in Through-Penetration Firestop System Nos. F-A-4025, F-A-8061, F-A-8062, W-J-4107, F-A-8064, W-J-8090, W-J-8091, W-J-8093.

ArmaProtect MM10 for use in Through-Penetration Firestop System Nos. C-AJ-1755, C-AJ-1756, F-A-1212, F-A-4026, W-J-1332, W-J-4108.

ArmaProtect FW2 for use in Through-Penetration Firestop System Nos. C-AJ-2927, C-AJ-8329, F-A-2373, F-A-5080, F-A-8060, F-A-8061, F-A-8062, F-A-8063, F-A-8064, F-A-8065, W-J-2376, W-J-5210, W-J-8089, W-J-8090, W-J-8091, W-J-8092, W-J-8093, W-J-8094, W-J-8097, W-L-2822, W-L-2823, W-L-2824, W-L-2825, W-L-8136, W-L-8137, W-J-8098.

ArmaProtect FW1 for use in Through-Penetration Firestop System Nos. C-AJ-2928, C-AJ-2929, F-A-2374, F-A-2376, F-A-2377, F-A-2378, F-A-2382, F-A-2386, F-A-2387, F-A-2388, F-A-2389, F-A-2390, F-A-2391, F-A-2392, F-A-2393, F-A-3083, W-J-2377, W-J-2378, W-J-2379, W-J-2380, W-J-8095, W-L-2819, W-L-2820, W-L-2821, W-L-2829, W-L-2833, W-L-2834, W-L-2835, W-L-2836, W-L-2837, W-L-8138, W-J-2384, W-J-2388, W-J-2389, W-J-2390, W-J-2391, W-J-2392.

ArmaProtect MM20 for use in Through-Penetration Firestop System Nos. C-AJ-6057, F-A-2377, F-A-4028, F-A-4030, F-A-8066, W-J-2379, W-J-4110, W-J-4112, W-J-8099.

ArmaProtect CU for use in Through-Penetration Firestop System Nos. F-B-4010, W-J-4113.

*B. Mahrenholz*

Bruce Mahrenholz, Director North American Certification Program  
 UL LLC

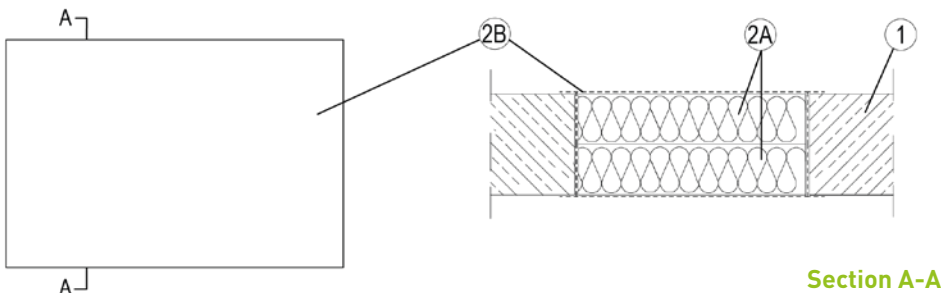
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System No. C-AJ-0181 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1

**Floor or Wall Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete, min thickness of solid concrete floor or wall assembly is 4-1/2 in. (115 mm). Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Opening shall be rectangular with max dimensions of 15-3/4 in. (400 mm) by 10-5/8 in. (270 mm).

See **Concrete Blocks** (CAZT) category in Fire Resistance Directory for names of manufacturers.
- 2

**Firestop System** — The Through-Penetration Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor or wall as a permanent form. Packing material to be installed flush with both surfaces of the floor or wall.

B. **Fill, Void or Cavity Material**\* — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the concrete by min. 3/4 in. (20 mm).

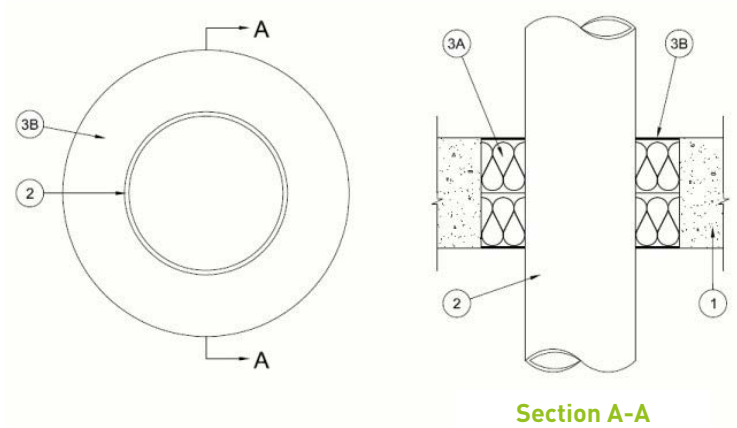
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. C-AJ-1753 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



- 1 Floor or Wall Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete, min thickness of solid concrete floor or wall assembly is 4-1/2 in. (115 mm). Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max diameter or dimensions of 10-1/4 in. (259 mm) in concrete walls and floors.

See **Concrete Blocks** (CAZT) category in Fire Resistance Directory for names of manufacturers.

- 2 Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in. (50 mm). Pipes to be rigidly supported on both sides of the floor or wall assembly. The following penetrants may be used:

A. Max 6-1/4 in. (159 mm) diameter Schedule 5 (or heavier) steel pipe.

B. Max 6-1/4 in. (159 mm) diameter Type M (or heavier) copper tubing.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m3) firmly packed into the opening of the floor or wall as a permanent form. Packing material to be installed flush with both surfaces of the floor or wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the concrete by min. 3/4 in. (20 mm).

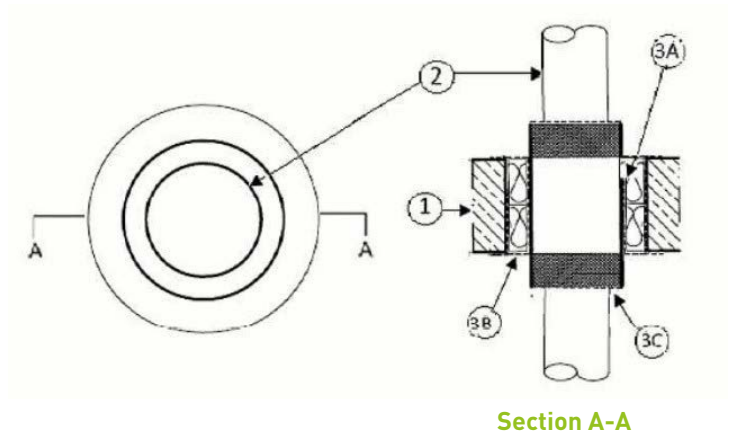
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. C-AJ-1754 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1/2 Hr



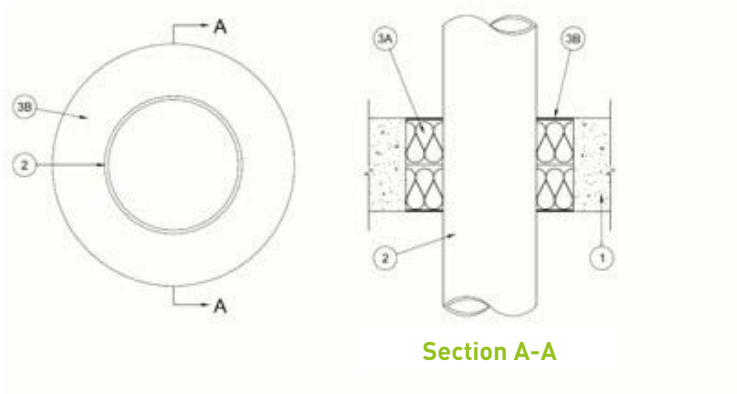
- 1 Wall and Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular with max diameter of 6-3/8 in. (162 mm).  
See Concrete Blocks (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the ArmaProtect CT and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the floor or wall assembly. The following penetrants may be used:  
  
A. Max 3-1/2 in. (89 mm) diameter Schedule 10 (or heavier) steel pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing material** — 2 layers nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor or wall as a permanent form.  
  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).  
**ARMACELL GMBH** — ArmaProtect ABLC  
  
C. Firestop Device\* — 7-7/8 in. (200 mm) long pipe wrap positioned centrally within the seal and wrapped around the pipe.  
**ARMACELL GMBH** — ArmaProtect CT

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. C-AJ-1757 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



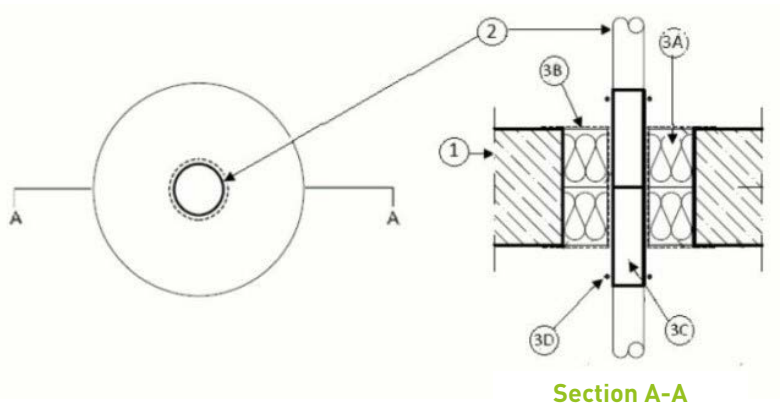
- 1 Floor or Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Opening shall be circular or rectangular with max diameter or dimensions with max. diameter or dimensions 16-3/4 in. (424 mm).  
  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Pipes** — Single pipe to be installed within the opening. The annular space between the pipe and the periphery of the opening to be a nom 2 in (50 mm). Pipe to be rigidly supported on both sides of the wall or floor assembly. The following pipes may be used:  
  
A. Nominal 12-3/4 in. (323.9 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing material** — 2 layers of nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into a steel sleeve in the opening of the wall or floor as a permanent form.  
  
B. **Fill, Void or Cavity Material**\* — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall or floor by min. 3/4 in. (20 mm).  
  
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. C-AJ-2927 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1/2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

**1 Floor and Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max dimensions of 5-1/4 in. (132 mm). See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

**2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the wall or floor assembly. The following penetrants may be used:

A. Nominal 1-1/4 in (32 mm) diameter, 1/8 in. (3 mm) wall thickness PE/AL/PE composite plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

**3 Firestop System** — The Firestop System shall consist of the following:

A. Packing material — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall or floor as a permanent form.

B. Fill, Void or Cavity Material\* — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall or floor by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

C. Fill, Void or Cavity Material\* — 2 lengths of 1 layer of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around pipe to a total length of 7-7/8 in. (200 mm).

**ARMACELL GMBH** — ArmaProtect FW2

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



## System No. C-AJ-2928 - November 30, 2021

### ANSI/UL1479 (ASTM E814)

F Rating — 3 Hr

T Rating — 3 Hr

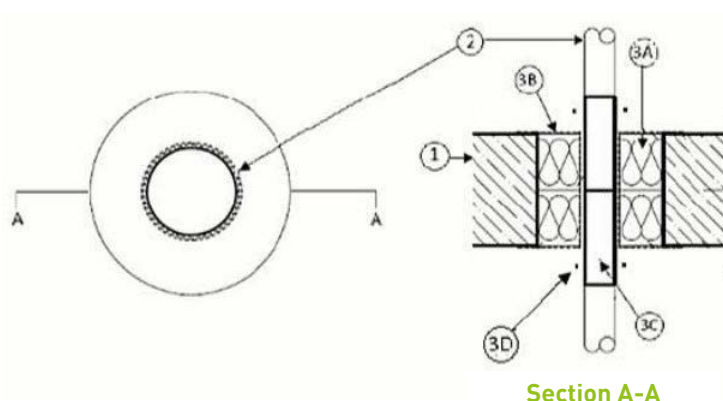
### CAN/ULC S115

F Rating — 3 Hr

FT Rating — 3 Hr

FH Rating — 3 Hr

FTH Rating — 3 Hr



**System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.**

- 1 Wall and Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max dimensions of 7-7/8 in. (200 mm). See Concrete Blocks (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the floor or wall assembly. The following penetrants may be used:

A. Nominal 1-1/4 in (32 mm) diameter, 1/16 in. (1.9 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall or floor by min. 3/4 in. (20 mm).

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 2 lengths of 1 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the bundle to a total length of 10 in. (200 mm).

**ARMACELL GMBH** — ArmaProtect FW1

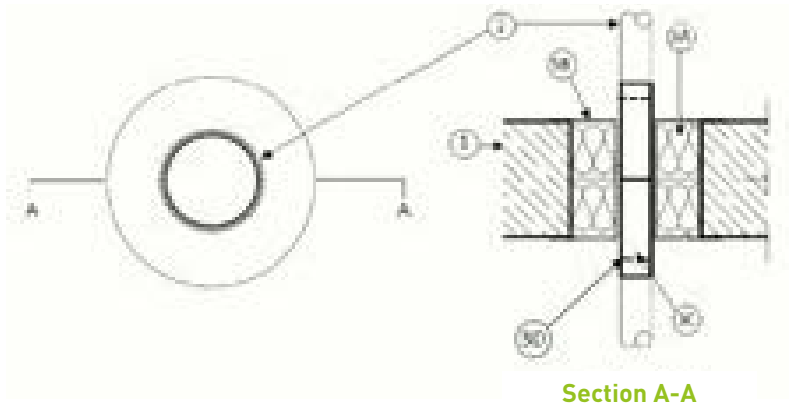
D. Min 24 AWG steel wire tied around 3C at nominally 1 in. (25 mm) from both faces of the seal

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. C-AJ-2929 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side

- 1 Wall and Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions 7-7/8 in. (200 mm) by 7-7/8 in. (200 mm). See Concrete Blocks (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Pipes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1-3/4 in (45 mm). Pipes to be rigidly supported on both sides of the wall or floor assembly. The following penetrants may be used:  
  
A. Nom 4-1/4 in (110 mm) diam 1/8 in. (3,4 mm) wall thickness PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. Packing material — 2 layers of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall or floor as a permanent form.  
  
B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall or floor by min 3/4 in. (20 mm).  
  
ARMACELL GMBH — ArmaProtect ABLC  
  
C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the pipe to a total length of 8 in. (200 mm).  
  
**ARMACELL GMBH** — ArmaProtect FW1  
  
D. 24 AWG Steel wire tied around 3C at nom 1 in. (25 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



## System No. C-AJ-2930 - November 30, 2021

### ANSI/UL1479 (ASTM E814)

F Rating — 3 Hr

T Rating — 3 Hr

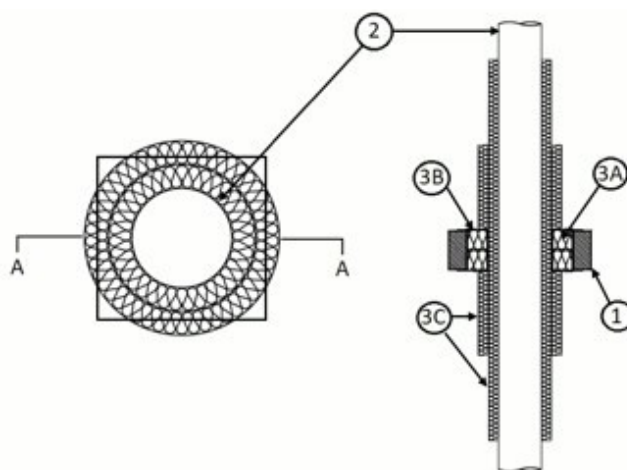
### CAN/ULC S115

F Rating — 3 Hr

FT Rating — 3 Hr

FH Rating — 3 Hr

FTH Rating — 3 Hr



Section A-A

**System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.**

- 1 Wall and Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions 7-7/8 in. (200 mm) by 7-7/8 in. (200 mm). See Concrete Blocks (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes** — Single pipe to be installed within the opening. The annular space between the pipe and the periphery of the opening to be a nom 1/2 in (15 mm). Pipe to be rigidly supported on both sides of the wall or floor assembly. The following pipes may be used:

A. Nom 4-1/4 in. (110 mm) diam (or smaller) 3/8 in. (10 mm) wall thickness Aluminium composite pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into a steel sleeve in the opening of the wall or floor as a permanent form.

B. **Fill, Void or Cavity Material\*** - Sealant — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall or floor by min 3/4 in. (20 mm).

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Pipe Insulation** — Nom 1-1/4 in. (30 mm) thick mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around pipe for min 19-3/4 in. (500 mm) on both faces and continuous through the seal. Nom 1-1/4 in. (30 mm) thick mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around first layer of pipe insulation for min 10 in. (250 mm) on both faces.

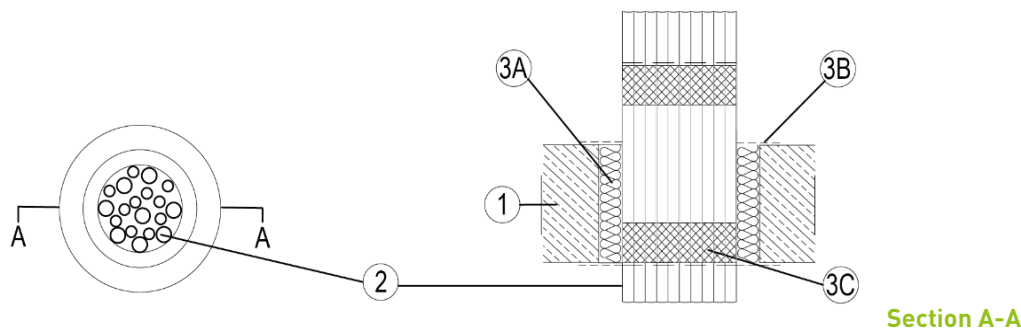
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. C-AJ-2931 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall and Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions 7-7/8 in. (200 mm) by 7-7/8 in. (200 mm). See Concrete Blocks (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall or floor as a permanent form, flush to both faces.
  - B. Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied over the full surface of the seal, and overlapping onto the wall or floor by min. 3/4 in. (20 mm). in. Min. 1/32 in. (1 mm) dry film thickness to be applied over both ends of the Firestop Device.

**ARMACELL GMBH** — ArmaProtect ABLC

  - C. Firestop Device\*** — 7-7/8 in. (200 mm) long by 4-1/2" (116 mm) diameter cable tube positioned centrally within the seal and around the cables.

**ARMACELL GMBH** — ArmaProtect CT

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



## System No. C-AJ-4118 - November 30, 2021

### ANSI/UL1479 (ASTM E814)

F Rating — 3 Hr

T Rating — 2 Hr

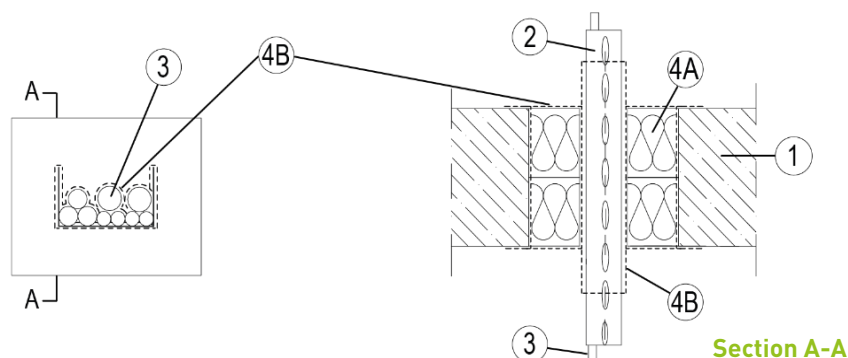
### CAN/ULC S115

F Rating — 3 Hr

FT Rating — 2 Hr

FH Rating — 3 Hr

FTH Rating — 2 Hr



- 1 Floor or Wall Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete, min thickness of solid concrete floor or wall assembly is 4-1/2 in. (115 mm). Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 7-7/8 in. (200 mm) by 6-1/4 in. (160 mm) in concrete walls and floors.  
See Concrete Blocks (CAZT) category in Fire Resistance Directory for names of manufacturers.
- 2 Cable Tray\*** — Max 4 in (100 mm) wide by 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. Cable trays to be rigidly supported on both sides of the floor or wall assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 15.48 percent of the cross-sectional area of the cable tray based on a max 1 in. (25 mm) cable loading depth within the tray. Any combination of the following types and sizes of cables may be used:

  - A. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
- 4 Through-Penetration Firestop System** — Aperture to be coated with item 3B before the Through-Penetration Firestop System is installed. The Through-Penetration Firestop System shall consist of the following:

  - A. **Packing Material** — Nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>), firmly packed into the opening of the floor or wall as a permanent form. Packing material to be installed flush with both surfaces of floor or wall.
  - B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a min length of 7-7/8 in. (200 mm) from both faces of the board.

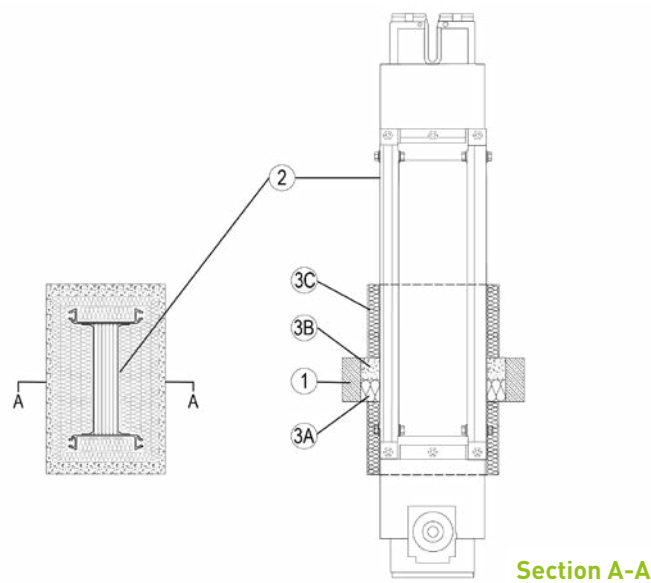
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. C-AJ-6057 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



- 1 Wall and Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Opening shall be rectangular with max dimensions 15-3/4 in. (400 mm) by 15-3/4 in. (400 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Busbar** — Single to be installed within the opening. The annular space between the busbar and the periphery of the opening to be 2 in (50 mm). Busbar to be rigidly supported on both sides of the wall or floor assembly. The following penetrants may be used:

A. Aluminium or Copper busbar with max dimensions 11-3/4 in. (300 mm) by 11-3/4 in. (300 mm).

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — 1 layer of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form, flush to one surface of the wall or floor.

B. **Fill, Void or Cavity Material**\* — Min 2-1/8 in. (55 mm) cast into the annular space between the cables/tray and periphery of the opening, flush with one surface of the wall or floor. Mortar to be mixed with water in accordance with the manufacturer's installation instructions.

**ARMACELL GMBH** — ArmaProtect MM20

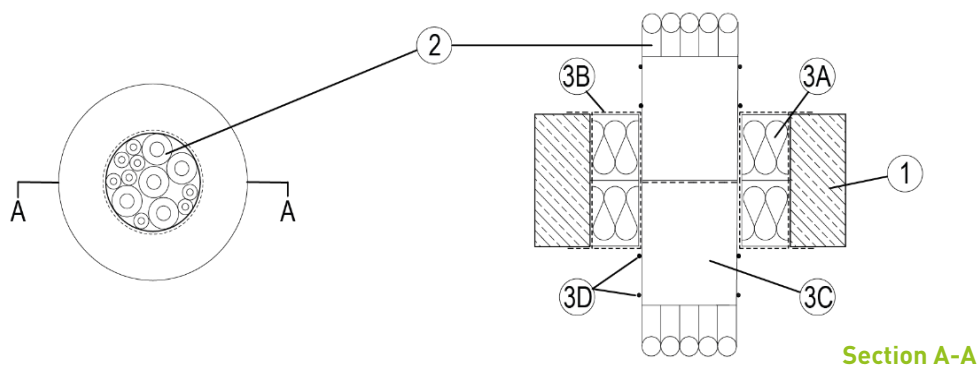
C. **Busbar Insulation** — Nom 1-1/4 in. (30 mm) thick mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around busbar for min 7-7/8 in. (200 mm) on both faces.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



# System No. C-AJ-8329 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall and Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm). See Concrete Blocks (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall or floor as a permanent form.
  - B. Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall or floor by min. 3/4 in. (20 mm).

**ARMACELL GMBH** — ArmaProtect ABLC

  - C. Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

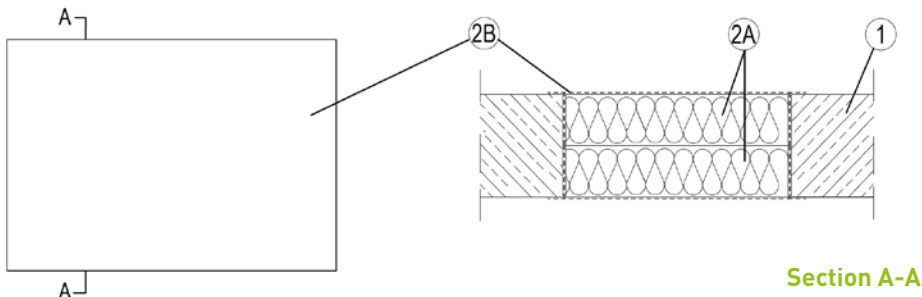
  - D.** 24 AWG Steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-0046 - Date

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 15-3/4 in. (400 mm) by 23-5/8 in. (600 mm).
- 2 Firestop System** — The Firestop System shall consist of the following:
  - A. Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor or wall as a permanent form.
  - B. Fill, Void or Cavity Material\*** — Min. 1/16 in. (2mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

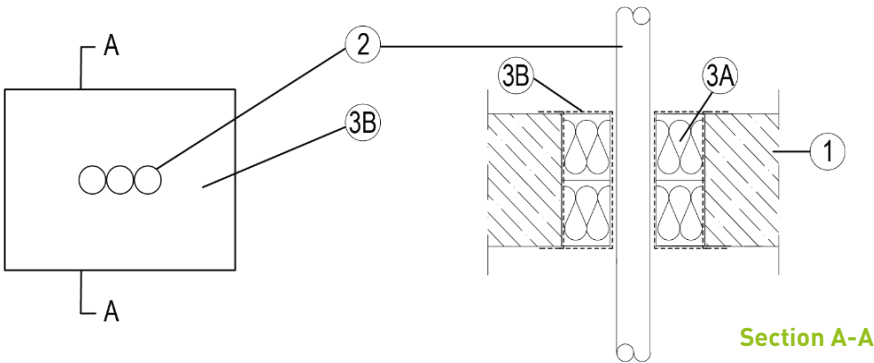
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-1208 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



- 1 Floor Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete, min thickness of solid concrete floor assembly is 4-1/2 in. (115 mm). Opening shall be rectangular with max dimensions of 4-1/2 in. (116 mm) by 5-7/8 in. (148 mm).
- 2 Steel Pipes** — Single or tight bundle to be installed within the opening on a cable tray. Aggregate cross-sectional area of pipes in opening to have a visual fill of min 0% to max 11%. The annular space between the pipes and the periphery of the opening to be a nom 2 in (50 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following pipes may be used:
  - A. Nominal 5/8 in. (17 mm) diameter (or smaller) Schedule 40 (or heavier), steel pipe.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m3) firmly packed into the opening of the floor as a permanent form. Packing material to be installed flush with both surfaces of floor.
  - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min. 3/4 in. (20 mm).

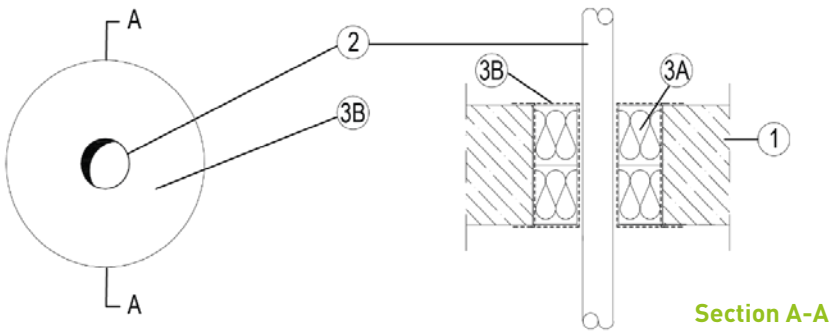
ARMACELL GMBH — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-1209 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



- 1 Floor Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete, min thickness of solid concrete floor assembly is 4-1/2 in. (115 mm). Opening shall be circular or rectangular with max diameter or dimensions of 5-1/4 in. (132 mm).
- 2 Through-Penetrant** — One penetrant to be installed within the opening. The annular space between the penetrant and the periphery of the opening to be a nom 2 in (50 mm). Penetrant to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:
  - A. Nominal 1-1/4 in. (32 mm) diameter (or smaller) Type M (or heavier) copper tube.
  - B. Nominal 1-1/4 in. (32 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe.
- 3 Firestop System** — The firestop system shall consist of the following:
  - A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form. Packing material to be installed flush with both surfaces of floor.
  - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the concrete by min. 3/4 in. (20 mm).

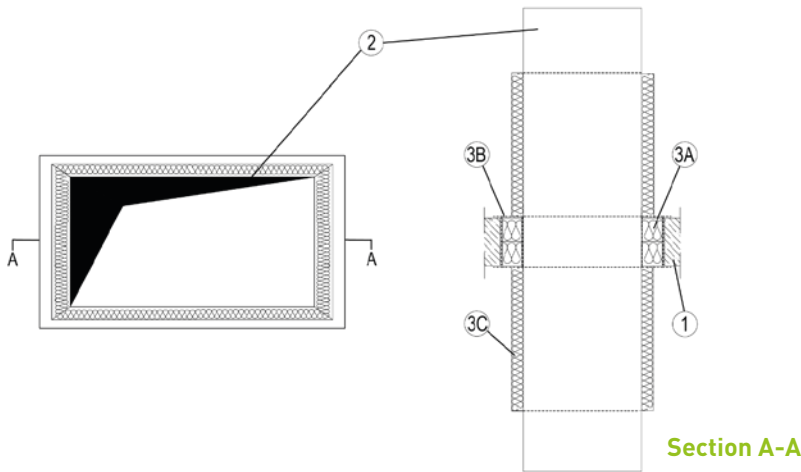
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-1211 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1/2 Hr



- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 19-3/4 in. (500 mm) by 15-3/4 in. (400 mm).
- 2 Duct** — Single to be installed within the opening. The annular space between the duct and the periphery of the opening to be 2 in (50 mm). Ducts to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
A. Max. 15-3/4 in. (400 mm) by 11-3/4 in. (300 mm) galvanized steel duct.
- 3 Firestop System** — The Firestop System shall consist of the following:  
A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).  
**ARMACELL GMBH** — ArmaProtect ABLC  
C. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick 'Klimarock' mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around duct for min. 10 in. (250 mm) on both faces.

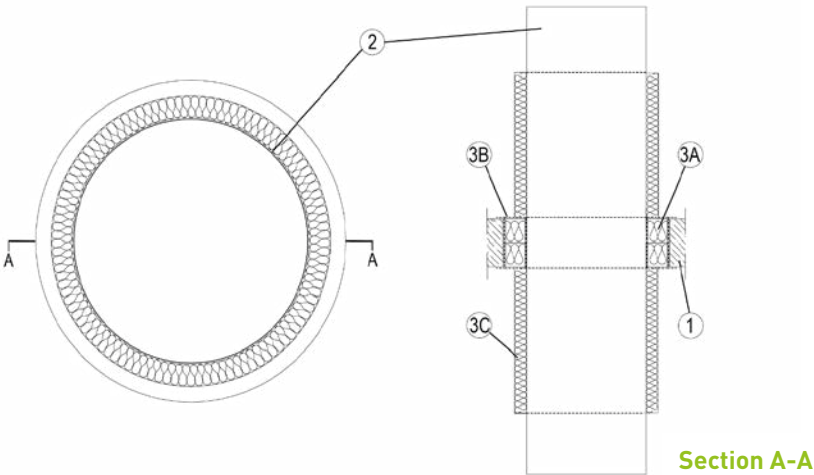
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. F-A-1213 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



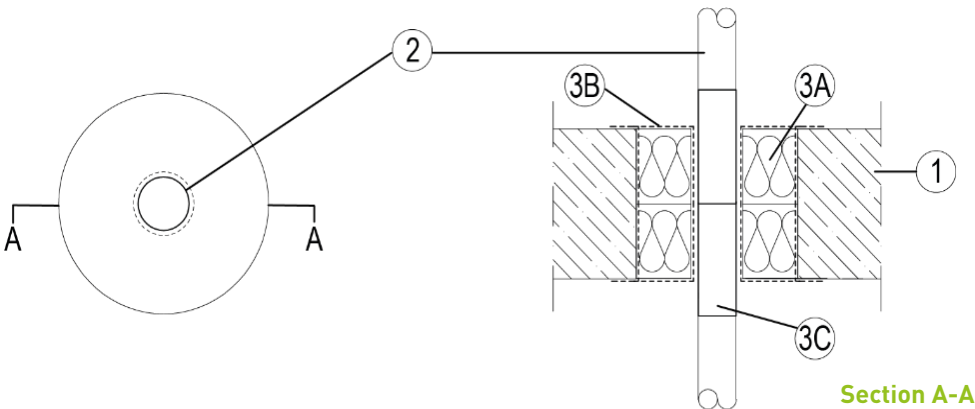
- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular or circular with max dimensions of 15-3/4 in. (400 mm).
- 2 Duct** — Single to be installed within the opening. The annular space between the duct and the periphery of the opening to be 1-1/4 in (30 mm). Ducts to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
A. 11-3/4 in. (300 mm) galvanized steel duct.
- 3 Firestop System** — The Firestop System shall consist of the following:  
A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min. 3/4 in. (20 mm).  
**ARMACELL GMBH** — ArmaProtect ABLC  
C. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick 'Klimarock' mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around duct for min. 10 in. (250 mm) on both faces.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2373 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 2 Hr
	FTH Rating — 1 Hr



**Floor Assembly — System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.**

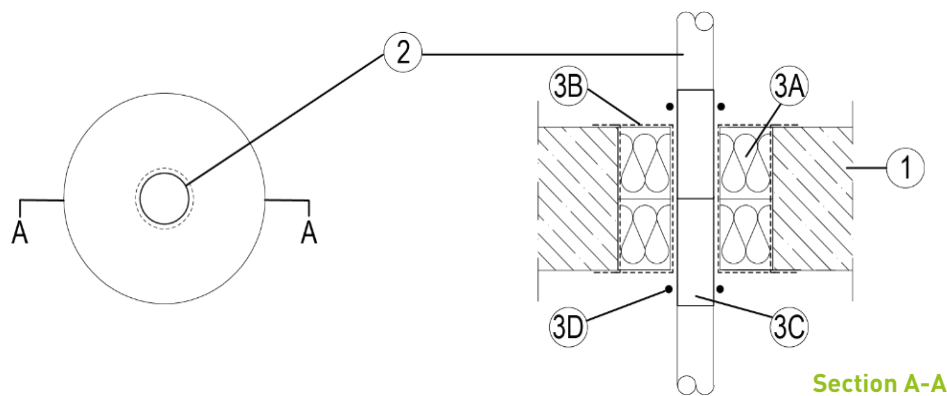
- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max dimensions of 5-1/4 in. (132 mm).
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nominal 1-1/4 in (32mm) diameter, 1/8 in. (3 mm) wall thickness PE/AL/PE composite plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.  
  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.  
ARMACELL GMBH — ArmaProtect ABLC  
  
C. **Fill, Void or Cavity Material\*** — 1 layer of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around pipe.  
  
**ARMACELL GMBH** — ArmaProtect FW2

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2374 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max dimensions of 7-7/8 in. (200 mm).
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
A. Nominal 4 in (100mm) diameter, 1/8 in. (2.7 mm) wall thickness PP-HT pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:  
A. Packing material — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

- C. Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the bundle to a total length of 10 in. (200 mm).

**ARMACELL GMBH** — ArmaProtect FW1

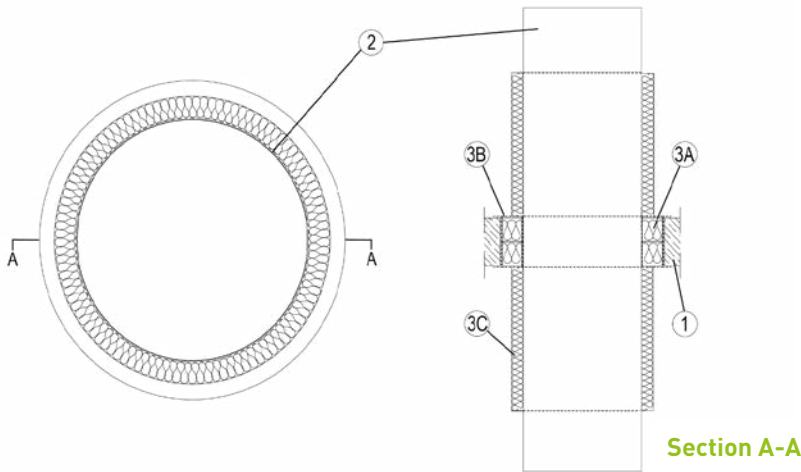
- D.** 24 AWG Steel wire tied around 3C at nominally 3/4 in. (20 mm) and 1-1/2 in. (40 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2375 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

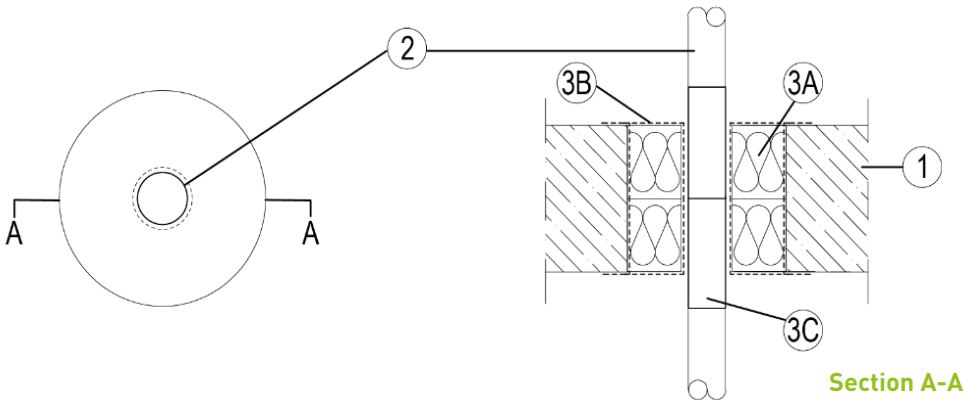
- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 7 in. (175 mm).
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1-1/4 in (30 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nominal 4-1/4 in (110mm) diameter, 1/8 in. (2.7 mm) wall thickness PE/AL/PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems..
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing material** — 2 layers of nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.  
  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).  
  
**ARMACELL GMBH** — ArmaProtect ABLC  
  
C. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick 'Klimarock' mineral fibre lamella mat wrapped around duct for min. 10 in. (250 mm) on both faces.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2376 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

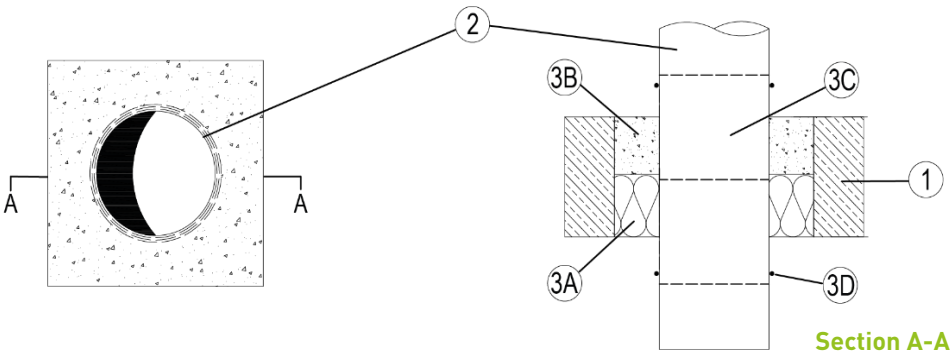
- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max dimensions of 7-7/8 in. (200 mm).
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nominal 3 in (76 mm) diameter, 1/8 in. (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.  
  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min. 3/4 in. (20 mm).  
  
**ARMACELL GMBH** — ArmaProtect ABLC  
  
C. **Fill, Void or Cavity Material\*** — 2 lengths of 2 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the bundle to a total length of 10 in. (200 mm).  
  
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2377 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating —3 Hr	FT Rating —3 Hr
	FH Rating — 3 Hr
	FTH Rating —3 Hr



**Floor Assembly — System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.**

- 1 Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 7-7/8 in. (200 mm) by 7-7/8 in. (200 mm).
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1-3/4 in (45 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:
  - A. Nom 4-1/4 in (110mm) diam, 1/8 in. (3,2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - B. Nom 4-1/4 in (110mm) diam, 1/8 in. (3,4 mm) wall thickness PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing Material** — 1 layer of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form, flush to the bottom surface of the floor.
  - B. **Fill, Void or Cavity Material\*** — Min 2-1/8 in. (55 mm) cast into the annular space between the pipe and periphery of the opening, flush with the top surface of the floor. Mortar to be mixed with water in accordance with the manufacturer's installation instructions.

ARMACELL GMBH — ArmaProtect MM20
  - C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the pipe to a total length of 8 in. (200 mm).

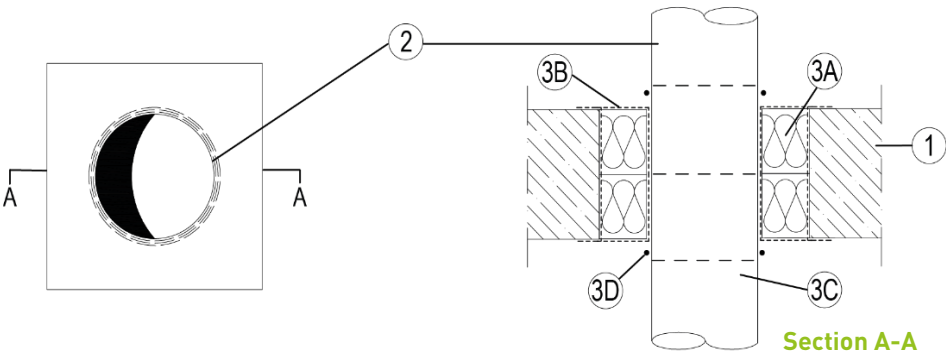
ARMACELL GMBH — ArmaProtect FW1
  - D. 24 AWG Steel wire tied around 3C at nom 1 in. (25 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2378 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

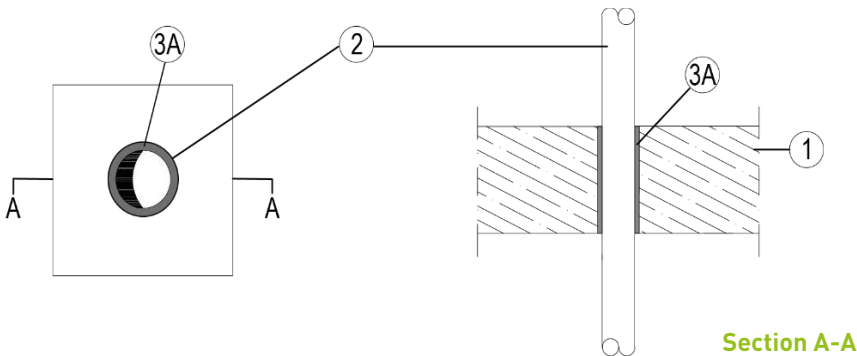
- 1 **Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular or circular with max dimensions of 7-7/8 in. (200 mm).
- 2 **Pipes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1-3/4 in (45 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 4-1/4 in (110mm) diam 1/8 in. (3,2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3 **Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing material** — 2 layers of nom 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.  
  
B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min 3/4 in. (20 mm).  
  
ARMACELL GMBH — ArmaProtect ABLC  
  
C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the pipe to a total length of 8 in. (200 mm).  
  
ARMACELL GMBH — ArmaProtect FW1  
  
D. 24 AWG Steel wire tied around 3C at nom 1 in. (25 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2379 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 2.36 in. (60 mm).
  - 2 Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.4 in (10 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:
    - A. Nom 1-1/2 in (40 mm) diam 0.15 in (3.7 mm) wall thickness PE pipe for use in closed (process or supply) piping systems.
  - 3 Firestop System** — The Firestop System shall consist of the following:
    - A. **Fill, Void or Cavity Material\*** — Min 0.4 in. (10 mm) width inside the aperture.
- ARMACELL GMBH** — ArmaProtect ABLF

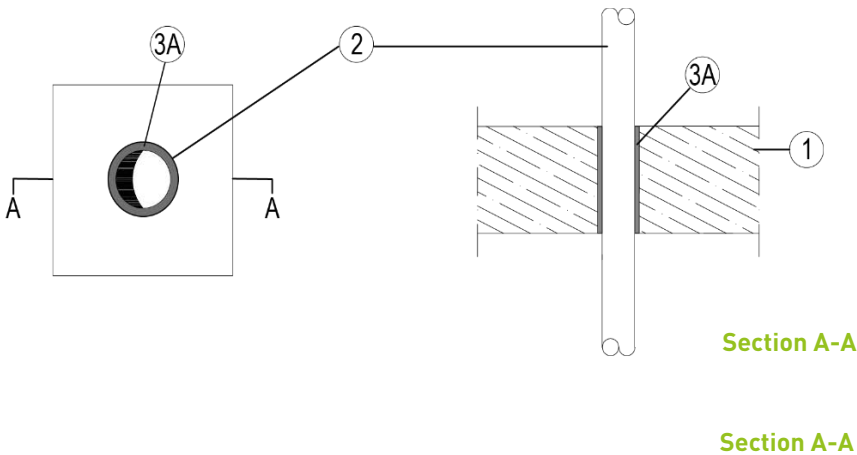
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. F-A-2380 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

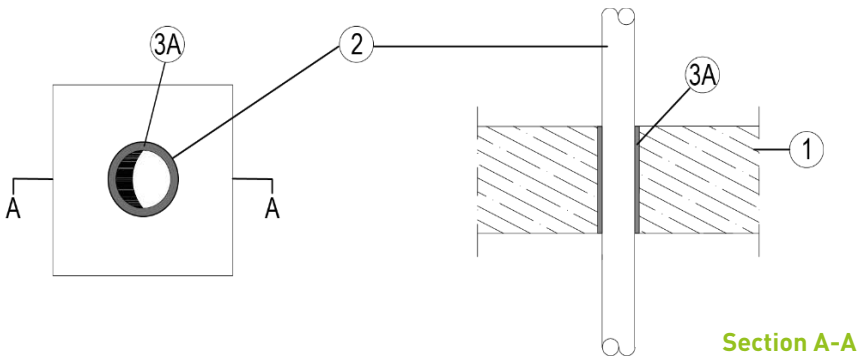
- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m³) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 2.36 in. (60 mm).
  - 2 Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.4 in (10 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:
    - A. Nom 1-1/2 in (40 mm) diam 0.12 in (3.0 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
  - 3 Firestop System** — The Firestop System shall consist of the following:
    - A. **Fill, Void or Cavity Material\*** — Min 0.44 in. (10 mm) width inside the aperture.
- ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2381 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	T Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

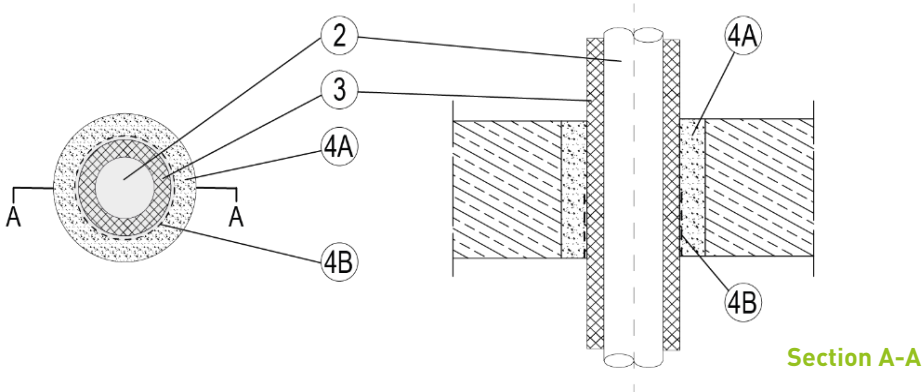
- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 2.36 in. (60 mm).
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.4 in (10 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 1-1/2 in (40 mm) diam 0.15 in (3.7 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Fill, Void or Cavity Material\*** — Min 0.4 in (10 mm) width inside the aperture.  
  
**ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2382 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. [115 mm] thick lightweight or normal weight [100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>] concrete. Opening shall be circular or rectangular with max diameter or dimensions of 6.4 in. [163 mm].
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1.22 in [31 mm]. Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 2-1/2 in (63 mm) diam 0.19 in (4.7 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 Pipe Covering\*** — Nom 0.12 in. [19 mm] thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated pipe or tubing and periphery of the opening shall be 1.22 in [31 mm].  
  
See Plastics+ [QMFZ2] category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 95-5VA may be used.
- 4 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — UL Certified gypsum mud, minimum 31 mm width inside the aperture.  
  
B. **Fill, Void or Cavity Material\*** — 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. [50 mm] wrap flush mounted on the exposed side around the pipe.

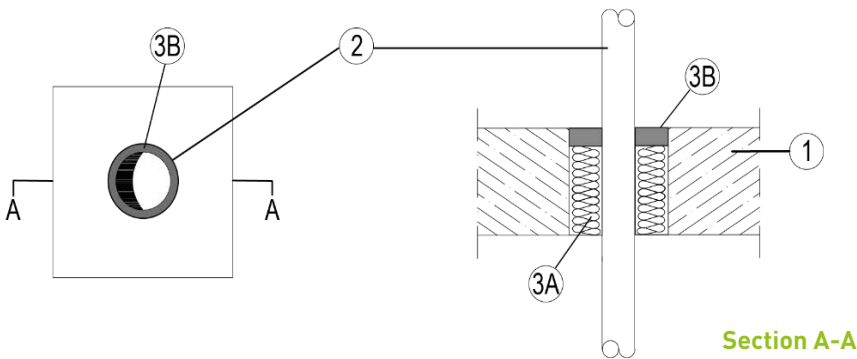
ARMACELL GMBH — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2383 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 **1. Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 3.9 in. (100 mm).
- 2 **2. Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.5 in (12.5 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 2.95 in (75 mm) diam 0.14 in (3.6 mm) wall thickness PE pipe for use in closed (process or supply) piping systems.
- 3 **3. Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing material** — 1 layer of Nom. 0.5 in. (12.5 mm) thick and 3.9 in. (100 mm) depth mineral wool board min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the floor and flush mounted on the exposed side as a permanent form.  
  
B. **Fill, Void or Cavity Material\*** — Min 0.5 in (12,5 mm) width and min 0.6 in. (15 mm) depth cast in to aperture in the floor over the packing material and around the services.

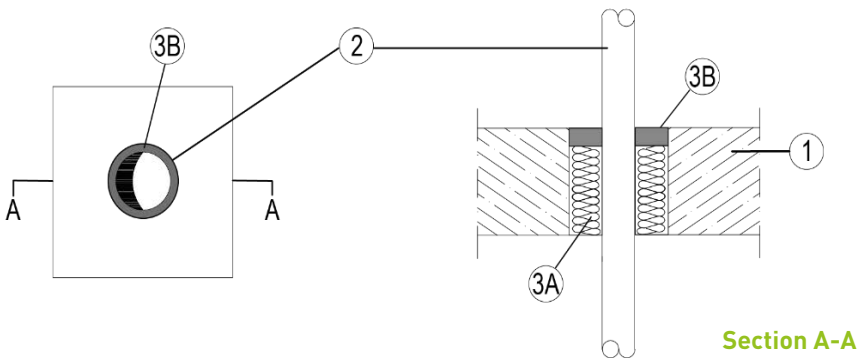
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2384 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 3.9 in. (100 mm).
- 2 Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.5 in (12.5 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 2.95 in (75 mm) diam 0.14 in (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing material** — 1 layers of Nom. 0.5 in. (12.5 mm) thick and 3.9 in. (100 mm) depth mineral wool board min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the floor and flush mounted on the exposed side as a permanent form.  
  
B. **Fill, Void or Cavity Material\*** — Min 0.5 in (12,5 mm) width and min 0.6 in. (15 mm) depth cast in to aperture in the floor over the packing material and around the services.

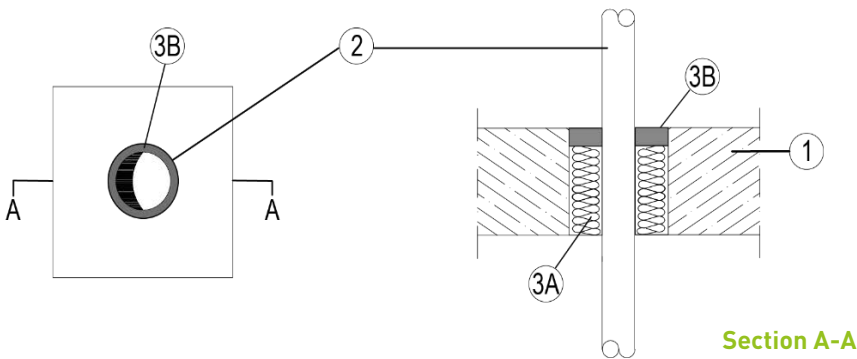
ARMACELL GMBH — ArmaProtect ABLC

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System No. F-A-2385 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 3.9 in. (100 mm).
- 2 Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.5 in (12.5 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:
  - A. Nom 2.95 in (75 mm) diam 0.18 in (4.5 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing material** — 1 layer of Nom. 0.5 in. (12.5 mm) thick and 3.9 in. (100 mm) depth mineral wool board min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the floor and flush mounted on the exposed side as a permanent form.
  - B. **Fill, Void or Cavity Material\*** — Min 0.5 in (12,5 mm) width and min 0.6 in. (15 mm) depth cast in to aperture in the floor over the packing material and around the services.

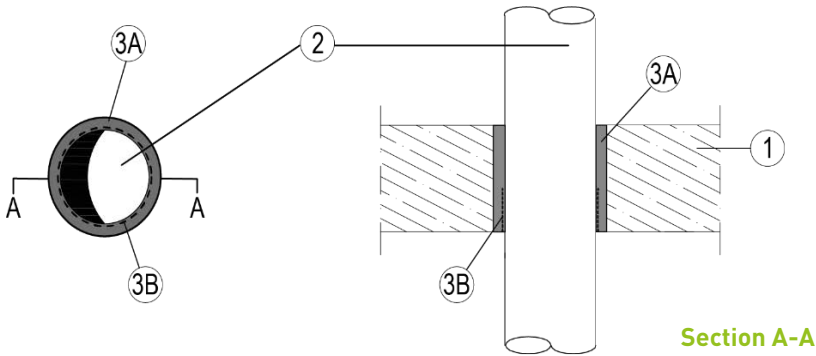
ARMACELL GMBH — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2386 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 6.3 in. (160 mm).
- 2 Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 4.3 in (110 mm) diam 0.26 in (6.6 mm) wall thickness PE pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — UL Certified gypsum mud, minimum 1 in. width inside the aperture.  
  
B. **Fill, Void or Cavity Material\*** — 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted on the exposed side around the pipe.

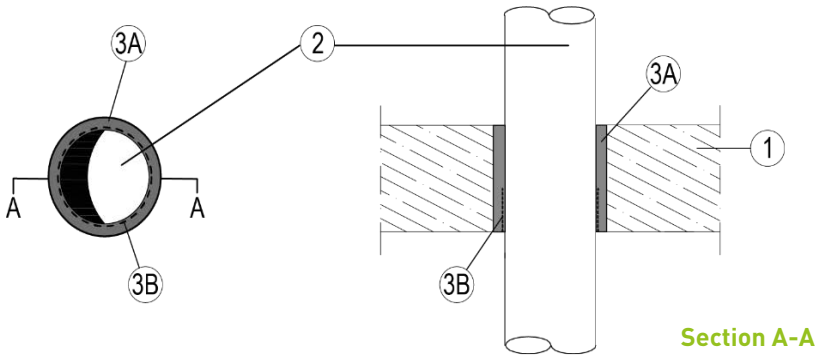
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2387 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 6.3 in. (160 mm).
- 2 Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:
  - A. Nom 4.3 in (110 mm) diam 0.21 in (5.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing Material** — UL Certified gypsum mud, minimum 1 in. width inside the aperture.
  - B. **Fill, Void or Cavity Material\*** — 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted on the exposed side around the pipe.

**ARMACELL GMBH** — ArmaProtect FW1

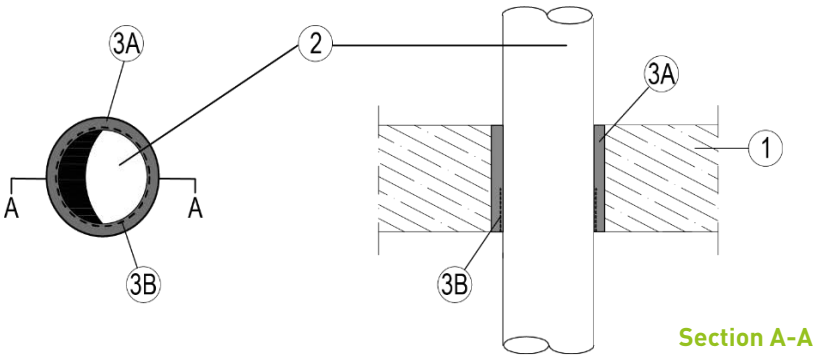
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. F-A-2388 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 6.3 in. (160 mm).
- 2 Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 4.3 in (110 mm) diam 0.25 in (6.3 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — UL Certified gypsum mud, minimum 1 in. width inside the aperture.  
  
B. **Fill, Void or Cavity Material\*** — 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted on the exposed side around the pipe.

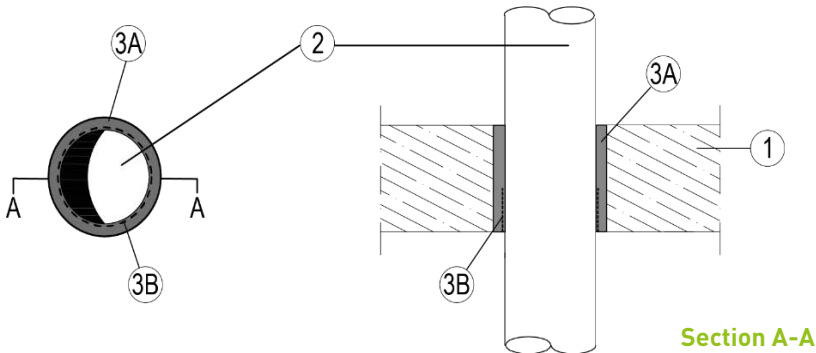
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2389 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3Hr	FT Rating — 3 Hr
	FT Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1. Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 6.3 in. (160 mm).
- 2. Pipes/Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 4.3 in (110 mm) diam 0.26 in (6.6 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.
- 3. Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — UL Certified gypsum mud, minimum 1 in. width inside the aperture.  
  
B. **Fill, Void or Cavity Material\*** — 1 length of 2 layers of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted on the exposed side around the pipe.

**ARMACELL GMBH** — ArmaProtect FW1

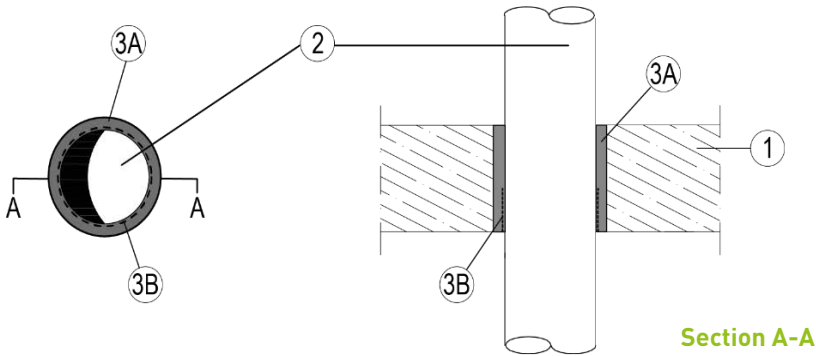
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. F-A-2391 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. [115 mm] thick lightweight or normal weight [100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>] concrete. Opening shall be circular or rectangular with max diameter or dimensions of 8.3 in. [210 mm].
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in [25 mm]. Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 6.3 in [160 mm] diam 0.3 in [7.7 mm] wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — UL Certified gypsum mud, minimum 1 in. width inside the aperture.  
  
B. **Fill, Void or Cavity Material\*** — 1 length of 2 layers of 1/16 in [1.5 mm] by 2 in. [50 mm] wrap flush mounted on the exposed side around the pipe.

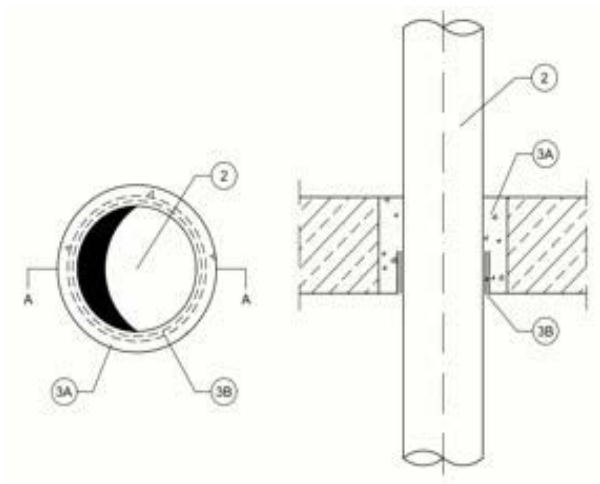
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-2392 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 8.3 in. (210 mm).
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 6.3 in (160 mm) diam 0.36 in (9.1 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — UL Certified gypsum mud, minimum 1 in. width inside the aperture.  
  
B. **Fill, Void or Cavity Material\*** — 1 length of 2 layers of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted on the exposed side around the pipe.

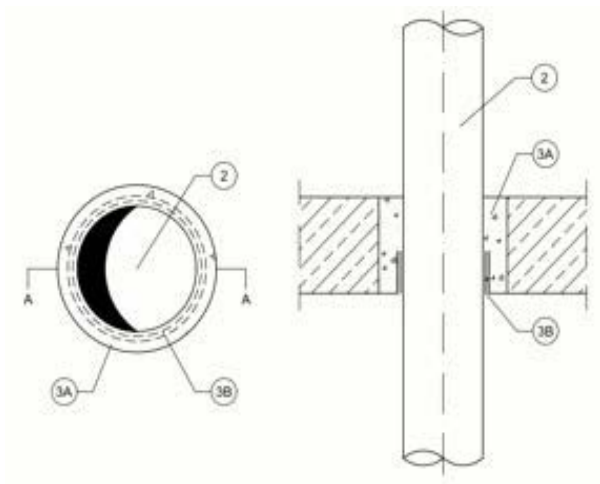
**ARMACELL GMBH** — ArmaProtect FW1

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System No. F-A-2393 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 **Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m³) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 6.3 in. (160 mm).
- 2 **Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:  
  
A. Nom 4.3 in (110 mm) diam 0.48 in (12.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 **Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — UL Certified gypsum mud, minimum 1 in. width inside the aperture.  
  
B. **Fill, Void or Cavity Material\*** — 1 length of 2 layers of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted on the exposed side around the pipe.

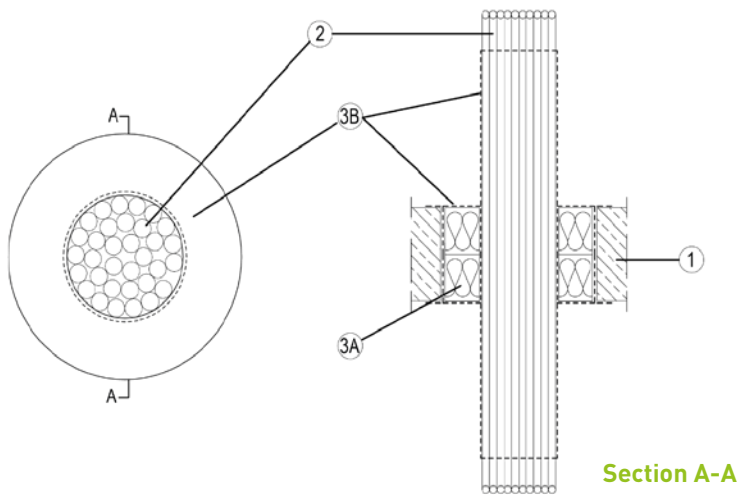
**ARMACELL GMBH** — ArmaProtect FW1

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System No. F-A-3081 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



- 1 Floor Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete, min thickness of solid concrete floor assembly is 4-1/2 in. (115 mm). Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm).
- 2 Cables** — Single or tight bundle of cables to be installed within the opening on a cable tray. Aggregate cross-sectional area of cables in opening to have a visual fill of min 0% to max 50%. The annular space between the cable bundle and the periphery of the opening to be 2 in (50 mm). Cables to be rigidly supported on both sides of the floor assembly. The following types and sizes of cables may be used:  
  
A. Max 20/C No. 19 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cables PE jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form. Packing material to be installed flush with both surfaces of floor.  
  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the concrete by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables to a minimum length of 7-7/8 in. (200 mm) from both faces of the board.

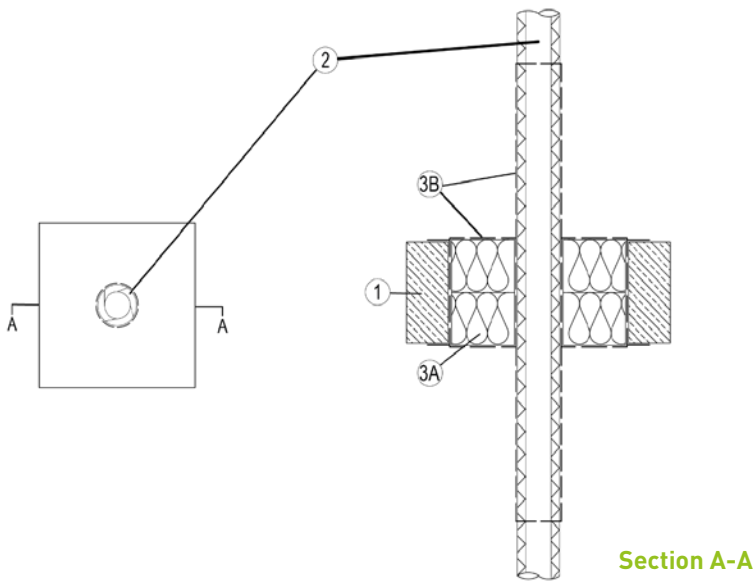
**ARMACELL GMBH** — ArmaProtect ABLC

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System No. F-A-3082 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



- 1 Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 7-7/8 in. (200 mm) by 7-7/8 in. (200 mm).
- 2 Services** — Single hollow optic cable (waveguide) with max diam 2-1/2 in. (63 mm). The annular space between the cable and the periphery of the opening to be 2-3/4 in. (68.5 mm). Cable to be rigidly supported on both sides of the floor assembly.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. Packing material** — 2 layers of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.
  - B. Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min 3/4 in. (20 mm). Min 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cable to a min length of 7-7/8 in. (200 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

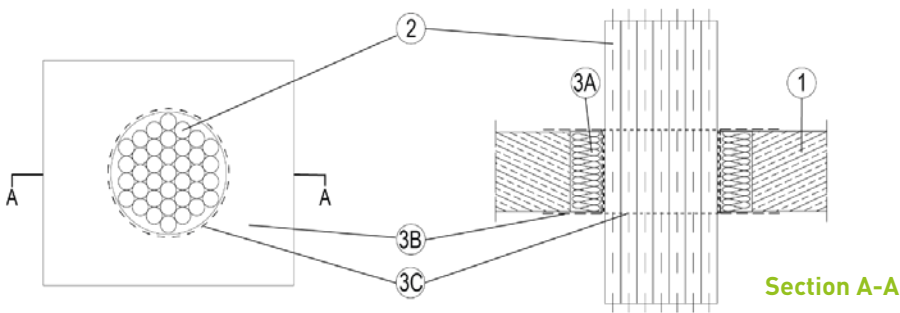
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. F-A-3083 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

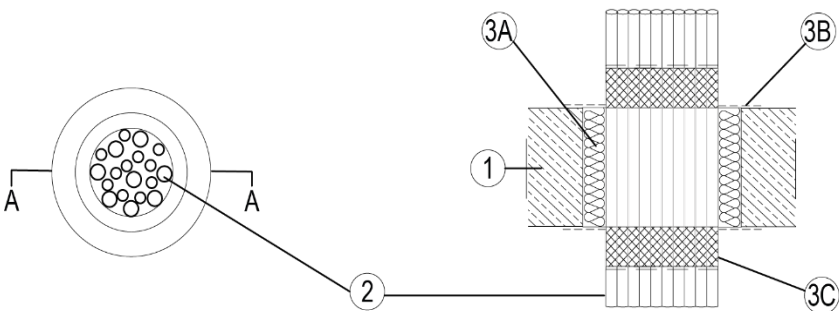
- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Max size of opening to be 12 in. (300 mm) high by 12 in. (300 mm) wide.
- 2 Cables** — Bundle of 6" (150 mm) diameter of the following types and sizes of cables may be used:  
A. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:  
A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.  
B. **Fill, Void or Cavity Material\*** — Min. 1/8 in. (4 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).  
**ARMACELL GMBH** — ArmaProtect ABLC  
C. **Fill, Void or Cavity Material\*** — 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted on the exposed side around the cable bundle.  
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-3084 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1/2 Hr



Section A-A

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 6-3/8 in. (162 mm).
- 2 Cables** — Bundle of 5-3/8" (137 mm) diameter of the following types and sizes of cables may be used:  
A. Max 20/C No. 5/8" (16.2 mm) diameter (or smaller), copper conductor cable with PE insulation and PE jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:  
A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form, flush to both faces.  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min. 3/4 in. (20 mm). in. 1/32 in. (1 mm) dry film thickness to be applied to cables over 7-7/8" (200 mm) length, centralized within the seal.  
C. **Firestop Device\*** — 7-7/8 in. (200 mm) long by 5-3/8" (137 mm) diameter cable tube positioned flush to the soffit of floors and around the cables.

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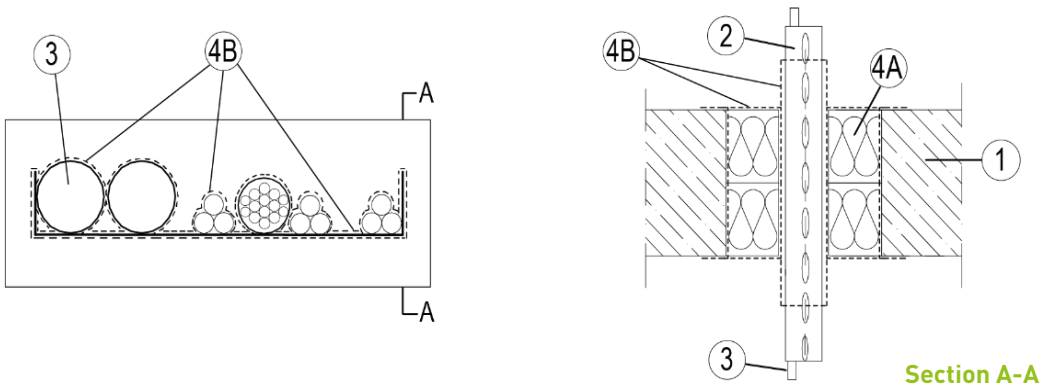
ARMACELL GMBH — ArmaProtect CT

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-4024 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



- 1 Floor Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete, min thickness of solid concrete floor assembly is 4-1/2 in. (115 mm). Opening shall be rectangular with max dimensions of 23-1/2 in. (600 mm) by 4-1/3 in. (110 mm).
- 2 Cable Tray\*** — Max 20 in. (500 mm) wide by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. Cable trays to be rigidly supported on both sides of the floor assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 39 percent of the cross-sectional area of the cable tray based on a max 2-5/8 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1 in. Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 185 mm diameter (or smaller), copper conductor cable with PVC insulation and jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

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## System No. F-A-4024 (contd.)

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form. Packing material to be installed flush with both surfaces of floor.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 7-7/8 in. (200 mm) from both faces of the board.

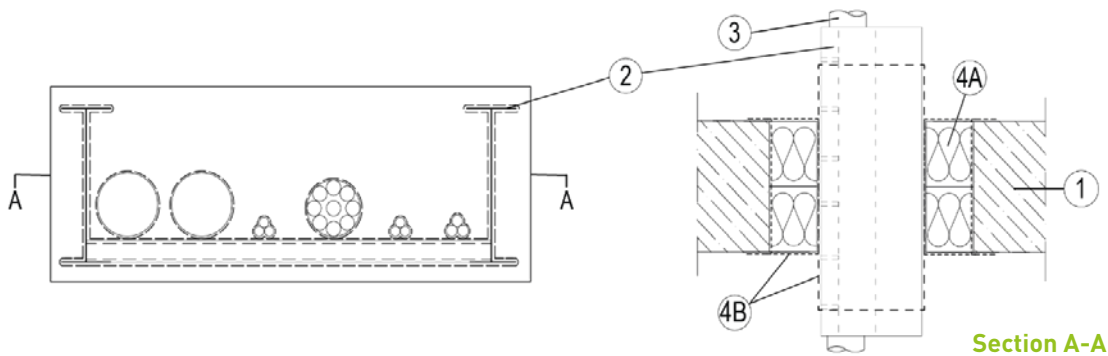
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-4027 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



- 1 Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete. Opening shall be rectangular with max dimensions of 23-1/2 in. (600 mm) by 7-7/8 in. (200 mm).
- 2 Cable Tray\*** — Nom 19-5/8 in. (500 mm) wide by max 6-3/8 in. (163 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. (2.3 mm) thick aluminium. The annular space between the cables trays and the periphery of the opening to be a min 3/4 in. (18 mm) to a max 2 in. (50 mm). Cable trays to be rigidly supported on both sides of the floor assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 13 percent of the cross-sectional area of the cable tray based on a max 2-3/4 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
  - A. Nom 4-1/4 in (110mm) diam 1/8 in. (3,2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.9 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.

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## System No. F-A-4027 (contd.)

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Packing material** — Nom 2-3/8 in. (60 mm) thick mineral wool boards min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form. Packing material to be installed flush with both surfaces of floor.

B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min 3/4 in. (20 mm). Min 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a min length of 7-7/8 in. (200 mm) from both faces of the board.

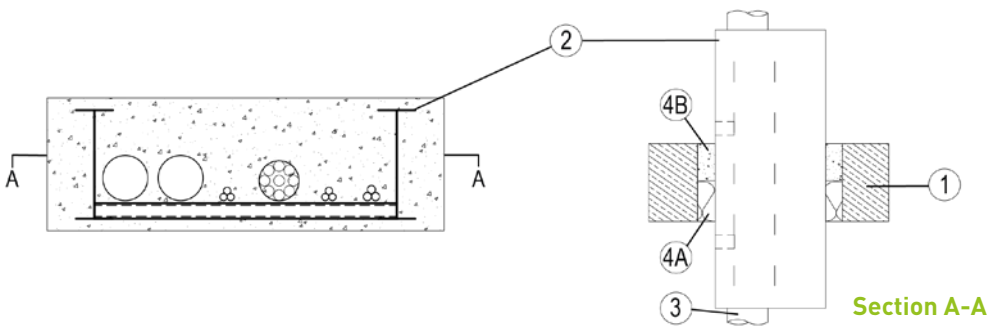
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-4028 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



- 1 Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 23-1/2 in. (600 mm) by 7-7/8 in. (200 mm).
- 2 Cable Tray\*** — Nom 19-5/8 in. (500 mm) wide by max 6-3/8 in. (163 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. (2.3 mm) thick aluminium. The annular space between the cables trays and the periphery of the opening to be a min 3/4 in. (18 mm) to a max 2 in. (50 mm). Cable trays to be rigidly supported on both sides of the floor assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 13 percent of the cross-sectional area of the cable tray based on a max 2-3/4 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 185 mm diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.
- 4 Fill, Void or Cavity Material\*** — The Firestop System shall consist of the following:
  - A. Packing Material — 1 layer of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form, flush to the bottom surface of the floor.
  - B. Fill, Void or Cavity Material\* — Min 2-1/8 in. (55 mm) cast into the annular space between the cables/tray and periphery of the opening, flush with the top surface of the floor. Mortar to be mixed with water in accordance with the manufacturer's installation instructions.

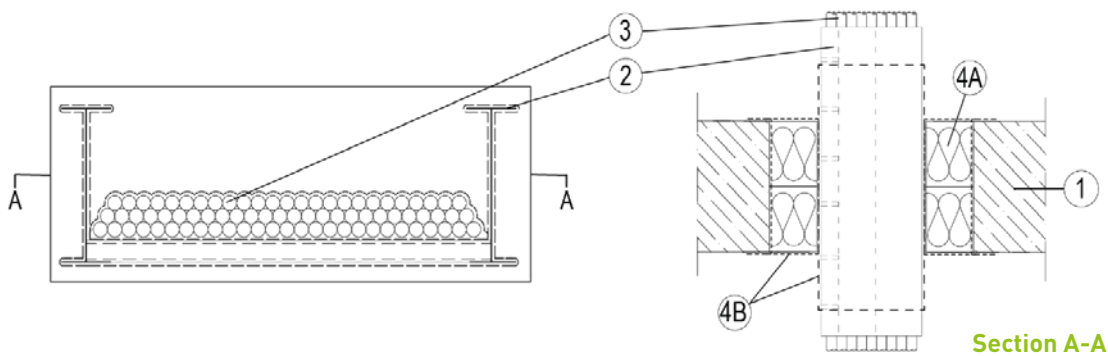
**ARMACELL GMBH** — ArmaProtect MM20

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-4029 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



- 1 Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 21-3/4 in. (551 mm) by 7-7/8 in. (200 mm).
- 2 Cable Tray\*** — Nom 13-3/4 in. (350 mm) wide by max 4 in. (101.6 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. (2.3 mm) thick aluminium. The annular space between the cables trays and the periphery of the opening to be a min 1-7/8 in. (47 mm). Cable trays to be rigidly supported on both sides of the floor assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 19 percent of the cross-sectional area of the aperture based on a max 1-7/8 in. (48 mm) cable loading depth within the tray. The following types and sizes of cables may be used:  
  
A. Nom 4-1/4 in (110mm) diam 1/8 in. (3,2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 4 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing material** — Nom 2-3/8 in. (60 mm) thick mineral wool boards min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of floor.  
  
B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min 3/4 in. (20 mm). Min 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a min length of 7-7/8 in. (200 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

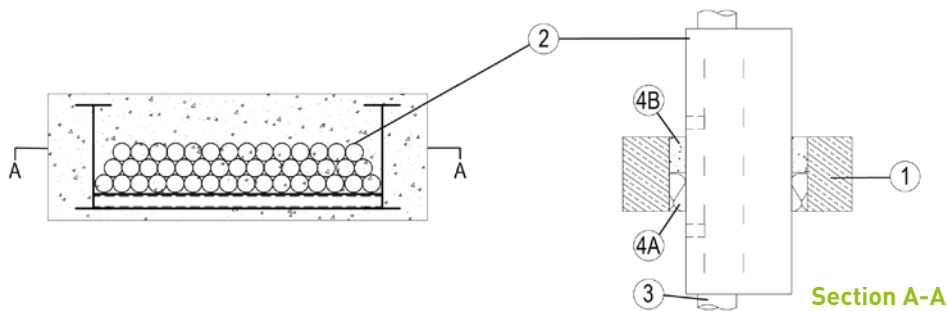
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. F-A-4030 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



- 1 Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 21-3/4 in. (551 mm) by 7-7/8 in. (200 mm).
- 2 Cable Tray\*** — Nom 13-3/4 in. (350 mm) wide by max 4 in. (101.6mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. (2,3 mm) thick aluminium. The annular space between the cables trays and the periphery of the opening to be a min 3/4 in. (18 mm) to a max 2 in. (48 mm). Cable trays to be rigidly supported on both sides of the floor assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 19 percent of the cross-sectional area of the cable tray based on a max 1-7/8 in. (48 mm) cable loading depth within the tray. The following types and sizes of cables may be used:  
A. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
- 4 Firestop System** — The Firestop System shall consist of the following:  
A. **Packing Material** — 1 layer of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form, flush to the bottom surface of the floor.  
B. **Fill, Void or Cavity Material\*** — Min 2-1/8 in. (55 mm) cast into the annular space between the cables/tray and periphery of the opening, flush with the top surface of the floor. Mortar to be mixed with water in accordance with the manufacturer's installation instructions.

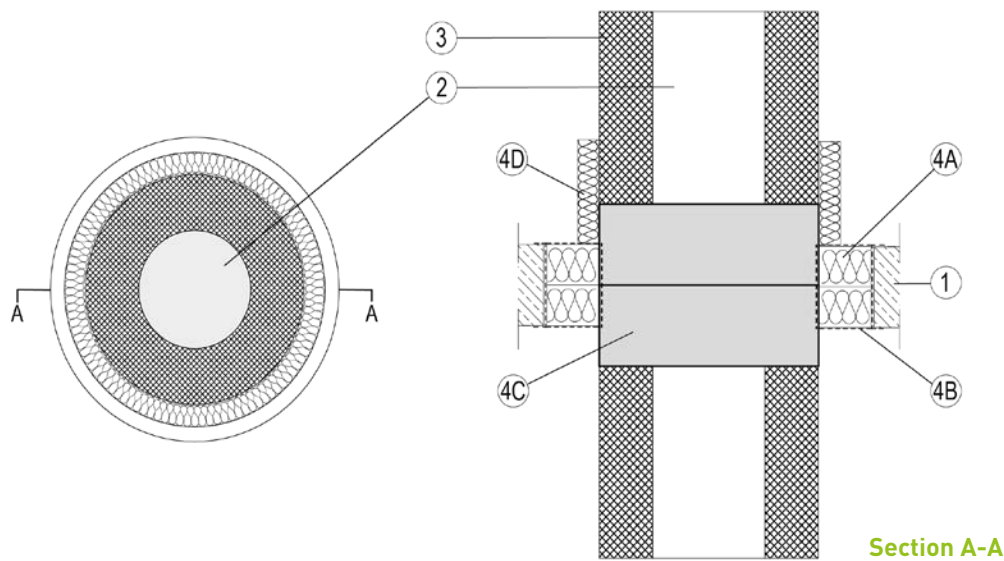
**ARMACELL GMBH** — ArmaProtect MM20

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-5080 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1. Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max dimensions of 16-1/8 in. (409 mm).
- 2. Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the floor assembly. The following penetrants may be used:
- A. Nominal 6-1/4 in (159 mm) diameter, Schedule M copper pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3. Pipe Covering\*** — Nom 3 in. (75 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated pipe or tubing and periphery of the opening shall be 2 in (50 mm).
- See Plastics+ (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 95-5VA may be used.

*continued on next page*



## System No. F-A-5080 [contd.]

**4**

**A. Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.

**B. Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min. 3/4 in. (20 mm).

**ARMACELL GMBH** — ArmaProtect ABLC

**C. Fill, Void or Cavity Material\*** — 2 lengths of 2 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around pipe to a total length of 9-7/8 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

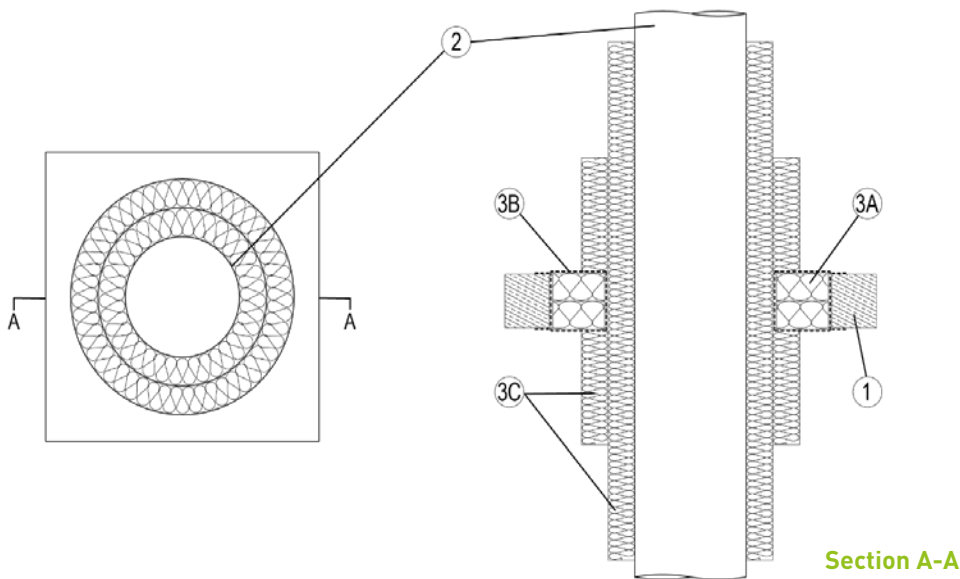
**D. Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick stone wool mineral fibre 2.5-3.1 pcf (40-50 kg/m<sup>3</sup>) wrapped around duct for min. 20 in. (500 mm) on the top face.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-5081 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



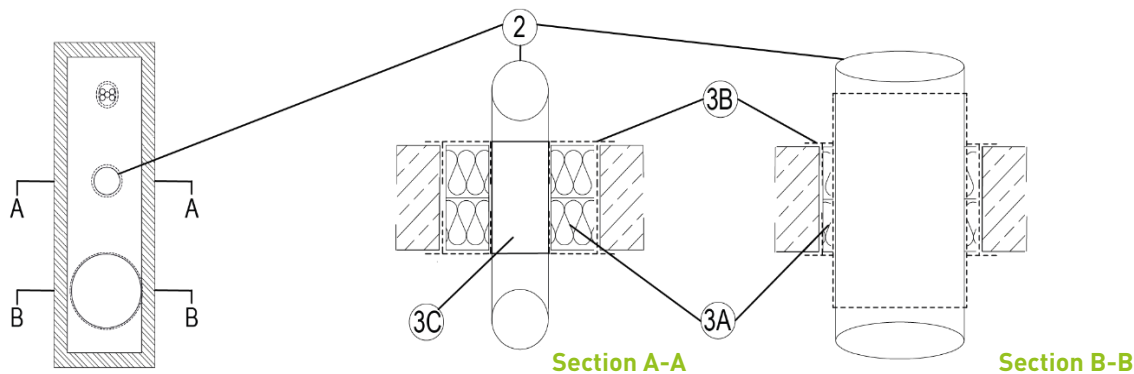
- 1 Floor Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete, min thickness of floor assembly is 4-1/2 in. (115 mm). Opening shall be circular or rectangular with max diam or dimensions 11-3/4 in. (300 mm).
- 2 Pipes** — Single pipe to be installed within the opening. The annular space between the pipe and the periphery of the opening to be a nom 2-1/8 in (58 mm). Pipe to be rigidly supported on both sides of the floor assembly. The following pipes may be used:
  - A. Nom 5 in. (125 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing material** — 2 layers of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.
  - B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min 3/4 in. (20 mm).
  - C. **Pipe Insulation** — Nom 1-1/4 in. (30 mm) thick mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around pipe for min 19-3/4 in. (500 mm) on both faces and continuous through the seal. Nom 1-1/4 in. (30 mm) thick mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around first layer of pipe insulation for min 10 in. (250 mm) on both faces.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-8060 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 23-5/8 in. (500 mm) by 6-1/4 in. (160 mm).
- 2 Services** — Services to be incorporated shall consist of the following:
  - A. Max 1/C 148 mm diameter (or smaller), copper conductor cable with XLPE insulation and HDPE jacket. The annular space between the cable and the periphery of the opening to be 0-2 in (0-50 mm).
  - B. Nominal 1-1/2 in (37mm) diameter PE-HD SRV-G 7x10 tc 'speed pipe' for use in closed (process or supply) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm).
  - C. Nominal 2-1/4 in. (56 mm) diameter HD 240 synthetic rubber hydraulic hose for use in closed (process or supply) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm).
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. Packing material — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.
  - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.
  - C. **Fill, Void or Cavity Material\*** — 1 layer of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around hydraulic pipe. 2 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around speed pipe.

ARMACELL GMBH — ArmaProtect ABLC

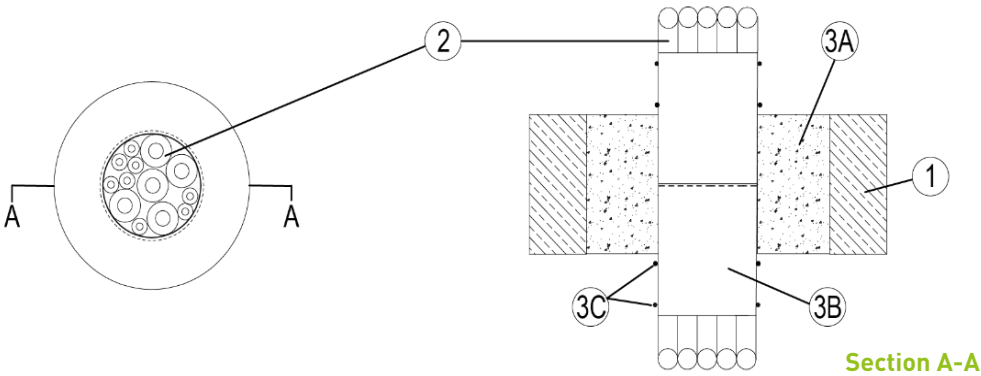
ARMACELL GMBH — ArmaProtect FW2

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-8061 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

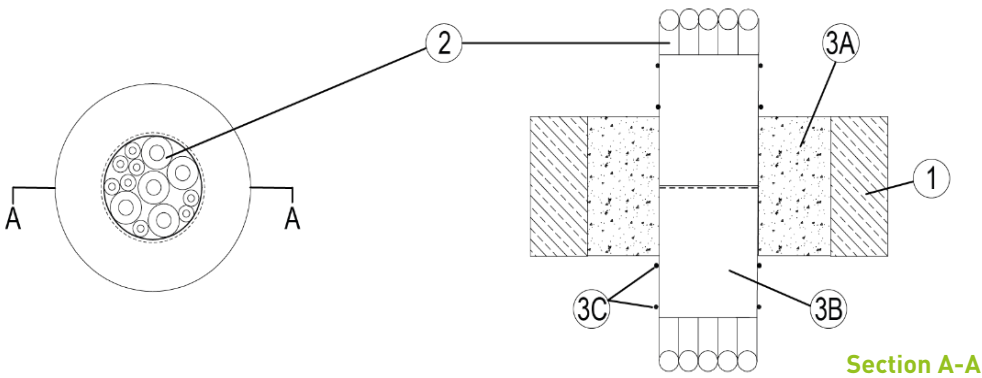
- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm).
- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing the following cables:
  - A. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - D. Max 20/C No. 23 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cable with PE jacket.
  - E. Max 3/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Fill, Void or Cavity Material\*** — Nom 4-1/2 in. (115 mm) cast in to aperture in the floor and around the services.
  - ARMACELL GMBH** — ArmaProtect CM
  - B. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).
  - ARMACELL GMBH** — ArmaProtect FW2
  - C. Steel wire tied around 3B at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-8062 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm).
- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty.

**3 Firestop System** — The Firestop System shall consist of the following:

A. **Fill, Void or Cavity Material\*** — Nom 4-1/2 in. (115 mm) cast in to aperture in the floor and around the services.

**ARMACELL GMBH** — ArmaProtect CM

B. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

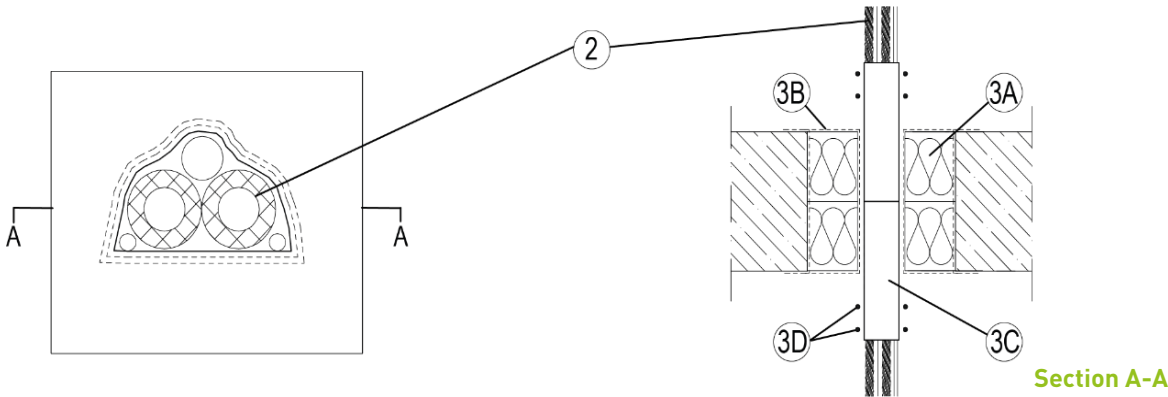
C. Steel wire tied around 3B at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-8063 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 1-1/2 in. (116 mm).
- 2 Services** — ‘Climasplit’ bundle of max diameter 2 in. (50 mm) or smaller, annular space between the bundle and the periphery of the opening to be 1-1/4 in (33 mm) and containing the following services:
  - A. 1 off 1 in. (25 mm) diameter (or smaller), 1/16 in. (1.5 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - B. 1 off 3/4 in. (18 mm) diameter (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9 mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - C. 1 off 3/8 in. (10 mm) diameter (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - D. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.

continued on next page





## System No. F-A-8063 [contd.]

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min. 3/4 in. (20 mm). Min. 1/32 in. (1mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.

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C. **Fill, Void or Cavity Material\*** — 2 lengths of 2 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the bundle to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

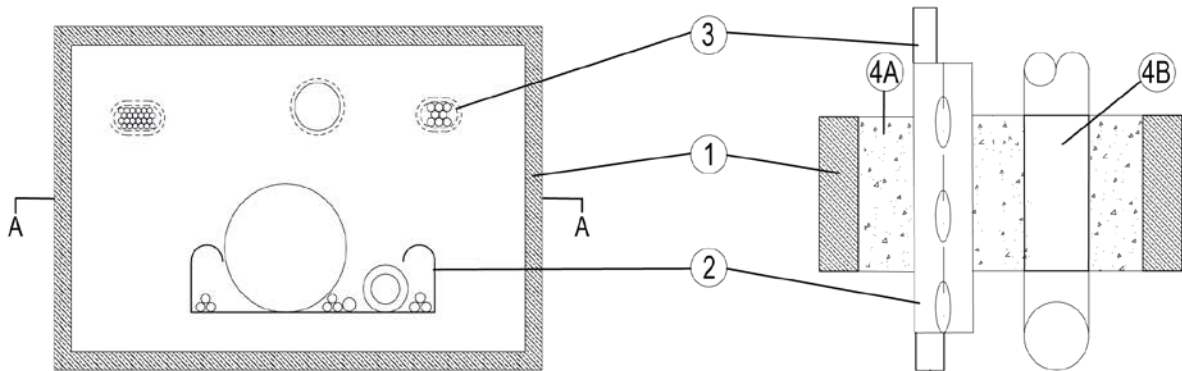
D. 24 AWG Steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-B-8064 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be rectangular with max dimensions of 23-5/8 in. (600 mm) by 15-3/4 in. (400 mm).
- 2 Cable Tray\*** — Max 11-3/4 in. (300 mm) wide by 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. Cable trays to be rigidly supported on both sides of the floor assembly.
- 3 Services** — Aggregate cross-sectional area of cables in cable tray not to exceed 46.62 percent of the cross-sectional area of the cable tray based on a max 2-3/8 in. (60 mm) cable loading depth within the tray. The annular space between the tray and the periphery of the opening to be 4 in (100 mm). Services to be incorporated shall consist of the following:
  - A. Max 1/C 5-3/4 in. 148 mm diameter (or smaller), copper conductor cable with XLPE insulation and HDPE jacket.
  - B. Nominal 1-1/2 in (37mm) diameter PE-HD SRV-G 7x10 tc 'speed pipe' for use in closed (process or supply) or vented (drain, waste or vent) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm).
  - C. Nominal 2-1/4 in. (56 mm) diameter HD 240 synthetic rubber hydraulic hose for use in closed (process or supply) or vented (drain, waste or vent) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm).
  - D. Nominal 1-3/4 in (43 mm) diameter PE-HD SRV-G 24x7 tc 'speed pipe' for use in closed (process or supply) or vented (drain, waste or vent) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm).
  - E. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.

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## System No. F-A-8064 [contd.]

F. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.

G. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

H. Max 1/C 2-1/8 in. (55.2 mm) diameter (or smaller), copper conductor cable with XLPE insulation and PVC jacket.

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Fill, Void or Cavity Material\*** — Mortar - Nom 4-1/2 in. (115 mm) thickness cast in to aperture in the floor and around the services.

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B. **Fill, Void or Cavity Material\*** — 1 layer of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around hydraulic pipe or speed pipes.

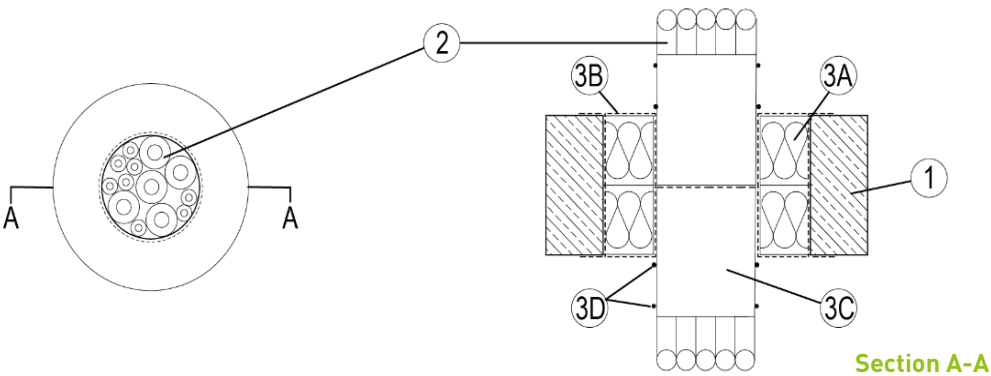
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\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-8065 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm).
- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing the following cables:
  - A. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - D. Max 20/C No. 23 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cable with PE jacket.
  - E. Max 3/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form.
  - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the floor by min. 3/4 in. (20 mm).

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## System No. F-A-8065 [contd.]

C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in. (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

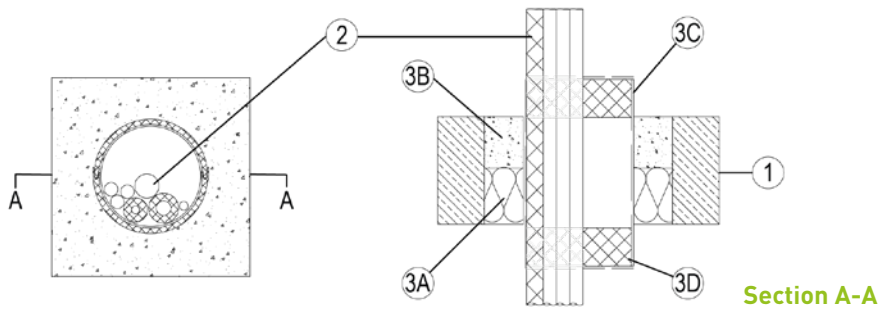
D. 24 AWG Steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-8066 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side

- 1 Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diam or dimensions of 6-3/8 in. (162 mm).
- 2 Services** — ‘Climasplit’ bundle of max diam 2 in. (50 mm) or smaller, annular space between the bundle and the periphery of the opening to be min 1-1/4 in (33 mm) and max 1-1/4 in (33 mm) and containing the following services:
  - A. 1 max 1 in. (25 mm) diam (or smaller), 1/16 in. (1.5 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - B. 1 max 3/4 in. (18 mm) diam (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9 mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - C. 1 max 3/8 in. (10 mm) diam (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - D. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing material** — 1 layer of Nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the floor as a permanent form, flush to the bottom face.
  - B. **Fill, Void or Cavity Material\*** — Min 2-1/8 in. (55 mm) cast into the annular space between the firestop device and periphery of the opening, flush with the top surface of the floor. Mortar to be mixed with water in accordance with the manufacturer’s installation instructions.

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## System No. F-A-8066 [contd.]

C. **Firestop Device\*** — 7-7/8 in. (200 mm) long by 5-3/8" (116 mm) diam cable tube positioned centrally within the seal and around the cables.

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D. **Fill, Void or Cavity Material\*** — Min 1/32 in. (1 mm) dry film thickness to be applied over both ends of the Firestop Device.

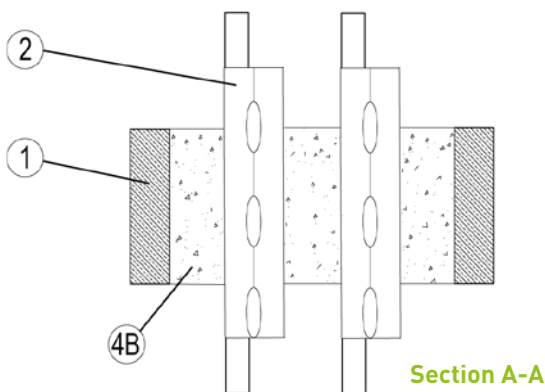
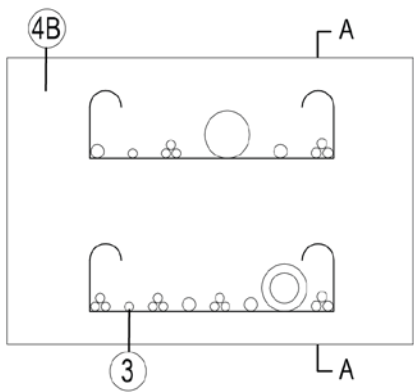
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-A-4025 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



- 1 Floor Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete, min thickness of solid concrete floor assembly is 4-1/2 in. (115 mm). Opening shall be rectangular with max dimensions of 23-1/2 in. (600 mm) by 15-3/4 in. (400 mm).
- 2 Cable Tray\*** — Max two, nom 12 in. (300 mm) wide or smaller by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. The annular space between the cables trays and the periphery of the opening shall be a min of 2 in. (51 mm) to a max 6 in. (152 mm). The cable trays to space a nom 6-1/2 in. (165 mm) apart. Cable trays to be rigidly supported on both sides of the floor assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 25 percent of the cross-sectional area of the cable tray based on a max 2-3/4 in. (69 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
  - A. Max 4/C 185 mm diam (or smaller), copper conductor cable with rubber (EPR) insulation and polyolefin (PO) jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - F. Max 1/C 2-1/8 in. (55 mm) diam (or smaller), aluminum conductor cable with PE insulation and jacket.

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## System No. F-A-4025 [contd.]

### 4 Firestop System — The firestop system shall consist of the following

A. **Forms** — Boards cut to fit the contour of the penetrating items and fastened to the underside of the floor to prevent the leakage of fill material (Item 4B) while in a liquid state. Forms to be removed after the fill material cures.

B. **Fill, Void or Cavity Material\*** — Mortar — Min 4-1/2 in. (115 mm) cast into the annular space between the cable tray, cables and the periphery of the opening, flush with both surfaces of floor. Mortar to be mixed with water in accordance with the manufacturer's installation instructions.

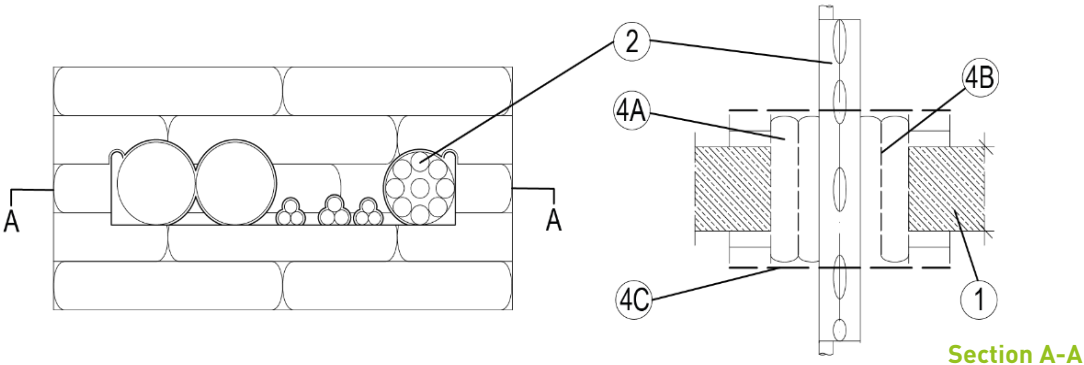
**ARMACELL GMBH** — ArmaProtect CM

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. F-B-4010 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



- 1 Floor Assembly** — Min 7-7/8 in. (200 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete or Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete increased in depth to min 7-7/8 in. (200 mm) around the seal by the fixing on non-combustible boards. Opening shall be rectangular with max dimensions of 15-3/4 in. (400 mm) by 7-7/8 in. (200 mm). See Concrete Blocks (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Cable Tray\*** — Nom 11-3/4 in. (300 mm) wide by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/16 in. (1.5 mm) thick steel. The annular space between the cables trays and the periphery of the opening to be nom 2 in. (50 mm). Cable trays to be rigidly supported on both sides of the floor assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 60 percent of the cross-sectional area of the cable tray based on a max 2-3/4 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min 1/4 in. (5 mm). Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 185 mm diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.

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## System No. F-A-4025 [contd.]

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Fill, Void or Cavity Material\*** — 200 mm deep pillows to be tightly packed into the opening in the floor and around the services, flush to both faces. Different size of pillow are used to best fill the space.

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B. **Fill, Void or Cavity Material\*** — Any open/free space between cables and pillows to be filled to full depth

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C. **Steel Mesh Guard\*** — Min 50 x 50 mm steel mesh guard to be mechanically fixed to both faces of the floor, completely covering the through penetration firestop.

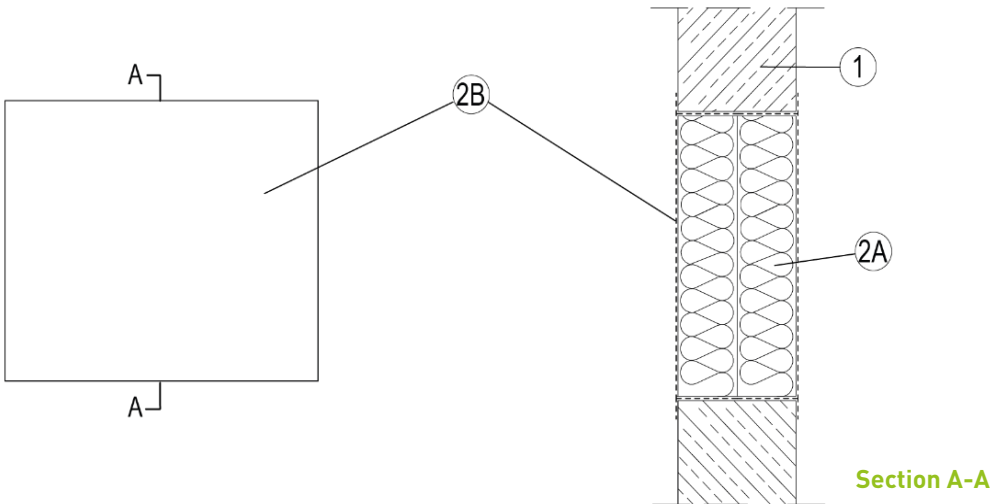
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-J-0034 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



**1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 2.1 in. (52 mm).  
See Concrete Blocks (CAZT) in the Fire Resistance Directory for names of manufacturers.

**2 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of the wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm) on both sides of wall.

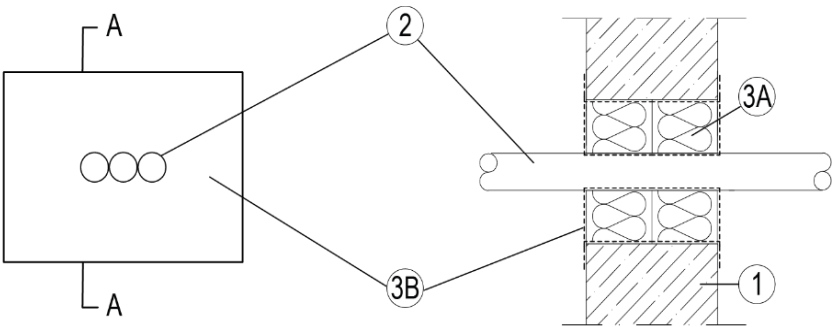
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-1328 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



Section A-A

- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 4-1/2 in. (116 mm) by 5-7/8 in. (148 mm). Opening shall be rectangular with max dimensions of 4-1/2 in. (116 mm) by 5-7/8 in. (148 mm).

See **Concrete Blocks** (CAZT) category in Fire Resistance Directory for names of manufacturers.

- 2 Pipes** — Single or tight bundle to be installed within the opening. Aggregate cross-sectional area of pipes in opening to have a visual fill of min 0% to max 3.49%. The annular space between the pipes and the periphery of the opening to be nom 2 in (50 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following pipes may be used:

A. Nom 5/8 in. (17 mm) diameter (or smaller) Schedule 40 (or heavier) steel pipe.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

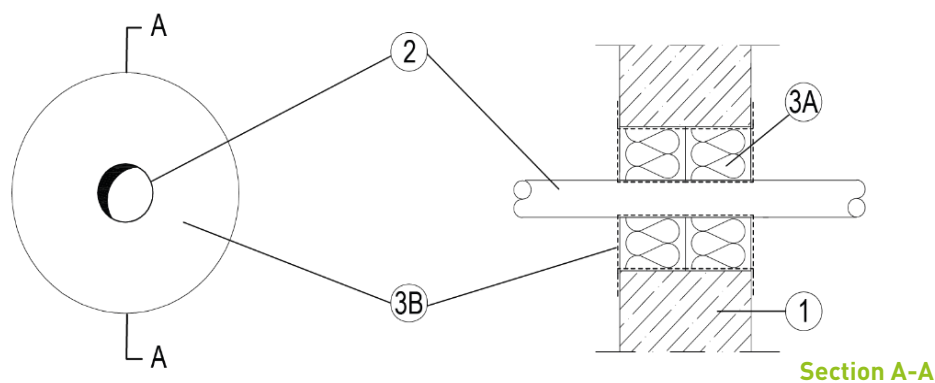
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-1329 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1/2 Hr



- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 5-1/4 in. (132 mm). Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max diameter or dimensions of 5-1/4 in. (132 mm).

See **Concrete Blocks** (CAZT) category in Fire Resistance Directory for names of manufacturers.

- 2 Pipes** — Single pipe to be installed within the opening. The annular space between the pipe and the periphery of the opening to be a nom 2 in (50 mm). Pipe to be rigidly supported on both sides of the wall assembly. The following pipes may be used:

- A. Nominal 1-1/4 in. (32 mm) diameter (or smaller) Type M (or heavier) copper tube.
- B. Nominal 1-1/4 in. (32 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

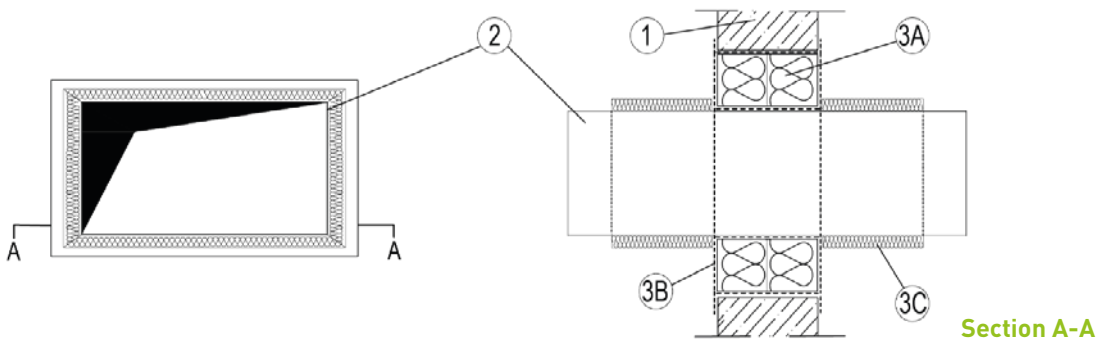
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-1330 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 11-3/4 in. (300 mm) by 7-7/8 (200 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Duct** — Single to be installed within the opening. The annular space between the duct and the periphery of the opening to be 2 in (50 mm). Ducts to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Max 7-7/8 in. (200 mm) by 4 in. (100 mm) galvanized steel duct.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

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C. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick 'Klimarock' mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around duct for min. 10 in. (250 mm) on both faces.

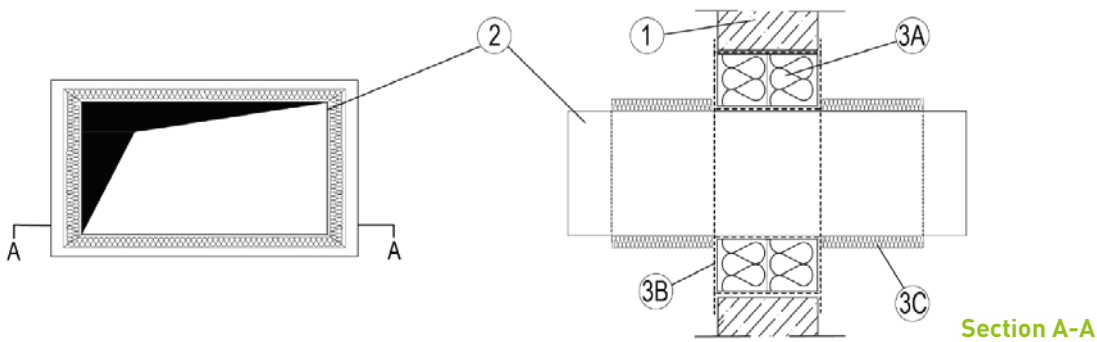
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-J-1331 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1/2 Hr



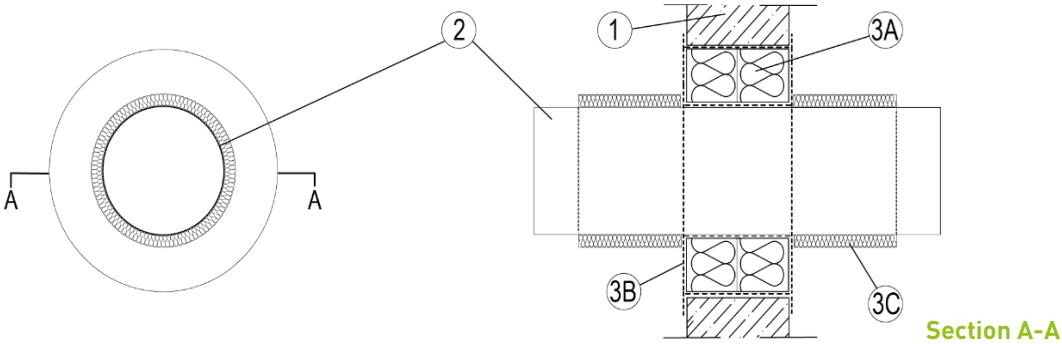
- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max. dimensions of 19-3/4 in. (500 mm) by 15-3/4 in. (400 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Duct** — Single to be installed within the opening. The annular space between the duct and the periphery of the opening to be 2 in (50 mm). Ducts to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:  
A. Max. 15-3/4 in. (400 mm) by 11-3/4 in. (300 mm) galvanized steel duct.
- 3 Firestop System** — The Firestop System shall consist of the following:  
A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).  
**ARMACELL GMBH** — ArmaProtect ABLC  
C. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick 'Klimarock' mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around duct for min. 10 in. (250 mm) on both faces.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-1333 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



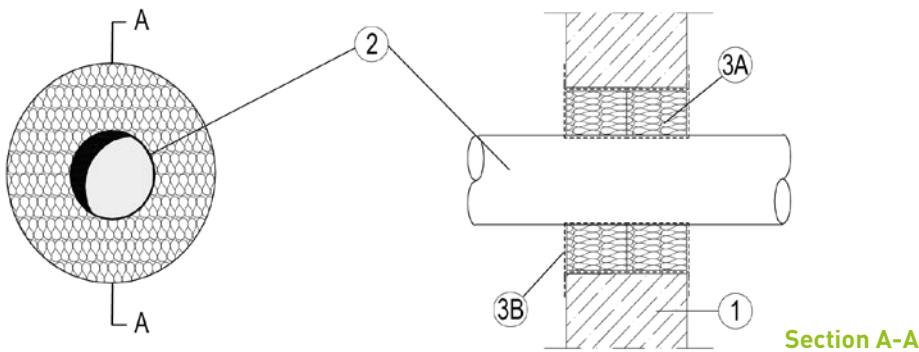
- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 15-3/4 in. (400 mm).  
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- 2 Duct** — Single to be installed within the opening. The annular space between the duct and the periphery of the opening to be 1-1/4 in (30 mm). Ducts to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:  
A. Max. 11-3/4 in. (300 mm) galvanized steel duct.
- 3 Firestop System** — The Firestop System shall consist of the following:  
A. **Packing material** — 2 layers of nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).  
**ARMACELL GMBH** — ArmaProtect ABLC  
C. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick 'Klimarock' mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around duct for min. 10 in. (250 mm) on both faces.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-1334 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



- 1 Wall and Floor Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions or diameter of 7-7/8 in. (200 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes** — Single pipe to be installed within the opening. The annular space between the pipe and the periphery of the opening to be a nom 2 in (50 mm). Pipe to be rigidly supported on both sides of the wall assembly. The following pipes may be used:

A. Nominal 4 in. (100 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into a steel sleeve in the opening of the wall as a permanent form

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

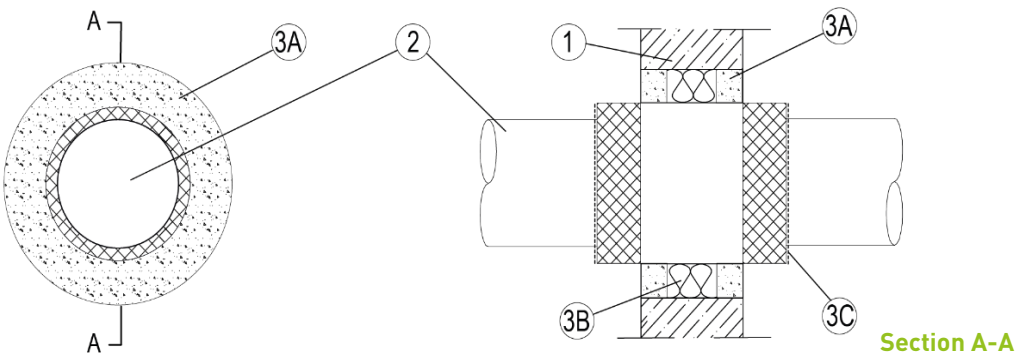
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-1335 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 2.1 in. (52 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Tubes** — Single to be installed within the opening. The annular space between the ArmaProtect CT and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Max 3-1/2 in. (89 mm) diameter Schedule 10 (or heavier) steel pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\*** — Min 0.4 in. (10 mm) width and min 1 in. (25 mm) depth on both sides between the wall and the pipe.

**ARMACELL GMBH** — ArmaProtect ABLF

C. **Firestop Device\*** — 7-7/8 in. (200 mm) long pipe wrap positioned centrally within the seal and wrapped around the cables.

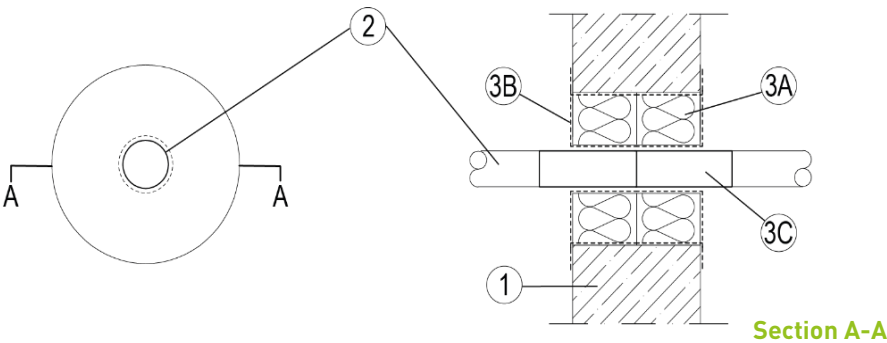
**ARMACELL GMBH** — ArmaProtect CT

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2376 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 2 Hr
	FTH Rating — 0 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

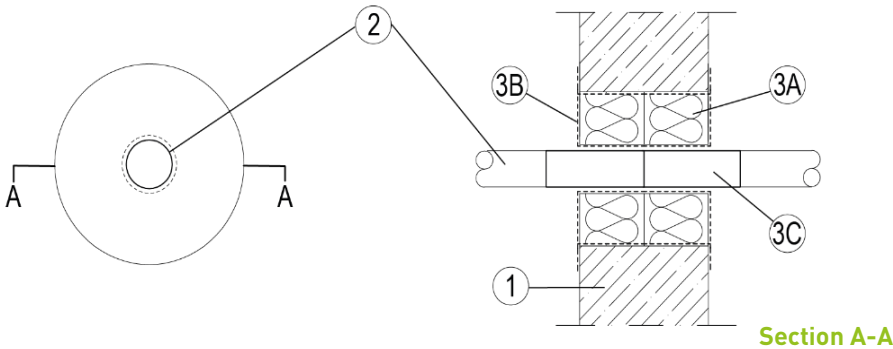
- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max dimensions of 5-1/4 in. (132 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:  
A. Nominal 1-1/4 in (32mm) diameter, 1/8 in. (3 mm) wall thickness PE/AL/PE composite plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.  
B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.  
**ARMACELL GMBH** — ArmaProtect ABLC  
C. **Fill, Void or Cavity Material\*** — 1 layer of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around pipe.  
**ARMACELL GMBH** — ArmaProtect FW2

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2377 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max dimensions of 7-7/8 in. (200 mm).

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nominal 4 in (100mm) diameter, 1/8 in. (2.7 mm) wall thickness PP-HT pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the bundle to a total length of 10 in. (200 mm).

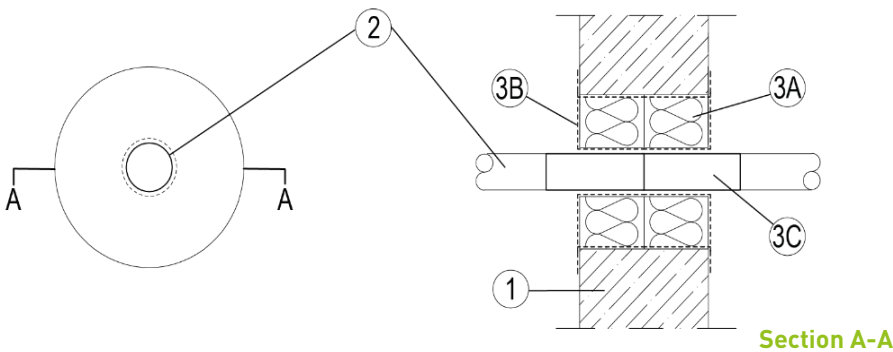
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2378 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max dimensions of 6-7/8 in. (175 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nominal 3 in (75 mm) diameter, 1/8 in. (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 2 lengths of 2 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the bundle to a total length of 7-7/8 in. (200 mm).

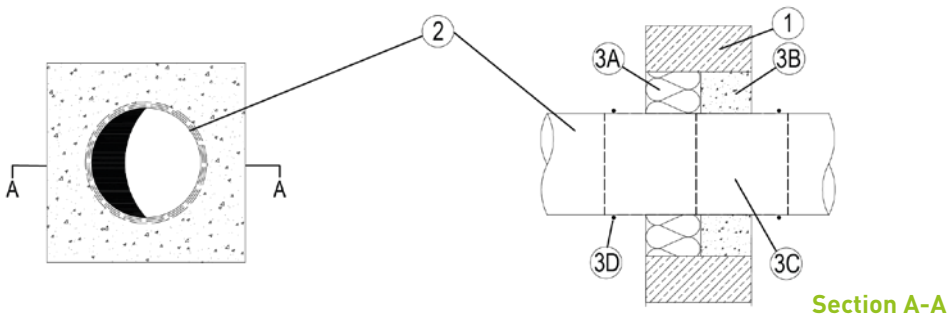
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2379 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1

**Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 7-7/8 in. (200 mm) by 7-7/8 in. (200 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2

**Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1-3/4 in (45 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 4-1/4 in (110 mm) diam 1/8 in. (3.2 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

B. Nom 4-1/4 in (110 mm) diam 1/8 in. (3.4 mm) wall thickness PE pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3

**Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — 1 layer of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m³) firmly packed into the opening of the wall as a permanent form, flush to one surface of the wall.

B. **Fill, Void or Cavity Material\*** — Min 2-1/8 in. (55 mm) cast into the annular space between the pipe and periphery of the opening, flush with one surface of the wall. Mortar to be mixed with water in accordance with the manufacturer’s installation instructions.

**ARMACELL GMBH** — ArmaProtect MM20

C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the pipe to a total length of 8 in. (200 mm).

**ARMACELL GMBH** — ArmaProtect FW1

D. 24 AWG Steel wire tied around 3C at nom 1 in. (25 mm) from both faces of the seal.

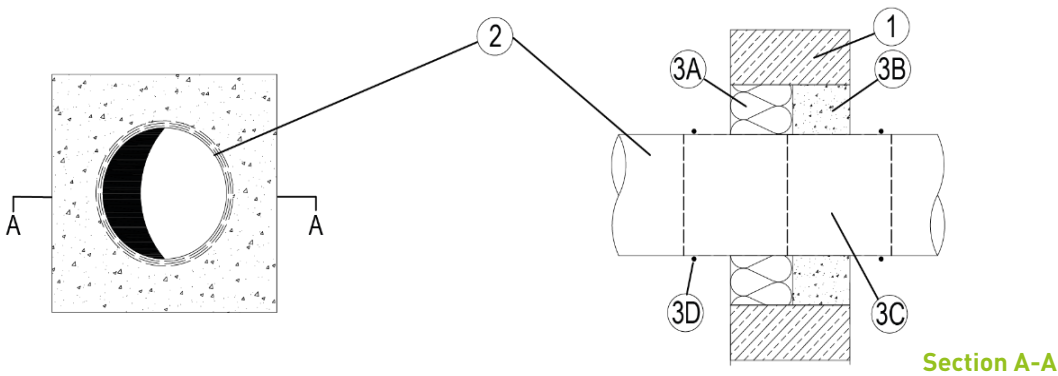
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-J-2380 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side

- 1 Wall Assembly** — Min 4-1/2 in. [115 mm] thick lightweight or normal weight [100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>] concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 7-7/8 in. [200 mm].

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1-3/4 in [45 mm]. Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 4-1/4 in [110mm] diam, 1/8 in. [3,2 mm] wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of nom 2-3/8 in. [60 mm] thick mineral wool board min 9.3 pcf [150 kg/m<sup>3</sup>] firmly packed into a steel sleeve in the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min 1/16 in. [2 mm] dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min 3/4 in. [20 mm].

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in [1.5 mm] by 4 in. [100 mm] wrap butt jointed centrally within the depth of the seal around the pipe to a total length of 8 in. [200 mm].

**ARMACELL GMBH** — ArmaProtect FW1

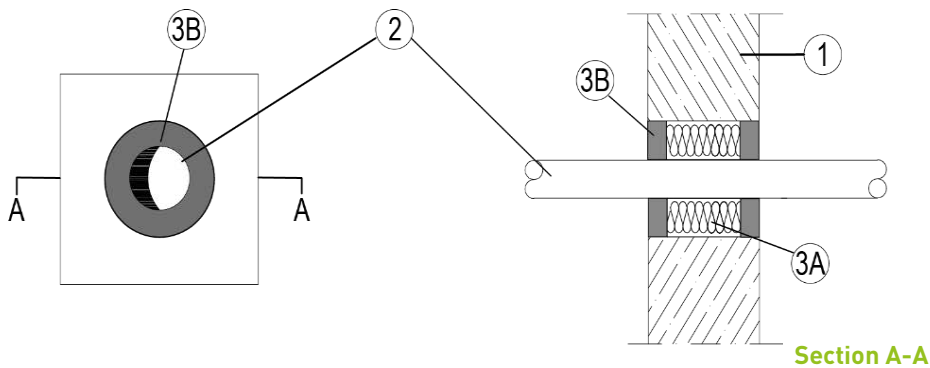
D. 24 AWG Steel wire tied around 3C at nom 1 in. [25 mm] from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2381 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3Hr	F Rating — 3 Hr
T Rating — 3Hr	FT Rating — 3Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 2.1 in. (52 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.4 in (10 mm). Pipes to be rigidly supported on both sides of the wall assembly.

The following penetrants may be used:

A. Nom 1 1/4 in (32 mm) diam 0.15 in (3.7 mm) wall thickness PE pipe for use in closed (process or supply) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\*** — Min 0.4 in. (10 mm) width and min 1 in. (25 mm) depth on both sides between the wall and the pipe.

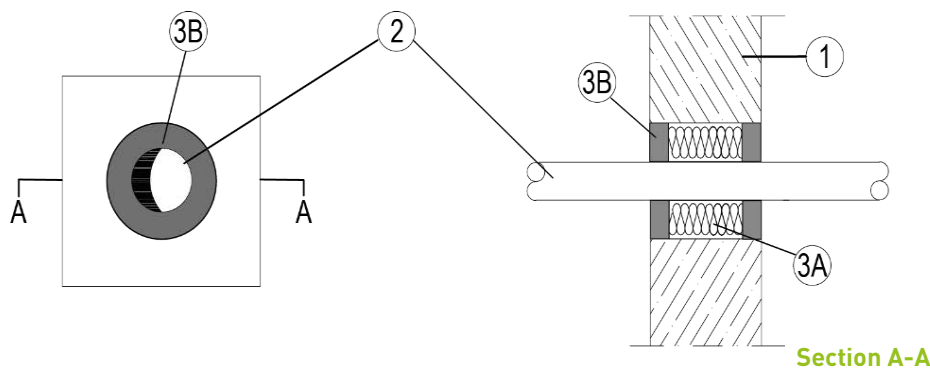
**ARMACELL GMBH** — ArmaProtect ABLF.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2382 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 2.1 in. (52 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.4 in (10 mm). Pipes to be rigidly supported on both sides of the wall assembly.

The following penetrants may be used:

A. Nom 1-1/4 in (32 mm) diam 0.12 in (3.0 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\*** — Min 0.4 in. (10 mm) width and min 1 in. (25 mm) depth on both sides between the wall and the pipe.

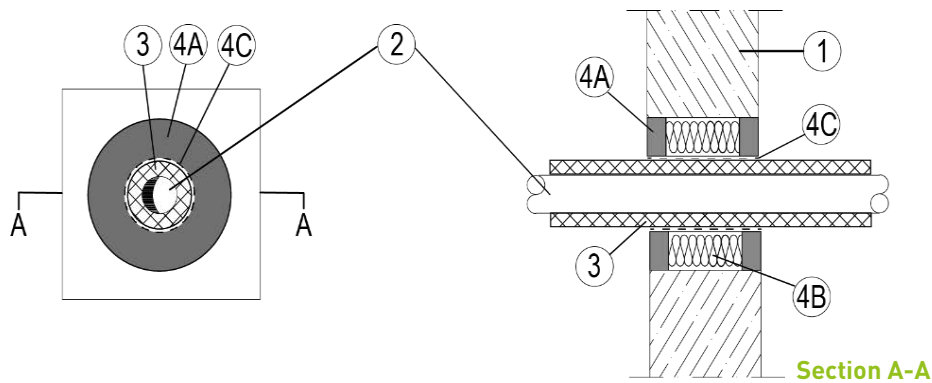
**ARMACELL GMBH** — ArmaProtect ABLF.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2384 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



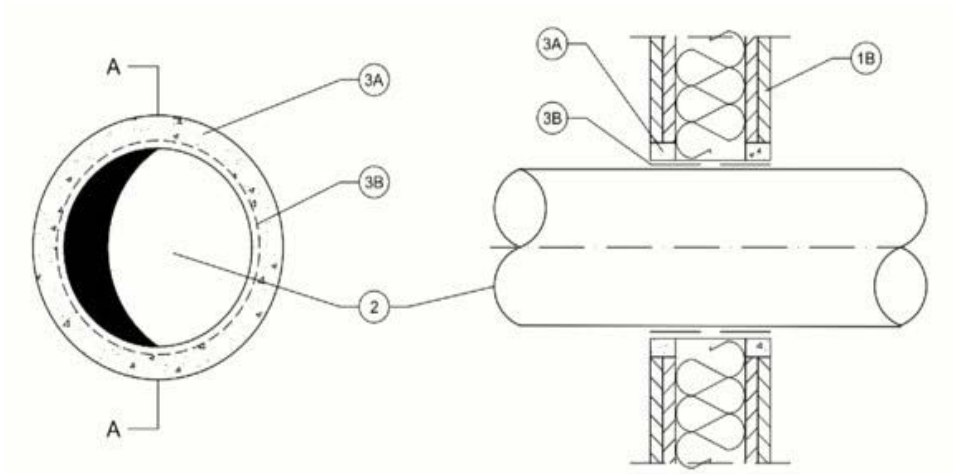
- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 5.9 in. (150 mm).  
See Concrete Blocks (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:  
  
A. Nom 2 in (50 mm) diam 0.19 in (4.7 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 Pipe Covering\*** — Nom 0.12 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated pipe or tubing and periphery of the opening shall be 2 in (31 mm).  
See Plastics+ (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 95-5VA may be used.
- 4 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — Gypsum mortar minimum 1.2 in. (31 mm) width and min 1 in. (25 mm) depth on both sides  
  
B. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool or optional gypsum mortar firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.  
  
C. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the wall surface on both sides around the pipe.  
  
**ARMACELL GMBH** — ArmaProtect FW1.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2385 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
  - B. Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 5.9 in. (150 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A. Nom 3.9 in (100 mm) diam 0.25 in (6.3 mm) wall thickness PP pipe** for use in closed (process or supply) piping systems.
- 3 Firestop System** — The firestop system shall consist of the following:
- A. Packing Material** — Gypsum mortar minimum 1 in. (25 mm) width and min 1 in. (25 mm) depth on both sides.
  - B. Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the gypsum mortar / gypsum board on both sides around the pipe.

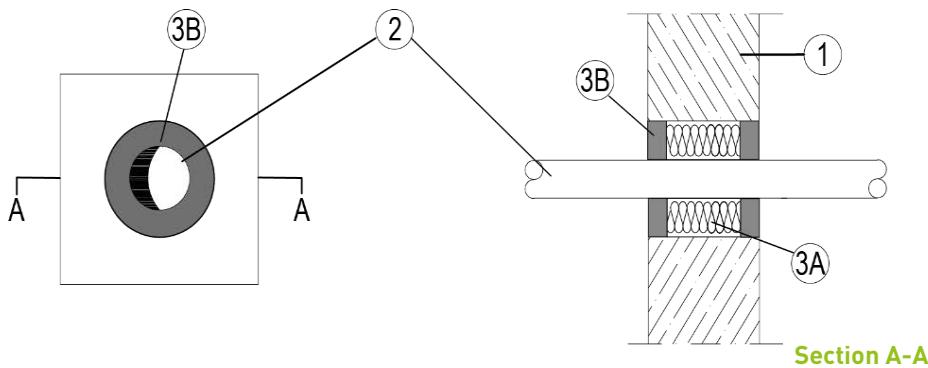
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2386 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 3.9 in. (100 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.5 in (12.5 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 2.95 in (75 mm) diam 0.14 in (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\*** — Min 0.4 in. (10 mm) width and min 1 in. (25 mm) depth on both sides between the wall and the pipe.

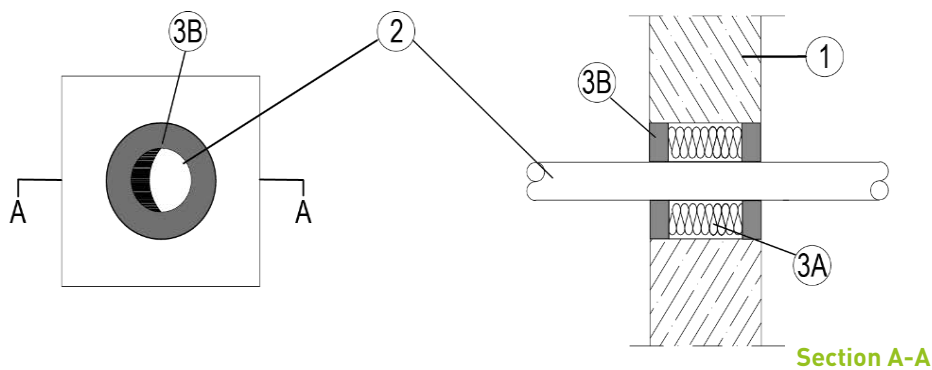
**ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2387 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1/2 Hr	F Rating — 1/2 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 1/2 Hr
	FTH Rating — 1/2 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 3.9 in. (100 mm).  
  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.5 in (12.5 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:  
  
A. Nom 2.95 in (75 mm) diam 0.17 in (4.3 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:  
  
A. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.  
  
B. **Fill, Void or Cavity Material\*** — Min 0.4 in. (10 mm) width and min 1 in. (25 mm) depth on both sides between the wall and the pipe.

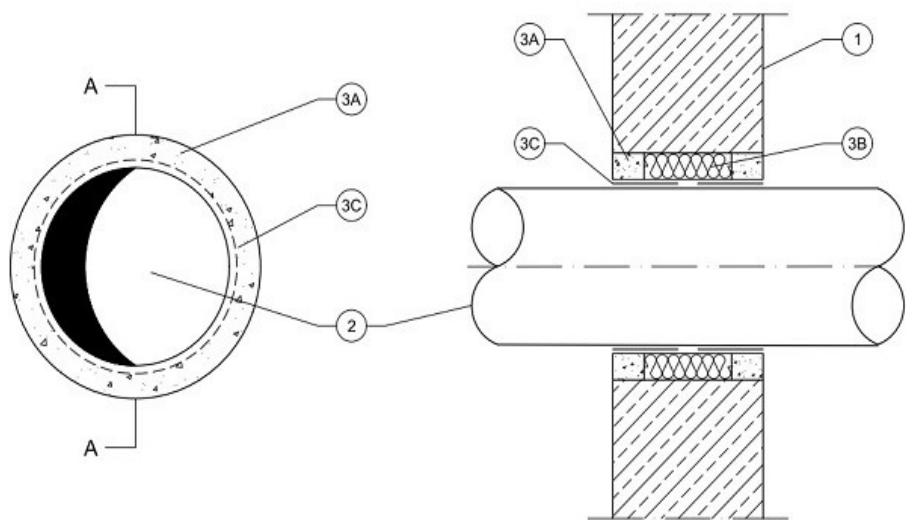
**ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2388 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 5.9 in. (150 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 3.9 in (100 mm) diam 0.26 in (6.6 mm) wall thickness PE pipe for use in closed (process or supply) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Gypsum mortar minimum 1 in. (25 mm) width and min 1 in. (25 mm) depth on both sides

B. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool or optional gypsum mortar firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

C. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the wall on both sides around the pipe.

**ARMACELL GMBH** — ArmaProtect FW1

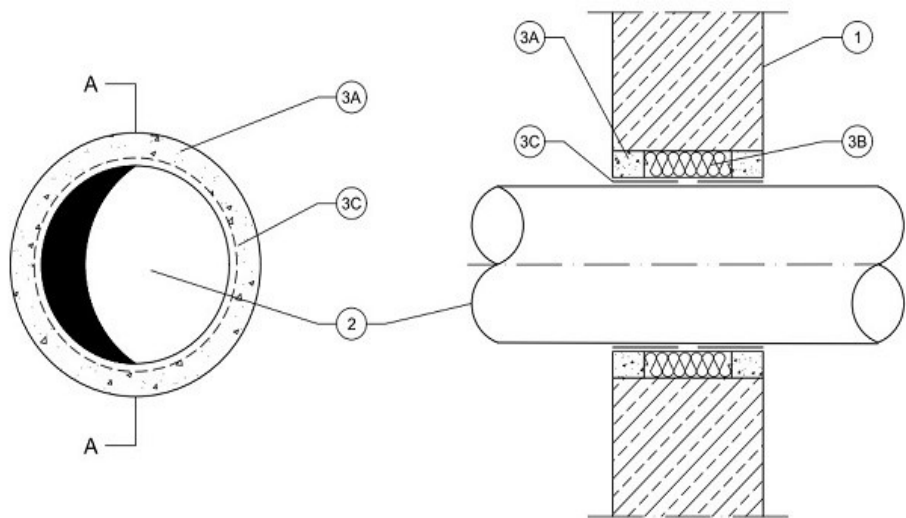
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-J-2389 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 5.9 in. (150 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 3.9 in (100 mm) diam 0.2 in (5.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Gypsum mortar minimum 1 in. depth and min 1 in. (25 mm) width on both sides

B. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool or optional gypsum mortar firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

C. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the wall on both sides around the pipe.

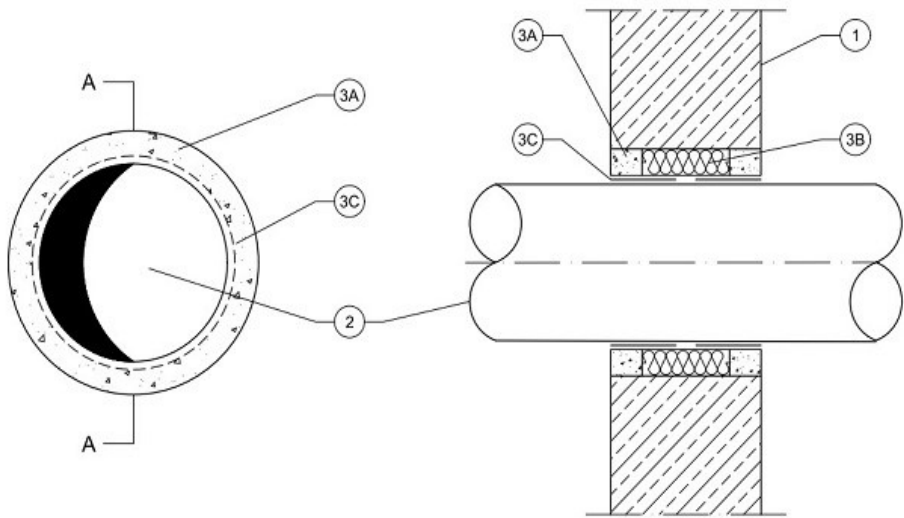
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2390 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 5.9 in. (150 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 3.9 in (100 mm) diam 0.25 in (6.3 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Gypsum mortar minimum 1 in. (25 mm) width and min 1 in. (25 mm) depth on both sides

B. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool or optional gypsum mortar firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

C. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the wall on both sides around the pipe.

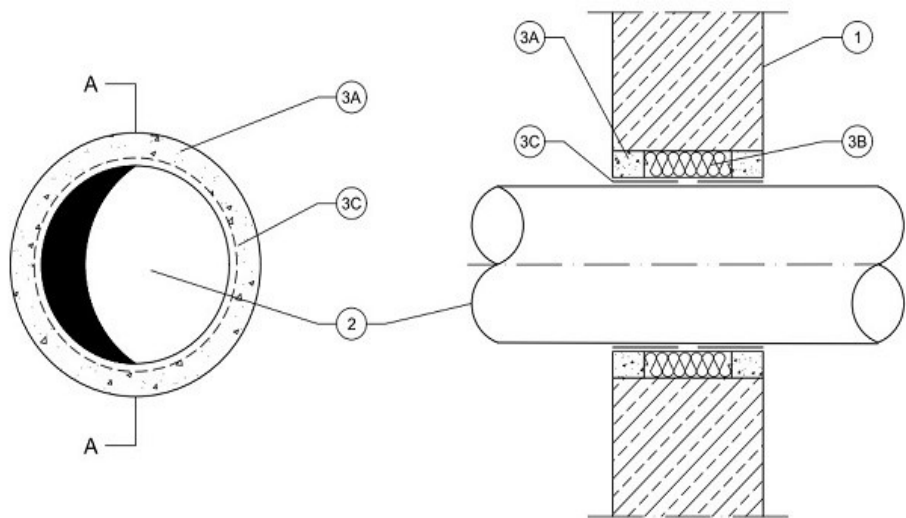
**ARMACELL GMBH** — ArmaProtect FW1

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System No. W-J-2391 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 5.9 in. (150 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 3.9 in (100 mm) diam 0.26 in (6.6 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Gypsum mortar minimum 1 in. depth and min 1 in. (25 mm) width on both sides

B. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool or optional gypsum mortar firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

C. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 2 layers of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the wall on both sides around the pipe.

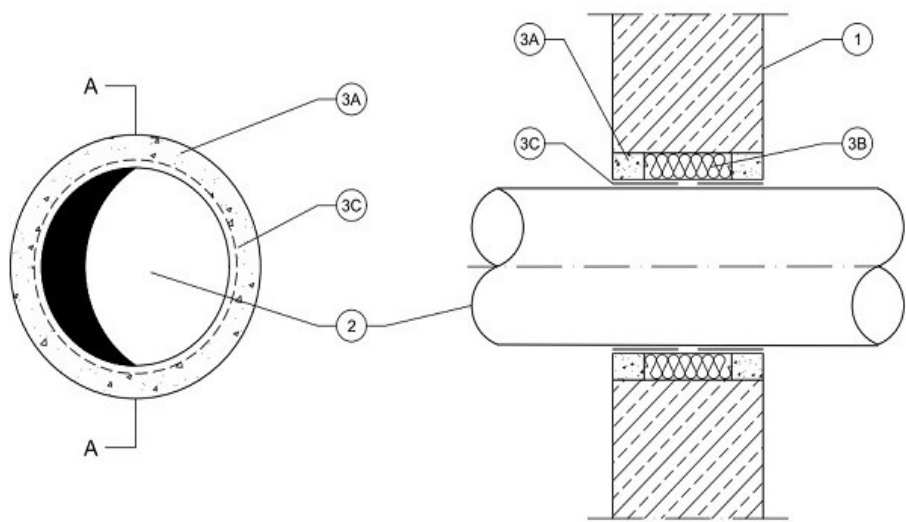
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-2392 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 5.9 in. (150 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

Nom 3.9 in (100 mm) diam 0.48 in (12.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Gypsum mortar minimum 1 in. (25 mm) width and min 1 in. (25 mm) depth on both sides

B. **Packing Material** — Min. 2-3/5 in. (65 mm) thickness of min. 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation or loose wool or optional gypsum mortar firmly packed into the opening as a permanent form. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

C. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 2 layers of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the wall on both sides around the pipe.

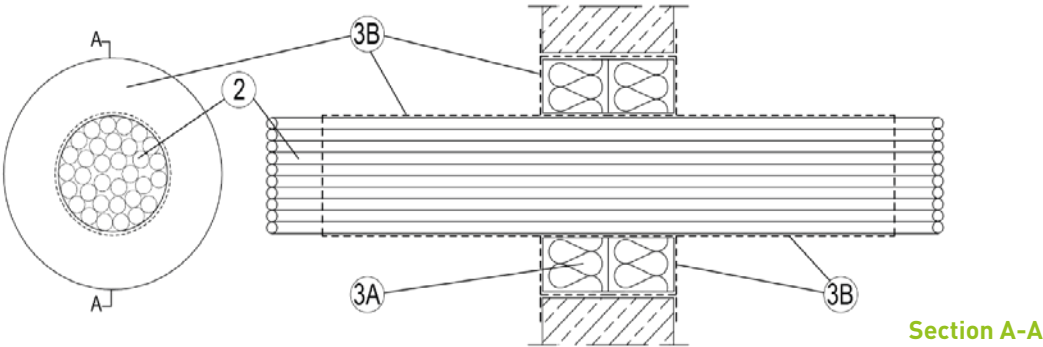
**ARMACELL GMBH** — ArmaProtect FW1

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System No. W-J-3274 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm). Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm).
- See **Concrete Blocks** (CAZT) category in Fire Resistance Directory for names of manufacturers.

- 2 Cables** — Single or tight bundle of cables to be installed within the opening on a cable tray. Aggregate cross-sectional area of cables in opening to have a visual fill of min 0% to max 21.73%. The annular space between the cable bundle and the periphery of the opening to be a nom 2 in (51 mm). Cables to be rigidly supported on both sides of the wall assembly. The following types and sizes of cables may be used:
- A. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.

- 3 Firestop System** — The firestop system shall consist of the following:
- A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.
- B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a min length of 7-7/8 in. (200 mm) from both faces of the board.

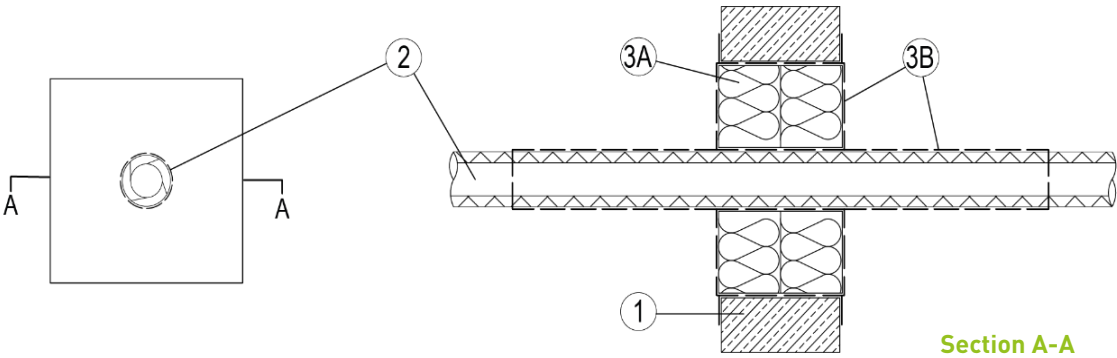
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-3275 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



- 1 Wall and Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 7-7/8 in. (200 mm) by 7-7/8 in. (200 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Services** — Single hollow optic cable (waveguide) with max diam 2-1/2 in. (63 mm). The annular space between the cable and the periphery of the opening to be a min 2-3/4 in (68 mm) and max 2-3/4 in. (68 mm). Cable to be rigidly supported on both sides of the wall assembly.

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min 3/4 in. (20 mm). Min 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cable to a min length of 7-7/8 in (200 mm) from both faces of the board.

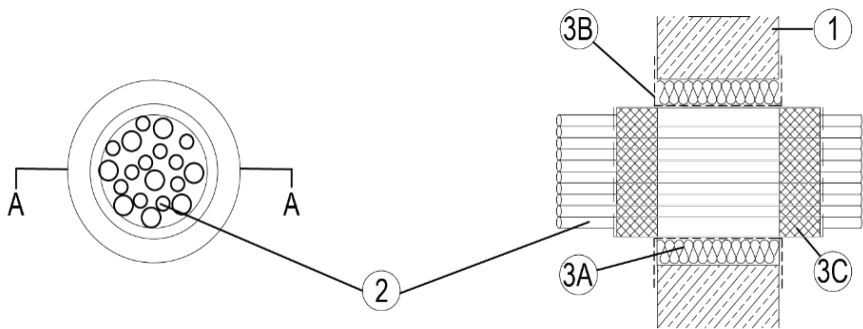
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-3276 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



Section A-A

- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max diameter or dimensions of 6-3/8 in. (162 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Cables** — Bundle of 5-3/8" (137 mm) diameter of the following types and sizes of cables may be used:
- A. Max 20/C No. 5/8" (16.2 mm) diameter (or smaller), copper conductor cable with PE insulation and PE jacket.

- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form, flush to both faces.
- B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). in. 1/32 in. (1 mm) dry film thickness to be applied to cables over 7-7/8" (200 mm) length, centralized within the seal.

**ARMACELL GMBH** — ArmaProtect ABLC

- C. **Firestop Device\*** — 7-7/8 in. (200 mm) long by 5-3/8" (137 mm) diameter cable tube positioned centrally within the seal and around the cables.

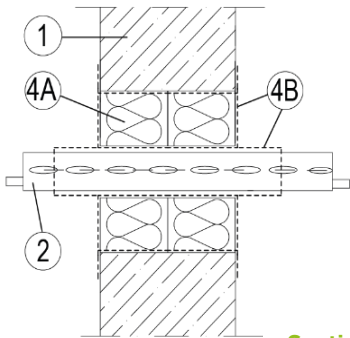
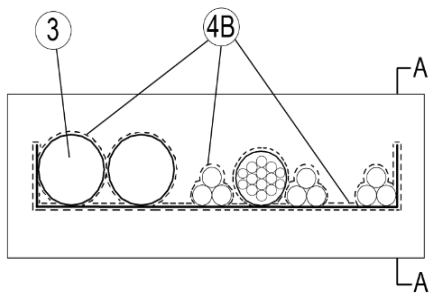
**ARMACELL GMBH** — ArmaProtect CT

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-4106 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 23-1/2 in. (600 mm) by 4-1/3 in. (110 mm).  
  
See **Concrete Blocks** (CAZT) category in Fire Resistance Directory for names of manufacturers.
- 2 Cable Tray\*** — Max 20 in. (500 mm) wide by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. Cable trays to be rigidly supported on both sides of the wall assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 33.73 percent of the cross-sectional area of the cable tray based on a max 2-5/8 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 185 mm diam (or smaller), copper conductor cable with PVC insulation and jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.
- 4 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.
  - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 7-7/8 in. (200 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

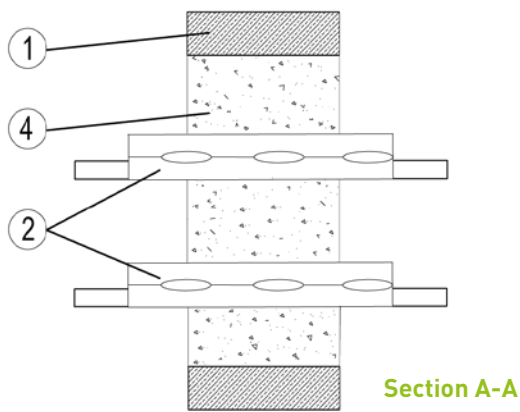
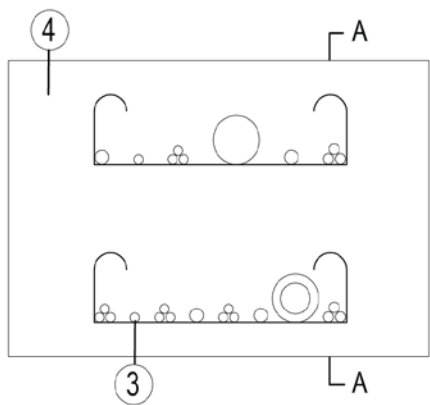
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-J-4107 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 23-1/2 in. (600 mm) by 15-3/4 in. (400 mm).  
See **Concrete Blocks** (CAZT) category in Fire Resistance Directory for names of manufacturers.
- 2 Cable Tray\*** — Max two, nom 12 in. (300 mm) wide by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. The cable trays to be spaced a nom 6-1/2 in. (165 mm) apart. The annular space between the cables trays and the periphery of the opening to be a min 2 in. (51 mm) to a max 6 in. (152 mm). Cable trays to be rigidly supported on both sides of the wall assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 25 percent of the cross-sectional area of the cable tray based on a max 2-3/4 in. (69 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
- A. Max 4/C 185 mm diam (or smaller), copper conductor cable with rubber (EPR) insulation and polyolefin (PO) jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - F. Max 1/C 800 mm diam (or smaller), aluminium conductor cable with PE insulation and jacket.
- 4 Fill, Void or Cavity Material\*** — Min 4-1/2 in. (115 mm) cast into the annular space between the cables, cable tray and periphery of the opening, flush with both surfaces of wall. Mortar to be mixed with water in accordance with the manufacturer's installation instructions.

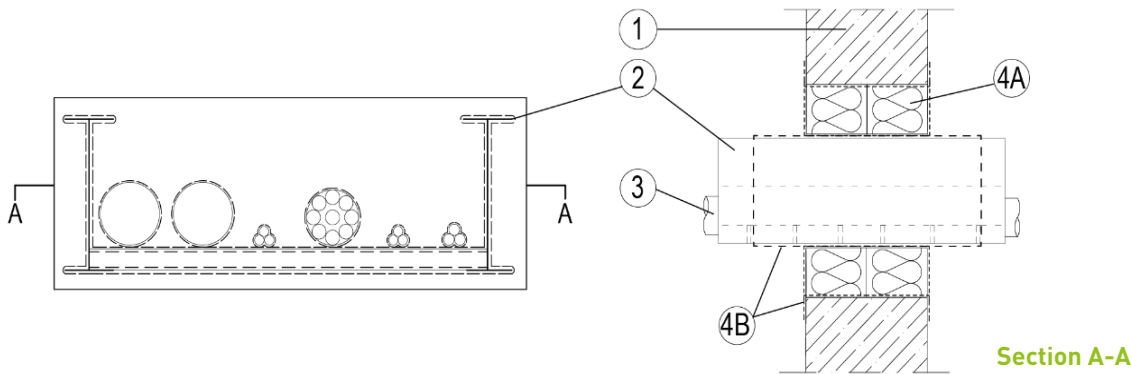
ARMACELL GMBH — ArmaProtect CM

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-4109 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1/2 Hr



- 1 Wall and Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 23-1/2 in. (600 mm) by 7-7/8 in. (200 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Cable Tray\*** — Nom 19-5/8 in. (500 mm) wide by max 6-3/8 in. (163 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. (2,3 mm) thick aluminium. The annular space between the cables trays and the periphery of the opening to be a min 3/4 in. (18 mm) to a max 2 in. (50 mm). Cable trays to be rigidly supported on both sides of the wall assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 13 percent of the cross-sectional area of the cable tray based on a max 2-3/4 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 15.3 mm diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.

*continued on next page*



## System No. W-J-4109 (contd.)

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Packing material** — Nom 2-3/8 in. (60 mm) thick mineral wool boards min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min 3/4 in. (20 mm). Min 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a min length of 7-7/8 in. (200 mm) from both faces of the board.

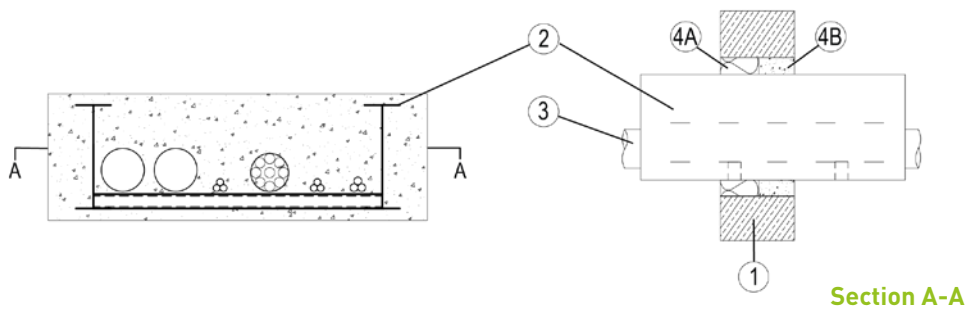
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-4110 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1-1/2 Hr	F Rating — 1-1/2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 1-1/2 Hr
	FTH Rating — 0 Hr



- 1 Wall Assembly** — Min 4-1/2 in. [115 mm] thick lightweight or normal weight [100-150 pcf or 1600-2400 kg/m<sup>3</sup>] concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 23-1/2 in. [600 mm] by 7-7/8 in. [200 mm].  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Cable Tray\*** — Nom 19-5/8 in. [500 mm] wide by max 6-3/8 in. [163 mm] deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. [2.3 mm] thick aluminium. The annular space between the cables trays and the periphery of the opening to be a min 3/4 in. [18 mm] to a max 2 in. [50 mm]. Cable trays to be rigidly supported on both sides of the wall assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 13 percent of the cross-sectional area of the cable tray based on a max 2-3/4 in. [68 mm] cable loading depth within the tray. Cable bundles of different types shall be separated by min 1 in. [25 mm]. Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 15.3 mm diam [or smaller], copper conductor cable with PVC insulation and PVC jacket.
  - B. Max 5/C No. 15 AWG [1.5 mm] diam [or smaller], copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG [1.5 mm] diam [or smaller], copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG [0.6 mm] diam [or smaller], copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG [1.5 mm] diam [or smaller], copper conductor cable with PVC insulation and PVC jacket.
- 4 Fill, Void or Cavity Material\*** — The Firestop System shall consist of the following:
  - A. **Packing Material** — 1 layer of nom 2-3/8 in. [60 mm] thick mineral wool board min 9.3 pcf [150 kg/m<sup>3</sup>] firmly packed into the opening of the wall as a permanent form, flush to one surface of the wall
  - B. **Fill, Void or Cavity Material\*** — Min 2-1/8 in. [55 mm] cast into the annular space between the cables/tray and periphery of the opening, flush with one surface of the wall. Mortar to be mixed with water in accordance with the manufacturer's installation instructions.

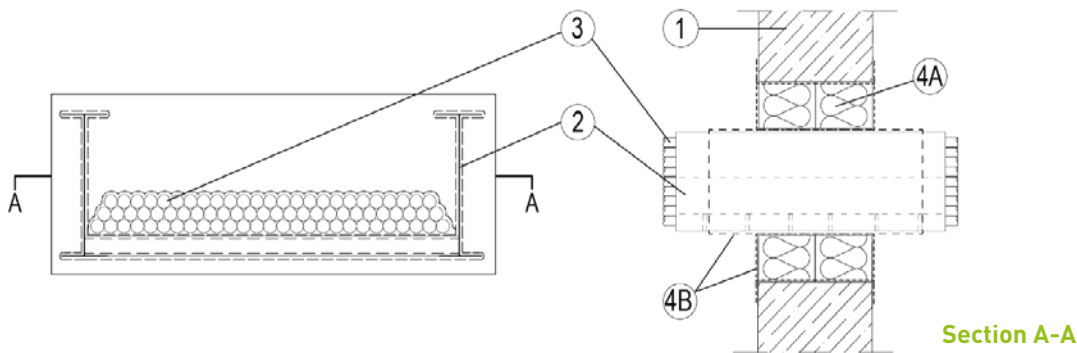
**ARMACELL GMBH** — ArmaProtect MM20

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-4111 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



- 1 Wall and Floor Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 15-3/4 in. (400 mm) by 7-7/8 in. (200 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Cable Tray\*** — Nom 13-3/4 in. (350 mm) wide by max 6-3/8 in. (163 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. (2.3 mm) thick aluminium. The annular space between the cable trays and the periphery of the opening to be a min 3/4 in. (18 mm) to a max 2 in. (48 mm). Cable trays to be rigidly supported on both sides of the wall assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 5 percent of the cross-sectional area of the aperture/opening on a max 1-7/8 in. (48 mm) cable loading depth within the tray. The following types and sizes of cables may be used:  
A. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
- 4 Firestop System** — The Firestop System shall consist of the following:  
A. **Packing material** — Nom 2-3/8 in. (60 mm) thick mineral wool boards min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.  
B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 7-7/8 in. (200 mm) from both faces of the board.

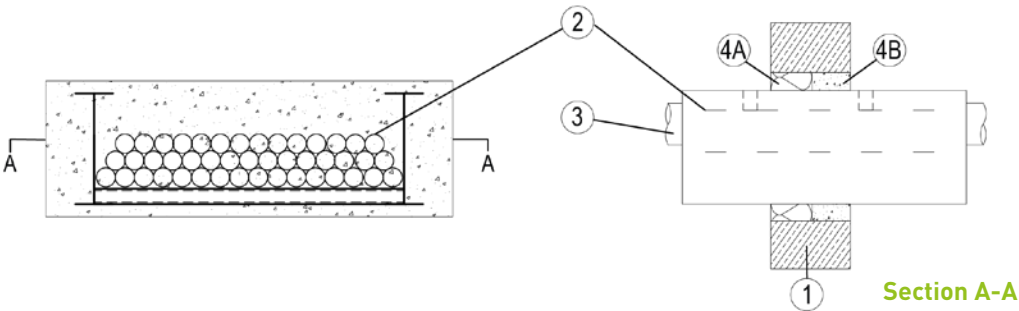
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-4112 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1/2 Hr



- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 21-3/4 in. (551 mm) by 7-7/8 in. (200 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Cable Tray\*** — Nom 19-3/4 in. (500 mm) wide by max 4 in. (102 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. (2.3 mm) thick aluminum. The annular space between the cables trays and the periphery of the opening to be a min 3/4 in. (18 mm) to a max 2 in. (48 mm). Cable trays to be rigidly supported on both sides of the wall assembly.
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 19 percent of the cross-sectional area of the cable tray based on a max 1-7/8 in. (48 mm) cable loading depth within the tray. The following types and sizes of cables may be used:  
A. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
- 4 Firestop System** — The firestop system shall consist of the following:  
A. **Packing Material** — 1 layer of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form, flush to one surface of the wall.  
B. **Fill, Void or Cavity Material\*** — Min 2-1/8 in. (55 mm) cast into the annular space between the cables/tray and periphery of the opening, flush with one surface of the wall. Mortar to be mixed with water in accordance with the manufacturer's installation instructions.

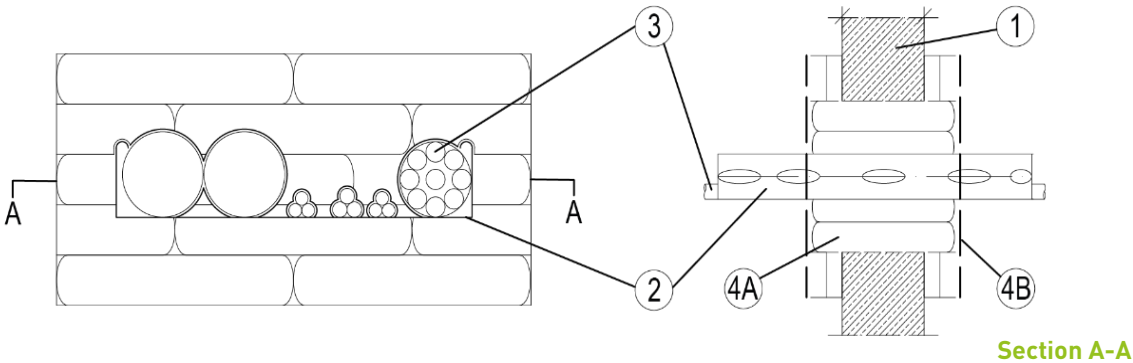
**ARMACELL GMBH** — ArmaProtect MM20

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-4113 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — Min 7-7/8 in. (200 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete or min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete increased in depth to min 7-7/8 in. (200 mm) around the seal by the fixing on non-combustible boards. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Opening shall be rectangular with max dimensions of 15-3/4 in. (400 mm) by 7-7/8 in. (200 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Cable Tray\*** — Nom 11-3/4 in. (300 mm) wide by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 1/8 in. (1,5 mm) thick steel. The annular space between the cable trays and the periphery of the opening to be nom. 2 in. (50 mm). Cable trays to be rigidly supported on both sides of the wall assembly.

- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 60 percent of the cross-sectional area of the cable tray based on a max 2-3/4 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1/4 in. (5 mm). Any combination of the following types and sizes of cables may be used:

- A. Max 3/C 185 mm diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.
- B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
- C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
- D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
- E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.

*continued on next page*



## System No. W-J-4113 (contd.)

### 4 Firestop System — The firestop system shall consist of the following:

A. **Fill, Void or Cavity Material\*** — 200 mm deep pillows to be tightly packed into the opening in the wall and around the services, flush to both faces. Different size of pillow are used to best fill the space.

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B. **Steel Mesh Guard\*** — Min. 50 x 50 mm steel mesh guard to be mechanically fixed to both faces of the wall, completely covering the through penetration firestop.

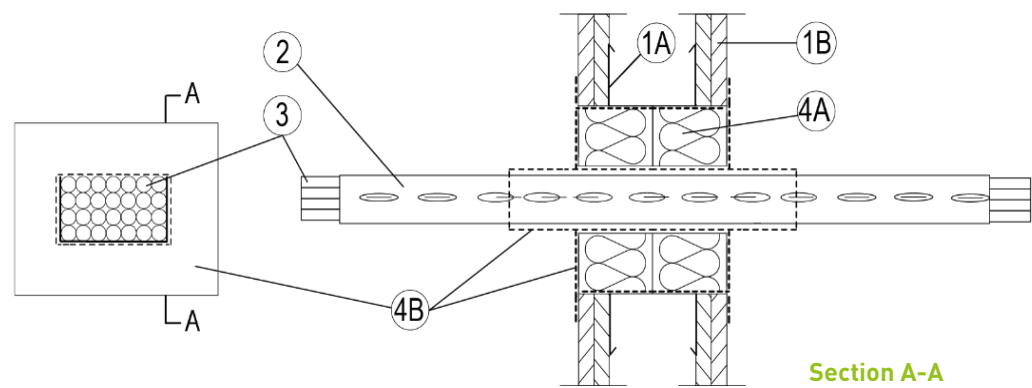
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-J-4114 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1-1/2 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular or circular with max dimensions of 2.1 in. (52 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Cable Tray\*** — Max 4 in. (100 mm) wide by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. Cable trays to be rigidly supported on both sides of the wall assembly. Annular space between tray and periphery of opening to be Min. 2 in. (50 mm) and Max. 2-3/4 (70 mm).
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 41.94 percent of the cross-sectional area of the cable tray based on a max 2-5/8 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 185 mm diam (or smaller), copper conductor cable with PVC insulation and jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.

*continued on next page*



## System No. W-J-4114 (contd.)

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 7-7/8 in. (200 mm) from both faces of the board.

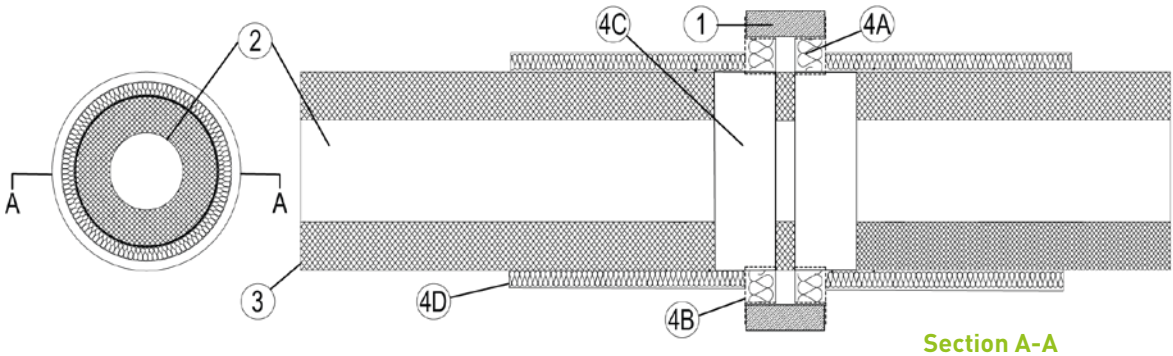
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-5210 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



- 1 Wall Assembly** — Wall Assembly — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max dimensions of 16-1/8 in. (409 mm).

\*See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nominal 6-1/4 in (159mm) diameter, Schedule M copper pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

- 3 Pipe Covering\*** — Nom 3 in. (75 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated pipe or tubing and periphery of the opening shall be 2 in (50 mm).  
See Plastics + (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 95-5VA may be used.

- 4 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

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C. **Fill, Void or Cavity Material\*** — 2 lengths of 2 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around pipe to a total length of 9-7/8 in. (250 mm).

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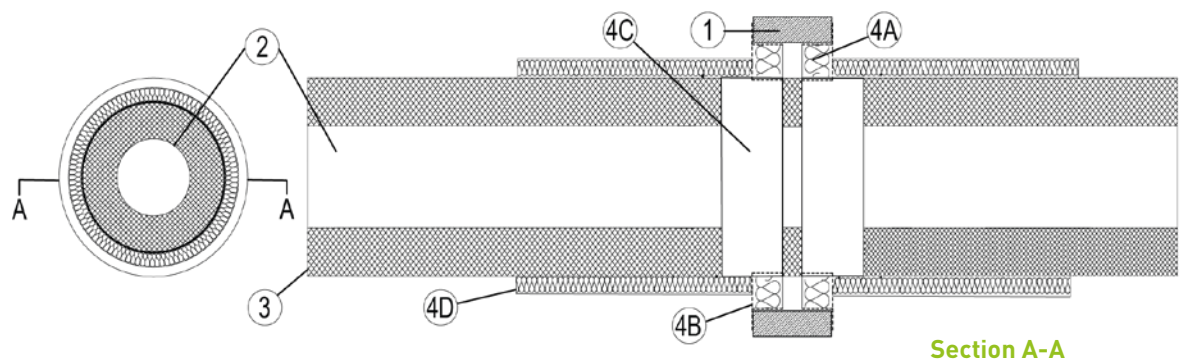
D. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick stone wool mineral fibre 2.5-3.1 pcf (40-50 kg/m<sup>3</sup>) wrapped around duct for min. 20 in. (500 mm) on both faces.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-5211 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



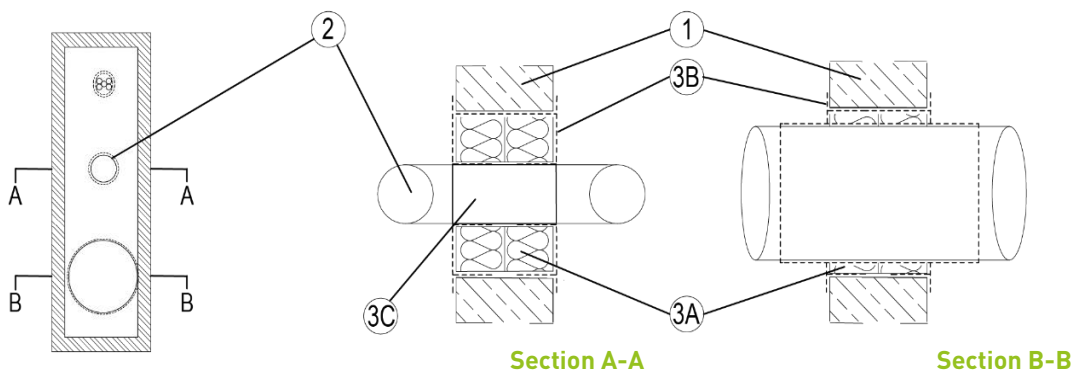
- 1 Wall Assembly** — Lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete, min thickness of wall assembly is 4-1/2 in. (115 mm). Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max diam or dimensions 11-3/4 in. (300 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Pipes** — Single pipe to be installed within the opening. The annular space between the pipe and the periphery of the opening to be a nom 2-1/8 in (58 mm). Pipe to be rigidly supported on both sides of the wall assembly. The following pipes may be used:  
A. Nom 5 in. (125 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing material** — 2 layers of nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the wall as a permanent form.
- B. **Fill, Void or Cavity Material\*** — Min 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min 3/4 in. (20 mm).
- ARMACELL GMBH** — ArmaProtect ABLC
- C. **Pipe Insulation** — Nom 1-1/4 in. (30 mm) thick mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around pipe for min 19-3/4 in. (500 mm) on both faces and continuous through the seal. Nom 1-1/4 in. (30 mm) thick mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around first layer of pipe insulation for min 10 in. (250 mm) on both faces.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-8089 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1-1/2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be rectangular with max dimensions of 23-5/8 in. (500 mm) by 6-1/4 in. (160 mm).

\* See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Services** — Services to be incorporated shall consist of the following:
- A. Max 1/C 148 mm diameter (or smaller), copper conductor cable with XLPE insulation and HDPE jacket. The annular space between the cable and the periphery of the opening to be 0-2 in (0-50 mm).
  - B. Nominal 1-1/2 in (37mm) diameter PE-HD SRV-G 7x10 tc 'speed pipe' for use in closed (process or supply) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm).
  - C. Nominal 2-1/4 in. (56 mm) diameter HD 240 synthetic rubber hydraulic hose for use in closed (process or supply) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm).

- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.
  - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.
- ARMACELL GMBH** — ArmaProtect ABLC
- C. **Fill, Void or Cavity Material\*** — 1 layer of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around hydraulic pipe. 2 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around speed pipe

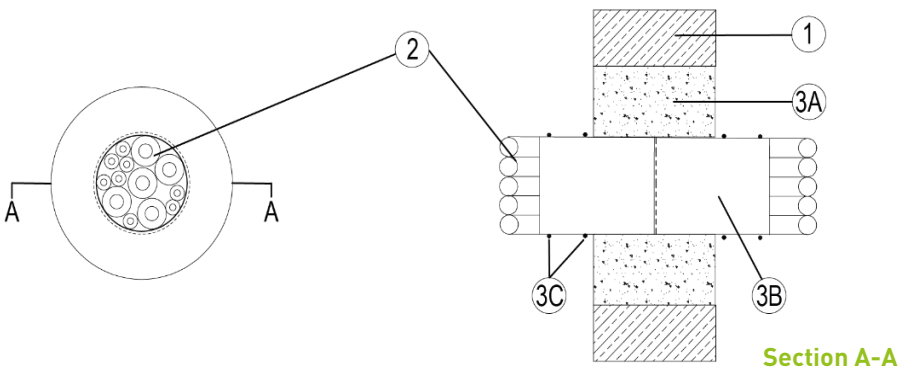
**ARMACELL GMBH** — ArmaProtect FW2

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-8090 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

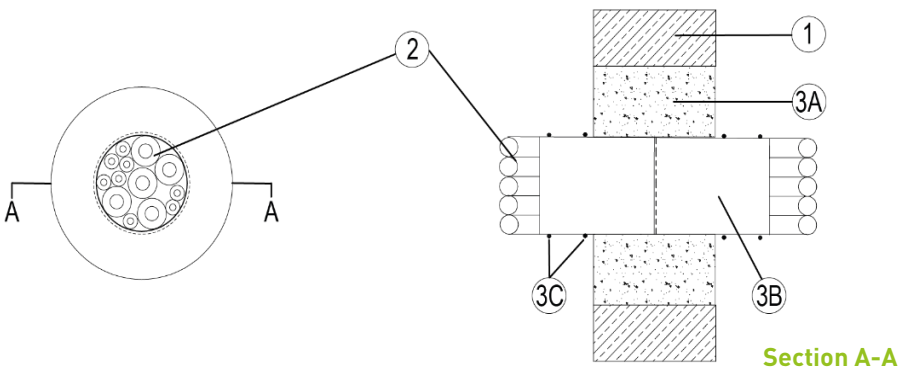
- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing the following cables:
  - A. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - D. Max 20/C No. 23 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cable with PE jacket.
  - E. Max 3/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Fill, Void or Cavity Material\*** — Nom 4-1/2 in. (115 mm) cast in to aperture in the wall and around the services.  
**ARMACELL GMBH** — ArmaProtect CM
  - B. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).  
**ARMACELL GMBH** — ArmaProtect FW2
  - C. Steel wire tied around 3B at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-8091 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty:

- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Fill, Void or Cavity Material\*** — Mortar - Nom 4-1/2 in. (115 mm) cast in to aperture in the wall and around the services.

**ARMACELL GMBH** — ArmaProtect CM

B. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

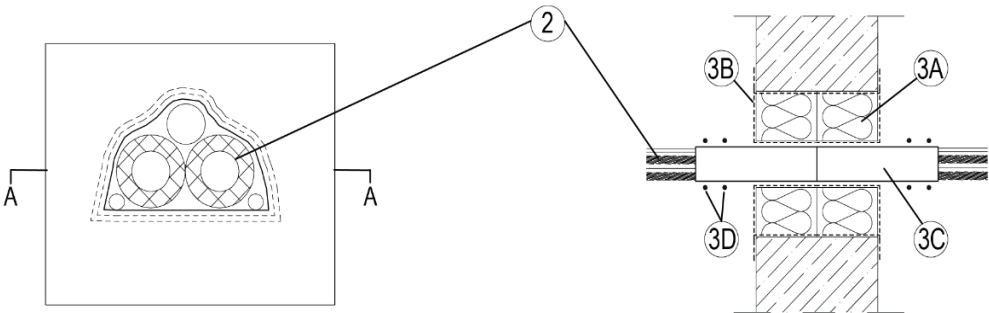
C. Min 24 AWG steel wire tied around 3B at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-8092 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1/2 Hr



Section A-A

System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 **Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max diameter or dimensions of 1-1/2 in. (116 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 **Services** — ‘Climasplit’ bundle of max diameter 2 in. (50 mm) or smaller, annular space between the bundle and the periphery of the opening to be 1-1/4 in (33 mm) and containing the following services:  
A. 1 off 1 in. (25 mm) diameter (or smaller), 1/16 in. (1.5 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.  
B. 1 off 3/4 in. (18 mm) diameter (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.  
C. 1 off 3/8 in. (10 mm) diameter (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.  
D. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.  
E. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

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## System No. W-J-8092 (contd.)

### 3 Firestop System — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 2 lengths of 2 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the bundle to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

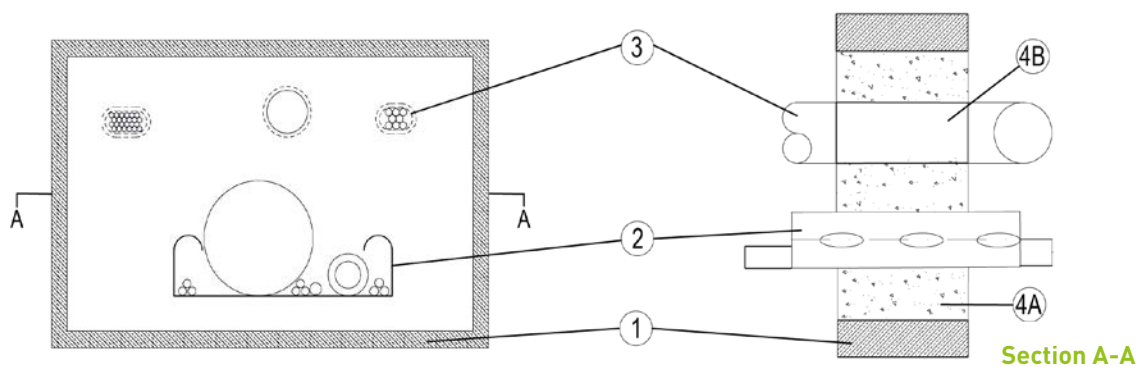
D. Min 24 AWG steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-8093 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 3 Hr
	FTH Rating — 1 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Opening shall be rectangular with max dimensions of 23-5/8 in. (600 mm) by 15-3/4 in. (400 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Cable Tray** — Max 11-3/4 in. (300 mm) wide by 2-3/8 in. (60mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. Cable trays to be rigidly supported on both sides of the wall assembly.

- 3 Services** — Aggregate cross-sectional area of cables in cable tray not to exceed 46.62 percent of the cross-sectional area of the cable tray based on a max 2-3/8 in. (60mm) cable loading depth within the tray. The annular space between the tray and the periphery of the opening to be 4 in (100 mm). Services to be incorporated shall consist of the following:

- A. Max 1/C 5-3/4 in. 148 mm diameter (or smaller), copper conductor cable with XLPE insulation and HDPE jacket.
- B. Nominal 1-1/2 in (37mm) diameter PE-HD SRV-G 7x10 tc 'speed pipe' for use in closed (process or supply) or vented (drain, waste or vent) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm)
- C. Nominal 2-1/4 in. (56 mm) diameter HD 240 synthetic rubber hydraulic hose for use in closed (process or supply) or vented (drain, waste or vent) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm).
- D. Nominal 1-3/4 in (43mm) diameter PE-HD SRV-G 24x7 tc 'speed pipe' for use in closed (process or supply) or vented (drain, waste or vent) piping systems. The annular space between the pipe and the periphery of the opening to be 2 in (50 mm).

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## System No. W-J-8093 (contd.)

E. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.

F. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPPE insulation and EVA jacket.

G. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

H. Max 1/C 2-1/8 in. (55.2 mm) diameter (or smaller), copper conductor cable with XLPE insulation and PVC jacket.

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Fill, Void or Cavity Material\*** — Mortar - Nom 4-1/2 in. (115 mm) cast in to aperture in the wall and around the services.

**ARMACELL GMBH** — ArmaProtect CM

B. **Fill, Void or Cavity Material\*** — 1 layer of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around hydraulic pipe or speed pipes.

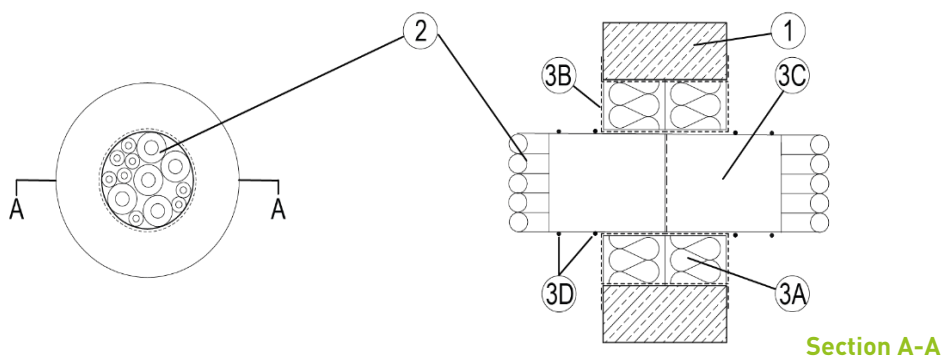
**ARMACELL GMBH** — ArmaProtect FW2

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-8094 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 3 Hr
	FTH Rating — 1-1/2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Opening shall be circular or rectangular with max diameter or dimensions of 7-7/8 in. (200 mm).  
See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing the following cables:
  - A. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - D. Max 20/C No. 23 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cable with PE jacket.
  - E. Max 3/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

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## System No. W-J-8094 (contd.)

### 3 Firestop System — The Firestop System shall consist of the following:

A. **Packing material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

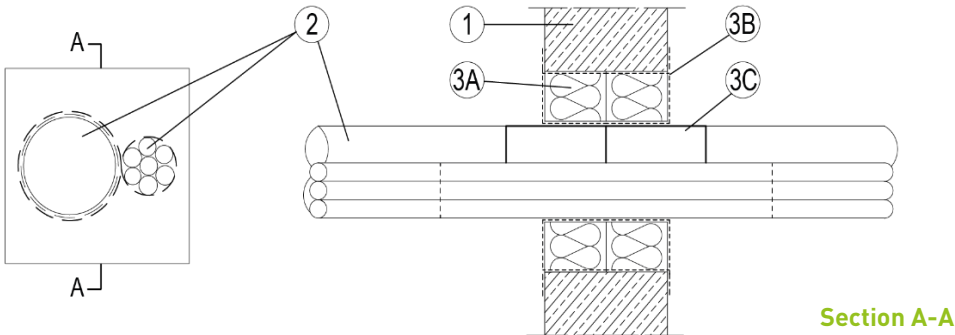
D. Min 24 AWG steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-J-8095 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 2 Hr
	FTH Rating — 1 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Opening shall be rectangular or circular with max dimensions of 2.1 in. (52 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Services** — Pipe and max. 2-3/8 in. (60 mm) diameter cable bundle without separation, annular space between the service and the periphery of the opening to be 1 in (25 mm) and containing the following services:
- A. 1 max 4-3/8 in. (110 mm) diameter (or smaller), 1/8 in. (2.7 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- B. Max 12, max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.

- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.
- B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 8 in. (200 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

- C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the pipe to a total length of 10 in. (250 mm).

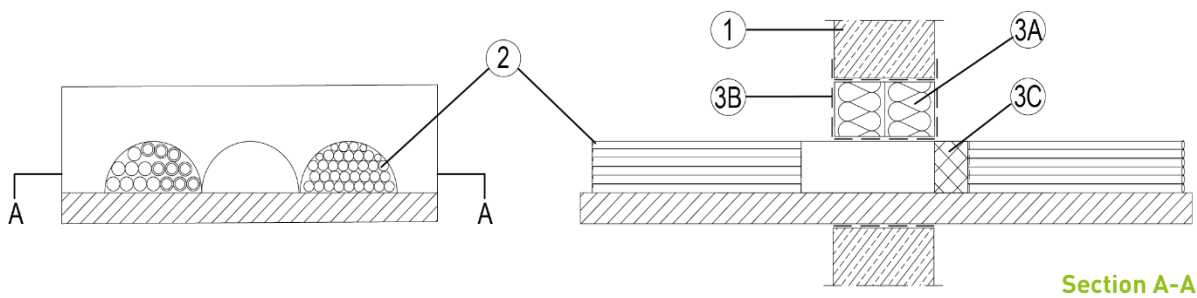
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



# System No. W-J-8096 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Opening shall be rectangular or circular with max dimensions of 2.1 in. (52 mm).
- See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.
- 2 Services** — Cables and conduits max. 2-3/8 in. (100 mm) diameter semicircle bundles in ArmaProtect CT ML half shells, positioned at floor level. Annular space between the ArmaProtect CT ML half shells and the periphery of the opening to be 1 in (25 mm) and containing the following services:
- A. 5/8 in. (16 mm) diameter PE/PP flex conduit.
  - B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - E. Max 20/C No. 23 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cable with PE jacket.
  - F. Max 3/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with NYM insulation.

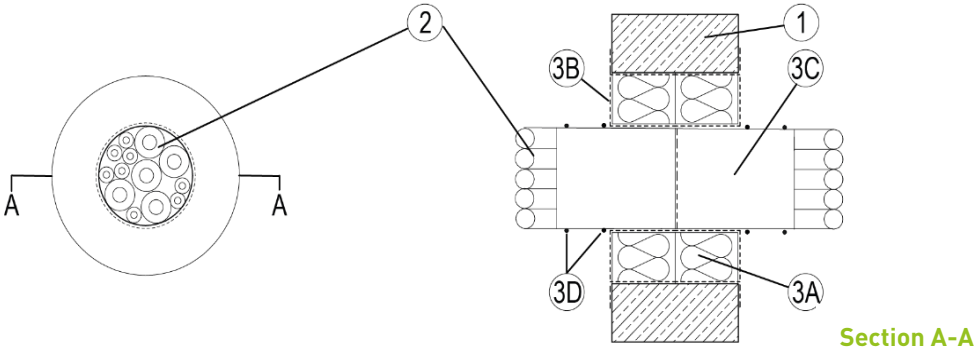
- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.
  - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 8 in. (200 mm) from both faces of the board.
- ARMACELL GMBH** — ArmaProtect ABLC
- C. **Firestop Device\*** — 7-7/8 in. (200 mm) long, half pipe wrap positioned centrally within the seal at floor level and wrapped around the cables.
- ARMACELL GMBH** — ArmaProtect CT ML

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



# System No. W-J-8097 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1-1/2 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight [100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>] concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Opening shall be rectangular or circular with max dimensions of 2.1 in. (52 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing the following cables:
- A. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - D. Max 20/C No. 23 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cable with PE jacket.
  - E. Max 3/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.
  - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm) on both sides of wall.  
**ARMACELL GMBH** — ArmaProtect ABLC
  - C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).  
**ARMACELL GMBH** — ArmaProtect FW2
  - D. 24 AWG Steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

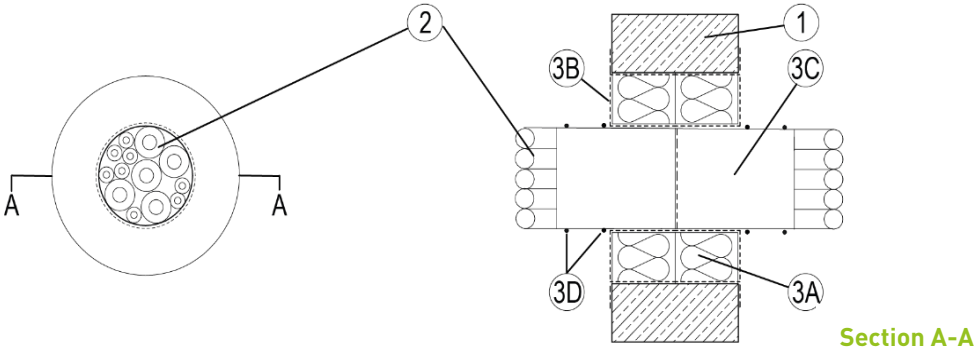
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-J-8098 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1-1/2 Hr



- 1 Wall Assembly** — Min. 4-1/2 in. (115 mm) thick lightweight or normal weight [100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>] concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Opening shall be rectangular or circular with max dimensions of 2.1 in. (52 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing the following cables:
- A. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
  - D. Max 20/C No. 23 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cable with PE jacket.
  - E. Max 3/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.
  - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm) on both sides of wall.

**ARMACELL GMBH** — ArmaProtect ABLC

- C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

- D. 24 AWG Steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



## System No. W-J-8099 - November 30, 2021

### ANSI/UL1479 (ASTM E814)

F Rating — 3 Hr

T Rating — 1-1/2 Hr

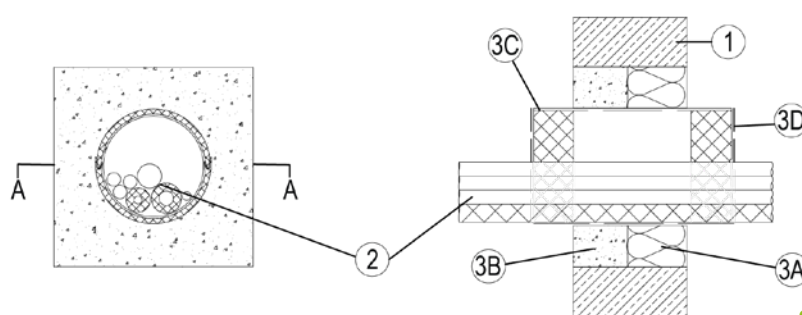
### CAN/ULC S115

F Rating — 3 Hr

FT Rating — 1-1/2 Hr

FH Rating — 3 Hr

FTH Rating — 1-1/2 Hr



Section A-A

**System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.**

- 1 Wall Assembly** — Min 4-1/2 in. (115 mm) thick lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. Opening shall be circular or rectangular with max diam or dimensions of 7-7/8 in. (200 mm).

See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

- 2 Services** — 'Climasplit' bundle of max diam 2 in. (50 mm) or smaller, annular space between the bundle and the periphery of the opening to be min 1-5/8 in (42 mm) max 1-5/8 in (42 mm) and containing the following services:

- A. 1 max 1 in. (25 mm) diam (or smaller), 1/16 in. (1.5 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- B. 1 max 3/4 in. (18 mm) diam (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9 mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- C. 1 max 3/8 in. (10 mm) diam (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- D. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and jacket.

- 3 Firestop System** — The Firestop System shall consist of the following:

- A. **Packing material** — 1 layer of Nom 2-3/8 in. (60 mm) thick mineral wool board min 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form, flush to one face.
- B. **Fill, Void or Cavity Material\*** — Min 2-1/8 in. (55 mm) cast into the annular space between the firestop device and periphery of the opening, flush with one surface of the wall. Mortar to be mixed with water in accordance with the manufacturer's installation instructions.

**ARMACELL GMBH** — ArmaProtect MM20

*continued on next page*



## System No. W-J-8099 (contd.)

C. **Firestop Device\*** — 7-7/8 in. (200 mm) long by 5-3/8" (116 mm) diam cable tube positioned centrally within the seal and around the pipes and cables.

**ARMACELL GMBH** — ArmaProtect CT

D. **Fill, Void or Cavity Material\*** — Min 1/32 in. (1 mm) dry film thickness to be applied over both ends of the Firestop Device.

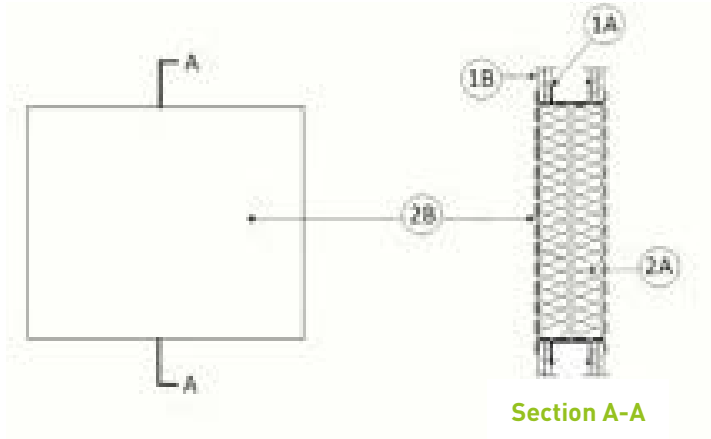
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-0065 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



**1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 15-3/4 in. (400 mm) high by 19-5/8 in. (500 mm) wide.

**2 Firestop System** — The Through-Penetration Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of the wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm) on both sides of wall.

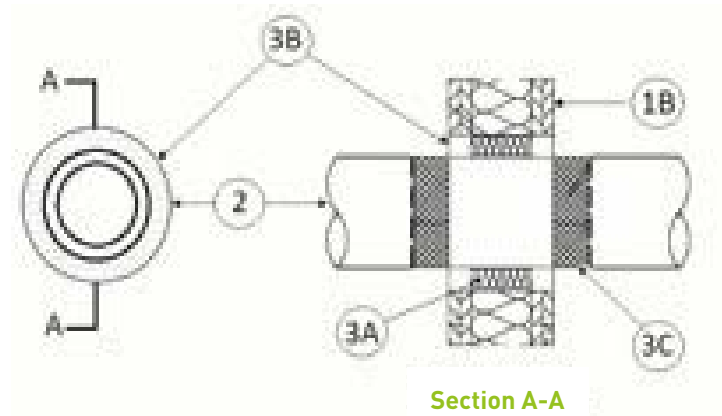
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-1606 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1/2 Hr



- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
  - B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 6-3/4 in. (170 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the ArmaProtect CT and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
  - A. Max 3-1/2 in. (89 mm) diameter Schedule 10 (or heavier) steel pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. **Packing Material** — Min. 9.3 pcf (150 kg/m<sup>3</sup>) mineral wool firmly packed into the opening of the wall as a permanent form. Packing material to be installed 1 in. space to both surfaces of wall.
  - B. **Fill, Void or Cavity Material\*** — Min 1 in. depth on both sides of mineral wool.

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  - C. **Firestop Device\*** — 7-7/8 in. (200 mm) long by 4-1/2" (116 mm) diam cable tube positioned centrally within the seal and around the pipe.

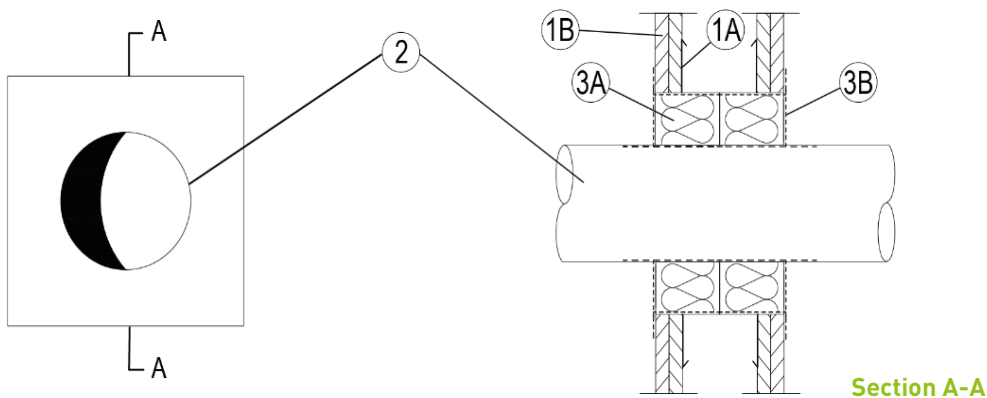
**ARMACELL GMBH** — ArmaProtect CT

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



# System No. W-L-1607 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 2 Hr
	FTH Rating — 0 Hr



**1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 10-1/4 in. (259 mm) high by 10-1/4 in. (259 mm) wide.

**2 Pipes** — Single pipe to be installed within the opening. The annular space between the pipe and the periphery of the opening to be a nom 2 in (50 mm). Pipe to be rigidly supported on both sides of the wall assembly. The following pipes may be used:

A. Nominal 6-1/4 in. (159 mm) diameter (or smaller) Type M (or heavier) copper tube.

B. Nominal 6-1/4 in. (159 mm) diameter (or smaller) Schedule 10 (or heavier) steel pipe.

**3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm) on both sides of the wall.

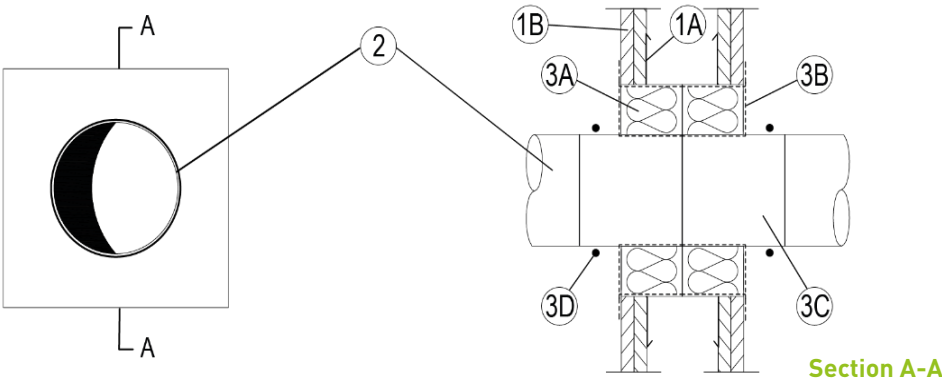
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



## System No. W-L-2819 - November 30, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1-1/2 Hr



**System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.**

**1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 5-1/4 in. (132 mm) high by 5-1/4 in. (132 mm) wide.

**2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nominal 1-1/4 in (32mm) diameter, 1/16 in. (1.9 mm) wall thickness PVC plastic pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

**3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 2 lengths of 1 layer of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 8 in. (200 mm).

**ARMACELL GMBH** — ArmaProtect FW1

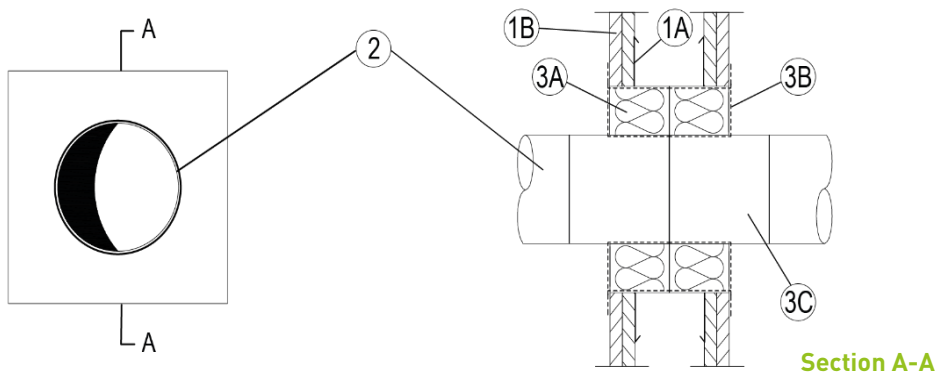
D. 24 AWG Steel wire tied around 3C at nominally 1 in. (25 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



# System No. W-L-2820 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 2 Hr
	FTH Rating — 0 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

**1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 8 in. (200 mm) high by 8 in. (200 mm) wide.

**2 Pipe** — Single pipe to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 4-3/8 in (110mm) diameter, 1/8 in. (2.7 mm) wall thickness PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

**3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m³) firmly packed into the opening of the wall as a permanent form, flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the pipe to a total length of 8 in. (200 mm).

**ARMACELL GMBH** — ArmaProtect FW1

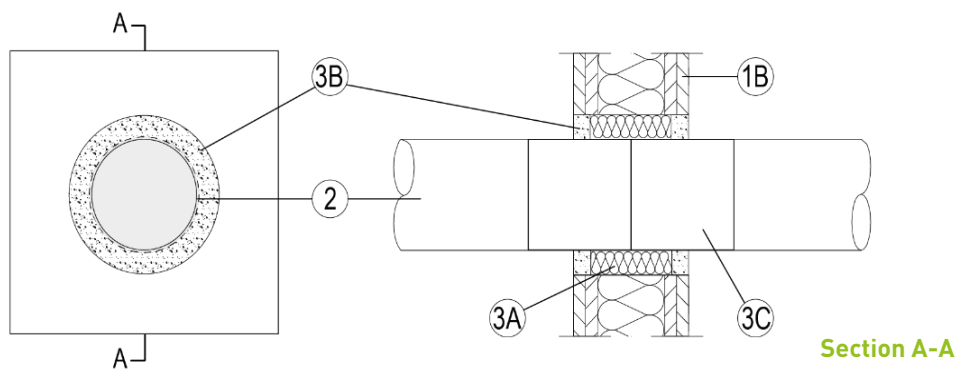
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-L-2821 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



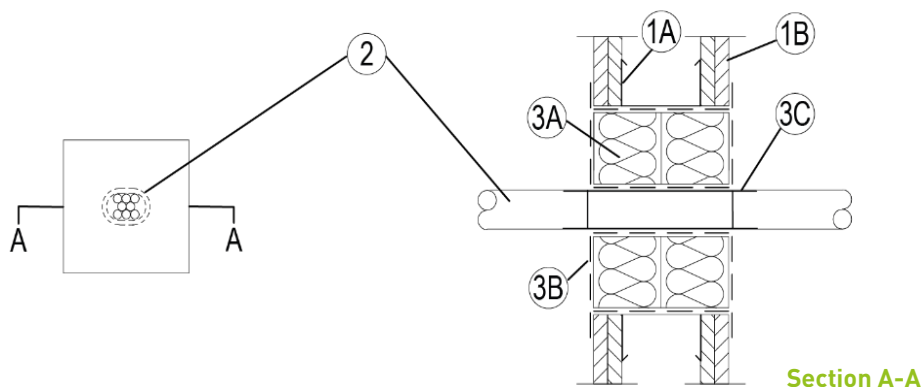
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
    - A. Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
    - B. Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 5 in. (125 mm) diameter.
  - 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
    - A. Nominal 3 in (75mm) diameter, 1/8 in. (3.6 mm) wall thickness PVC pipe** for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - 3 Firestop System** — The Firestop System shall consist of the following:
    - A. Packing Material** — Min. 9.3 pcf (150 kg/m<sup>3</sup>) mineral wool firmly packed into the opening of the wall as a permanent form. Packing material to be recessed 1 in. space to both surfaces of wall.
    - B. Packing Material** — Gypsum mortar minimum 1 in. depth on both sides.
    - C. Fill, Void or Cavity Material\*** — 2 lengths of 2 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the pipe to a total length of 8 in. (200 mm).
- ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



**System No. W-L-2822 - November 29, 2021**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 2 Hr
	FTH Rating — 0 Hr



**System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.**

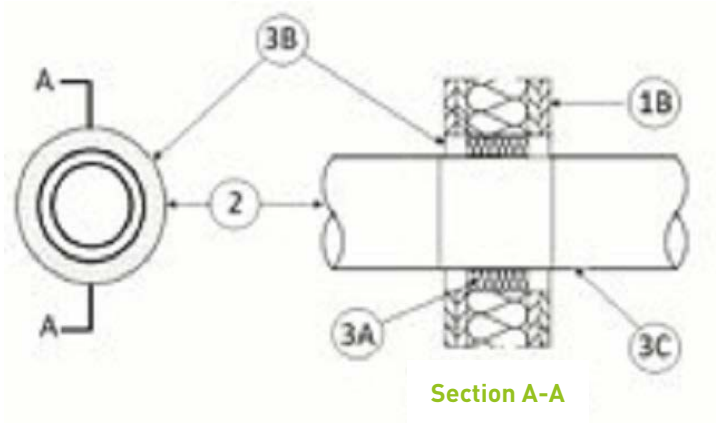
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
    - A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
    - B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 4-1/2 in. (116 mm) high by 4-1/2 in. (116 mm) wide.
  - 2 Pipes/ Tubes** — Single Speed-Pipe bundle to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1-1/3 in (33 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
    - A. Nominal 1 in (50mm) diameter, PE-HD plastic pipe 'Speed-Pipe bundle for use in closed (process or supply) piping systems.
  - 3 Firestop System** — The Firestop System shall consist of the following:
    - A. **Packing Material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.
    - B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm) on both sides of the wall.
- ARMACELL GMBH INTERNATIONAL** — ArmaProtect ABLC
- C. **Fill, Void or Cavity Material\*** — 1 lengths of 1 layer of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt positioned centrally within the depth of the seal.
- ARMACELL GMBH** — ArmaProtect FW2

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2823 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1 Hr	F Rating — 1 Hr
T Rating —0 Hr	FT Rating — 0 Hr
	FH Rating — 1 Hr
	FTH Rating — 0 Hr



**1 Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 4-1/2 in. (112 mm) diameter.

**2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

- A. Nominal 2-1/2 in (63mm) diameter, 3/16 in. (4.5 mm) wall thickness Multi-layer PE/AL/PE composite pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

**3 Firestop System** — The Firestop System shall consist of the following:

- A. **Packing Material** — Min. 9.3 pcf (150 kg/m3) mineral wool firmly packed into the opening of the wall as a permanent form. Packing material to be installed 1 in. space to both surfaces of wall.
- B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied inside the aperture before installation and over the full surface of the mineral wool to minimum 1 in. depth on both sides.

**ARMACELL GMBH** — ArmaProtect ABLC

- C. **Fill, Void or Cavity Material\*** — 1 length of 2 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around the pipe.

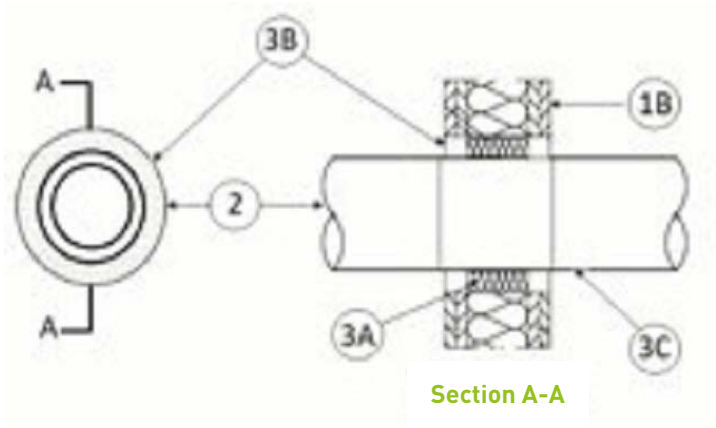
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2824 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 2 Hr
	FTH Rating — 1 Hr



**1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 3-1/4 in. (82 mm) diameter.

**2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nominal 1-1/4 in (32mm) diameter, 3/16 in. (4.5 mm) wall thickness multi-layer PE/AL/PE composite pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

**3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Min. 9.3 pcf (150 kg/m3) mineral wool firmly packed into the opening of the wall as a permanent form. Packing material to be installed 1 in. space to both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Minimum 1 in. depth on both sides of the mineral wool.

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 1 length of 1 layer of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap positioned centrally within the depth of the seal around the pipe.

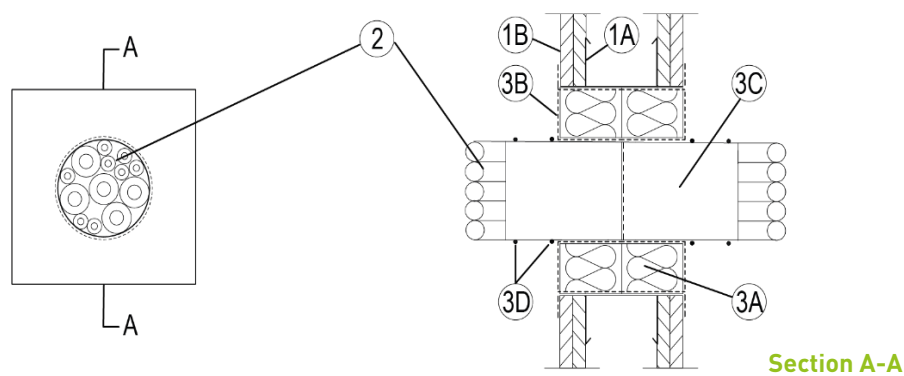
**ARMACELL GMBH** — ArmaProtect FW2

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2825 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - A. Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
  - B. Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 7-7/8 in. (200 mm) high by 7-7/8 in. (200 mm) wide.
- 2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, empty.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. Packing Material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form, flush with both surfaces of wall.
  - B. Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

**ARMACELL GMBH** — ArmaProtect ABLC

  - C. Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

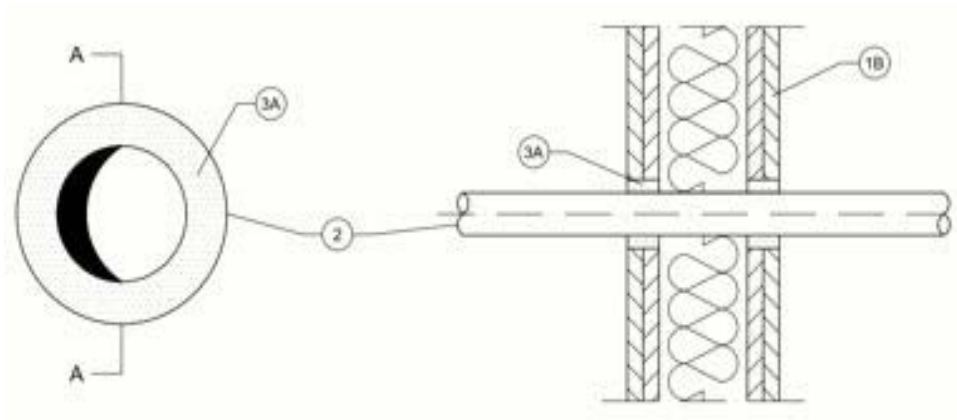
  - D.** 24 AWG Steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2826 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3Hr	F Rating — 3 Hr
T Rating — 3Hr	FT Rating — 3Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1

**Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

**A. Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.

**B. Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 2.1 in. (52 mm) diameter.
- 2

**Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.4 in (10 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

**A. Nom 1-1/4 in (32 mm) diam 0.15 in (3.7 mm) wall thickness PE pipe for use in closed (process or supply) piping systems.**
- 3

**Firestop System** — The firestop system shall consist of the following:

**A. Fill, Void or Cavity Material\*** — Min 0.4 in. (10 mm) depth and min 1 in. (25 mm) width on both sides between the gypsum board and the pipe.

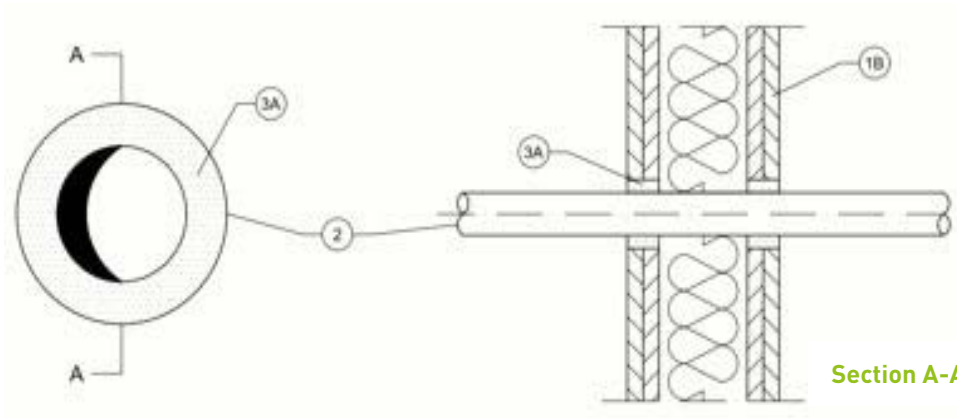
**ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2827 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



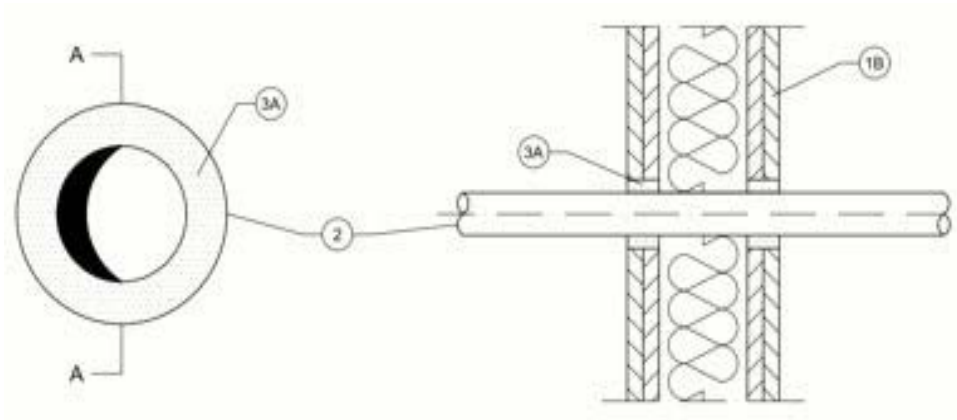
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 2.1 in. (52 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.4 in (10 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A. Nom 1-1/4 in (32 mm) diam 0.12 in (3.0 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Fill, Void or Cavity Material\*** — Min 0.4 in. (10 mm) width and min 1 in. (25 mm) depth on both sides between the gypsum board and the pipe.
- ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2828 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



- 1

**Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 2.1 in. (52 mm) diameter.
- 2

**Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.4 in (10 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 1-1/4 in (32 mm) diam 0.15 in (3.7 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.
- 3

**Firestop System** — The firestop system shall consist of the following:

A. **Fill, Void or Cavity Material\*** — Min 0.4 in (10 mm) width and min 1 in. (25 mm) depth on both sides between the gypsum board and the pipe.

**ARMACELL GMBH** — ArmaProtect ABLF

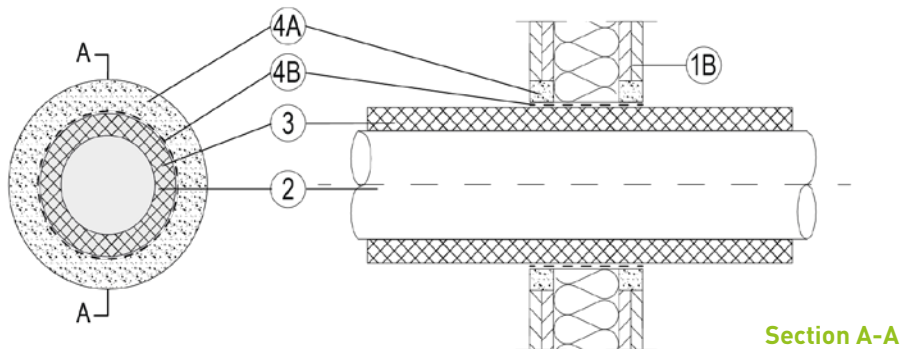
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-L-2829 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



**1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 5.9 in. (150 mm) diameter.

**2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 2 in (50 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

- A. Nom 2 in (50 mm) diam 0.19 in (4.7 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.

**3 Pipe Covering\*** — Nom 0.12 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated pipe or tubing and periphery of the opening shall be 2 in (31 mm).

See **Plastics+** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 95-5VA may be used.

**4 Firestop System** — The firestop system shall consist of the following:

- A. **Packing Material** — Gypsum mortar minimum 1.2 in. (31 mm) width and min 1 in. (25 mm) depth on both sides.
- B. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the gypsum mortar / gypsum board on both sides around the pipe.

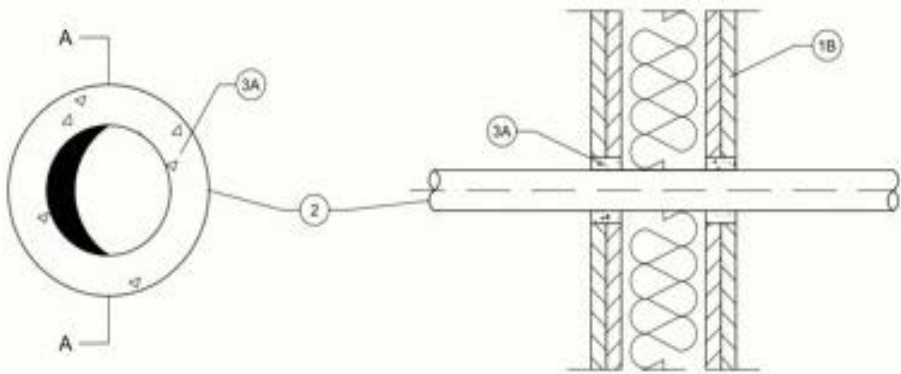
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2830 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



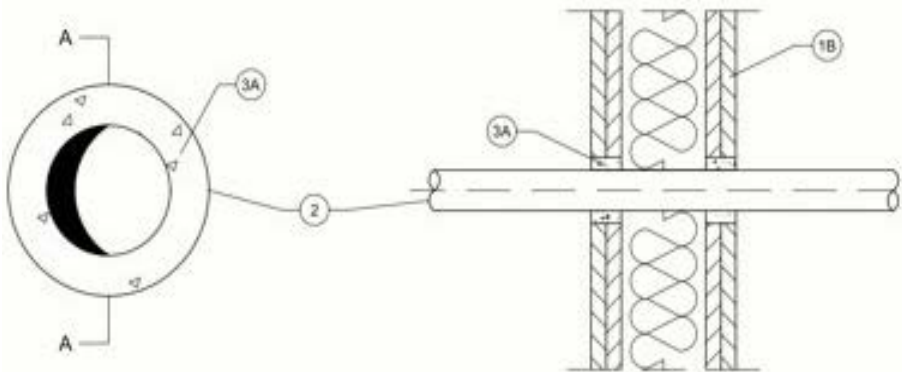
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 3.9 in. (100 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.5 in (12.5 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A. Nom 2.95 in (75 mm) diam 0.18 in (4.5 mm) wall thickness PE pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Fill, Void or Cavity Material\*** — Min 0.5 in (12.5 mm) width and min 1 in. (25 mm) depth on both sides between the gypsum board and the pipe.
- ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2831 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 3.9 in. (100 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.5 in (12.5 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 2.95 in (75 mm) diam 0.14 in (3.6 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:

A. **Fill, Void or Cavity Material\*** — Min 0.5 in (12.5 mm) width and min 1 in. (25 mm) depth on both sides between the gypsum board and the pipe.

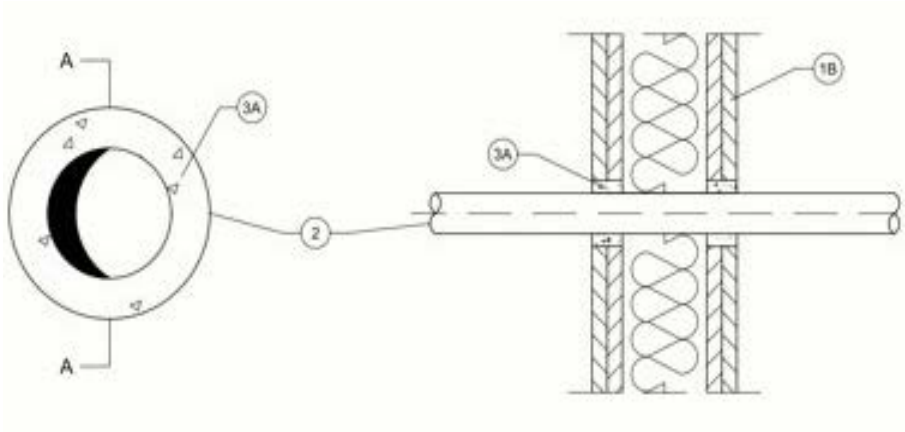
**ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2832 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1/2 Hr	F Rating — 1/2 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 1/2 Hr
	FTH Rating — 1/2 Hr



- 1

**Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 3.9 in. (100 mm) diameter.
- 2

**Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 0.5 in (12.5 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Nom 2.95 in (75 mm) diam 0.17 in (4.3 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.
- 3

**Firestop System** — The firestop system shall consist of the following:

A. **Fill, Void or Cavity Material\*** — Min 0.5 in (12.5 mm) width and min 1 in. (25 mm) depth on both sides between the gypsum board and the pipe.

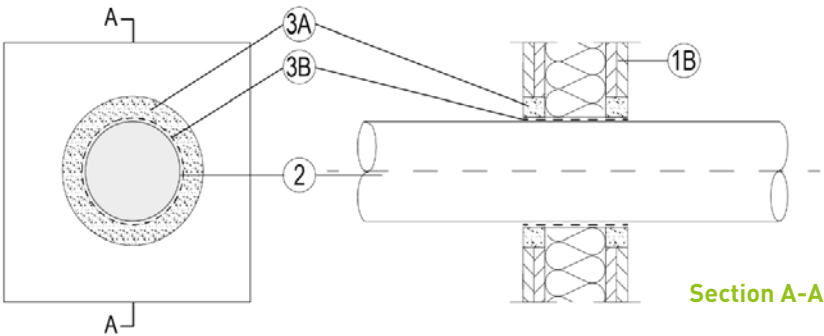
**ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2833 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



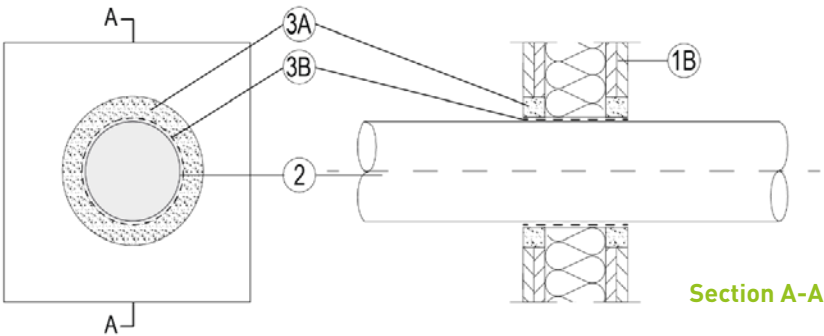
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 5.9 in. (150 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A. Nom 3.9 in (100 mm) diam 0.26 in (6.6 mm) wall thickness PE pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The firestop system shall consist of the following:
- A. **Packing Material** — Gypsum mortar minimum 1 in. (25 mm) width and min 1 in. (25 mm) depth on both sides.
- B. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the gypsum mortar / gypsum board on both sides around the pipe.
- ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2834 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



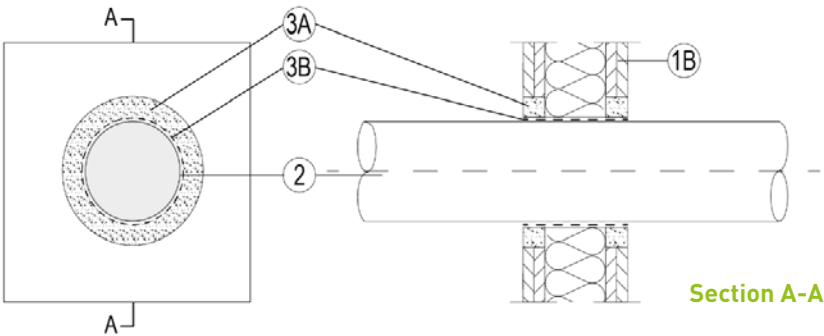
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 5.9 in. (150 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A. Nom 3.9 in (100 mm) diam 0.2 in (5.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The firestop system shall consist of the following:
- A. **Packing Material** — Gypsum mortar minimum 1 in. depth and min 1 in. (25 mm) width on both sides.
- B. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the gypsum mortar / gypsum board on both sides around the pipe.
- ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2835 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 3 Hr
	FTH Rating — 2 Hr



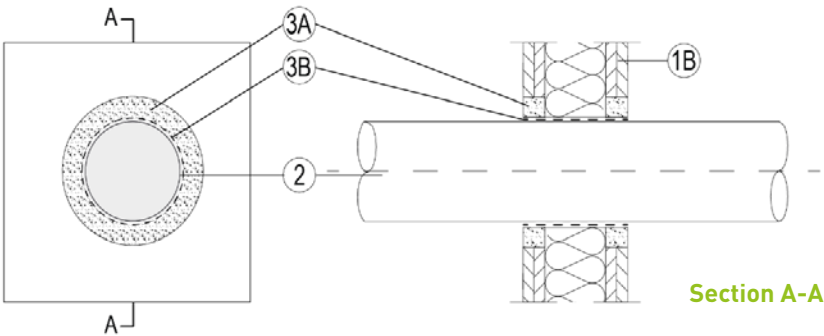
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
  - B. Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 5.9 in. (150 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A. Nom 3.9 in (100 mm) diam 0.25 in (6.3 mm) wall thickness PP pipe** for use in closed (process or supply) piping systems.
- 3 Firestop System** — The firestop system shall consist of the following:
- A. Packing Material** — Gypsum mortar minimum 1 in. (25 mm) width and min 1 in. (25 mm) depth on both sides.
  - B. Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 1 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the gypsum mortar / gypsum board on both sides around the pipe.
- ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-2836 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 5.9 in. (150 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A. Nom 3.9 in (100 mm) diam 0.26 in (6.6 mm) wall thickness PP pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing Material** — Gypsum mortar minimum 1 in. depth and min 1 in. (25 mm) width on both sides.
- B. **Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 2 layer of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the gypsum mortar / gypsum board on both sides around the pipe.
- ARMACELL GMBH** — ArmaProtect FW1

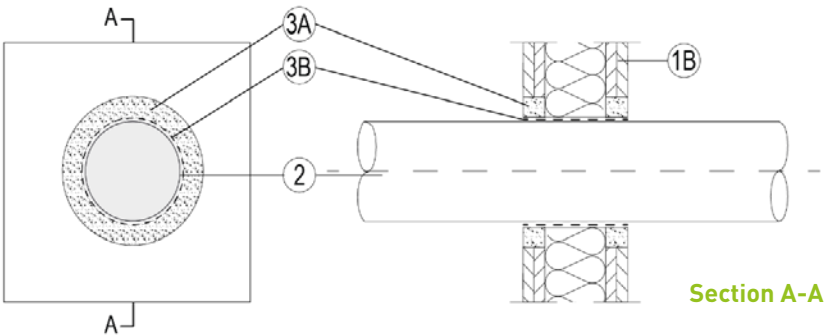
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-L-2837 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr



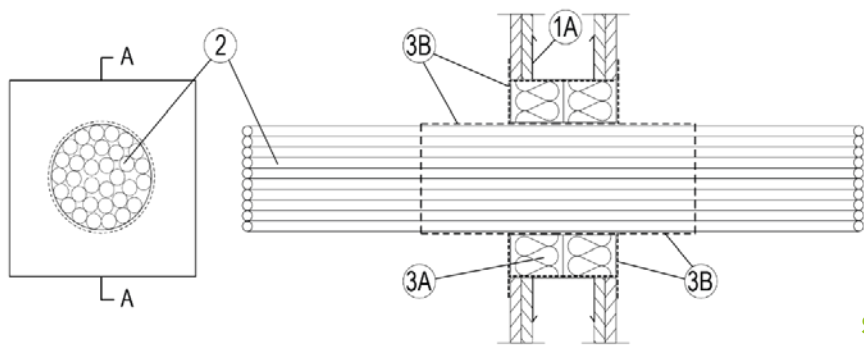
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
  - B. Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 5.9 in. (150 mm) diameter.
- 2 Pipes/ Tubes** — Single to be installed within the opening. The annular space between the pipes and the periphery of the opening to be 1 in (25 mm). Pipes to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A.** Nom 3.9 in (100 mm) diam 0.48 in (12.3 mm) wall thickness PVC pipe for use in closed (process or supply) piping systems.
- 3 Firestop System** — The Firestop System shall consist of the following:
- A. Packing Material** — Gypsum mortar minimum 1 in. (25 mm) width and min 1 in. (25 mm) depth on both sides.
  - B. Fill, Void or Cavity Material\*** — Overall 2 intumescent wraps. Each wrap is made up of 1 length of 2 layers of 1/16 in (1.5 mm) by 2 in. (50 mm) wrap flush mounted with the outside of the gypsum mortar / gypsum board on both sides around the pipe.
- ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-3479 - Date

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 2 Hr
	FTH Rating — 1 Hr



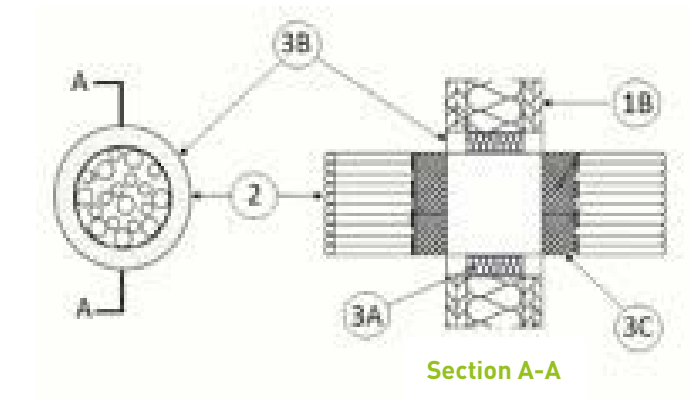
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 8 in. (200 mm) high by 8 in. (200 mm) wide.
- 2 Cables** — Bundle of 4" (100 mm) diameter of the following types and sizes of cables may be used:
- A. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
- 3 Firestop System** — The firestop system shall consist of the following:
- A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 9.3 pcf (150 kg/m³) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.
- B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables to a minimum length of 8 in. (200 mm) from both faces of the board.
- ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-3480 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 3/4 Hr	FT Rating — 3/4 Hr
	FH Rating — 2 Hr
	FTH Rating — 3/4 Hr



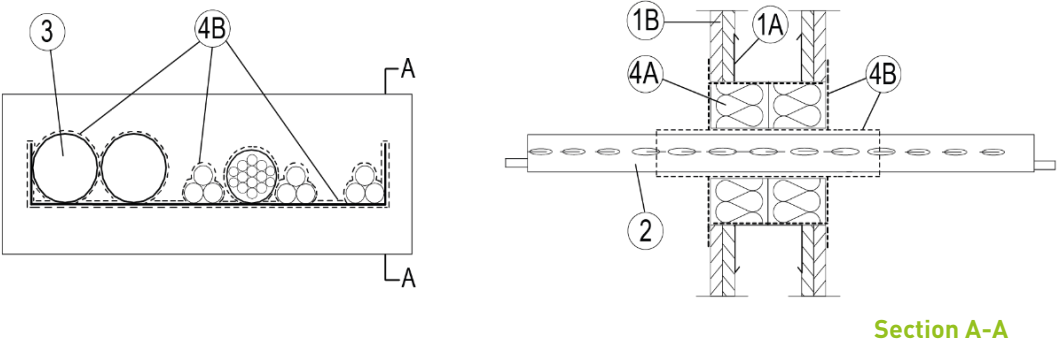
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening to be 6-3/4 in. (170 mm) diameter.
- 2 Cables** — Bundle of max 4-3/4" (120 mm) diameter of the following types and sizes of cables may be used. Annular space between cables and periphery of opening to be 1 in. (25 mm).
- A. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing Material** — Min. 9.3 pcf (150 kg/m<sup>3</sup>) mineral wool firmly packed into the opening of the wall as a permanent form. Packing material to be installed 1 in. space to both surfaces of wall.
- B. **Fill, Void or Cavity Material\*** — Min. 1 in. depth on both sides of the mineral wool.
- ARMACELL GMBH** — ArmaProtect ABLC
- C. **Firestop Device\*** — 7-7/8 in. (200 mm) long pipe wrap positioned centrally within the seal and wrapped around the cables.
- ARMACELL GMBH** — ArmaProtect CT

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-4109 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 2 Hr
	FTH Rating — 1 Hr



- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
  - B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 7-7/8 in. (200 mm) high by 22 in. (560 mm) wide.
- 2 Cable Tray\*** — Max 20 in. (500 mm) wide by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. Cable trays to be rigidly supported on both sides of the wall assembly. Annular space between tray and periphery of opening to be Min. 1-1/8 in. (30 mm) and Max. 2-3/4 (70 mm).
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 31.21 percent of the cross-sectional area of the cable tray based on a max 2-5/8 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 185 mm diam (or smaller), copper conductor cable with PVC insulation and jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.

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## System No. W-L-4109 (contd.)

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 7-7/8 in. (200 mm) from both faces of the board.

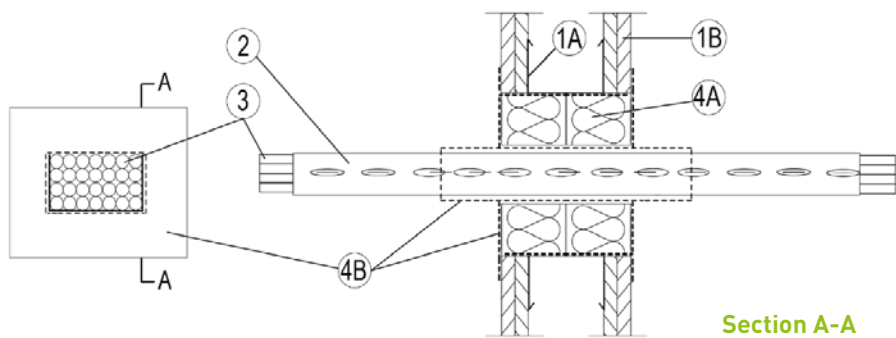
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-4110 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1-1/2 Hr



- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
  - B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 7-7/8 in. (200 mm) high by 22 in. (560 mm) wide.
- 2 Cable Tray\*** — Max 4 in. (100 mm) wide by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. Cable trays to be rigidly supported on both sides of the wall assembly. Annular space between tray and periphery of opening to be Min. 2 in. (50 mm) and Max. 2-3/4 (70 mm).
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 41.94 percent of the cross-sectional area of the cable tray based on a max 2-5/8 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 185 mm diam (or smaller), copper conductor cable with PVC insulation and jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.

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## System No. W-L-4110 (contd.)

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 7-7/8 in. (200 mm) from both faces of the board.

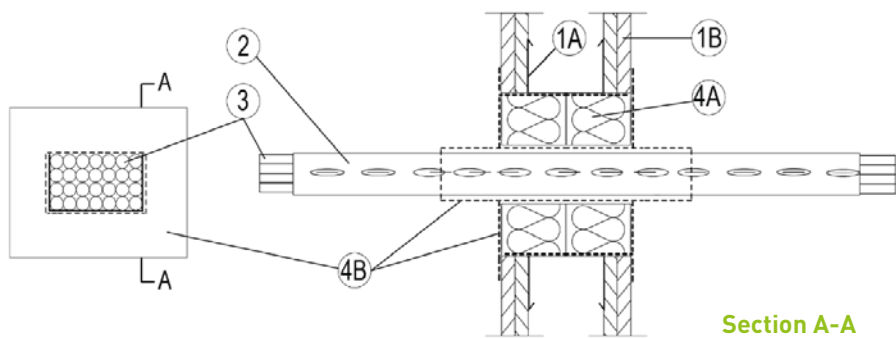
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-4111 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1-1/2 Hr



- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
  - B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 7-7/8 in. (200 mm) high by 22 in. (560 mm) wide.
- 2 Cable Tray\*** — Max 4 in. (100 mm) wide by max 2-3/8 in. (60 mm) deep open-perforated or solid sheet cable tray with side rails formed of min 0.05 in. (1.5 mm) thick steel. Cable trays to be rigidly supported on both sides of the wall assembly. Annular space between tray and periphery of opening to be Min. 2 in. (50 mm) and Max. 2-3/4 (70 mm).
- 3 Cables** — Aggregate cross-sectional area of cables in cable tray not to exceed 41.94 percent of the cross-sectional area of the cable tray based on a max 2-5/8 in. (68 mm) cable loading depth within the tray. Cable bundles of different types shall be separated by min. 1 in. (25 mm). Any combination of the following types and sizes of cables may be used:
  - A. Max 3/C 185 mm diam (or smaller), copper conductor cable with PVC insulation and jacket.
  - B. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - C. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
  - D. Max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diam (or smaller), copper conductor cable with PVC insulation and PVC jacket.

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## System No. W-L-4111 (contd.)

### 4 Firestop System — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool boards min. 3.7 pcf (60 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form. Packing material to be installed flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 7-7/8 in. (200 mm) from both faces of the board.

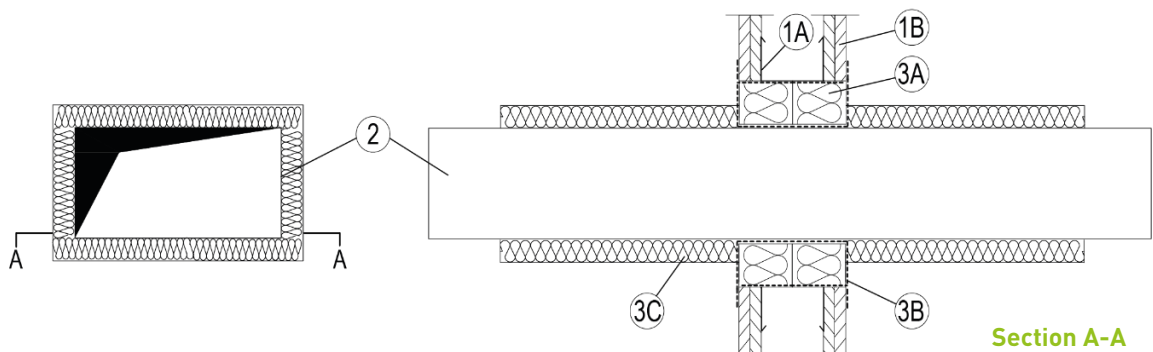
**ARMACELL GMBH** — ArmaProtect ABLC

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-7326 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



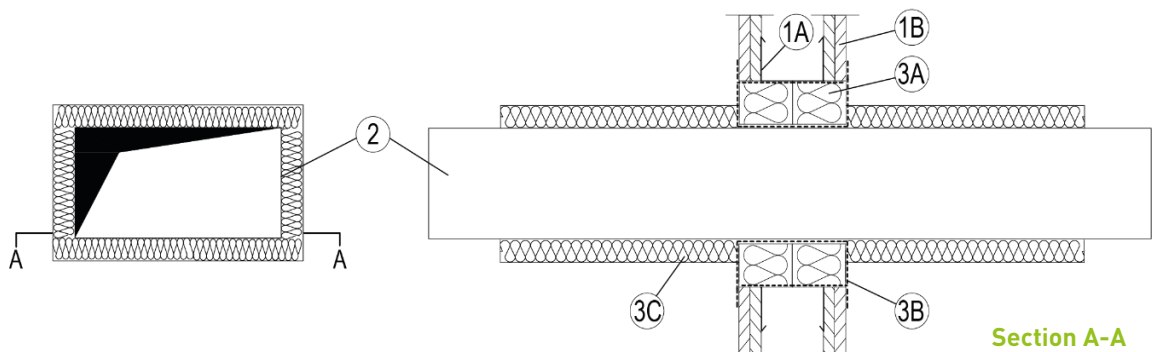
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 7-7/8 in. (200 mm) high by 11-3/4 in. (300 mm) wide.
- 2 Duct** — Single to be installed within the opening. The annular space between the duct and the periphery of the opening to be 2 in (50 mm). Ducts to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A. Max 7-7/8 in. (200 mm) by 4 in. (100 mm) galvanized steel duct.
- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form, flush with both surfaces of wall.
- B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).
- ARMACELL GMBH** — ArmaProtect ABLC
- C. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick 'Klimarock' mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around duct for min. 10 in. (250 mm) on both faces and secured by min 24 AWG steel wire at 2in. (50 mm) and 8in. (200 mm) from the faces of the firestop.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-7327 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1/2 Hr



**1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 15-3/4 in. (400 mm) high by 19-5/8 in. (500 mm) wide.

**2 Duct** — Single duct to be installed within the opening. The annular space between the duct and the periphery of the opening to be 2 in (50 mm). Ducts to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:

A. Max 15-3/4 in. (400 mm) by 11-3/4 in. (300 mm) galvanized steel duct min. 18 AWG (1 mm).

**3 Firestop System** — The Firestop System shall consist of the following:

A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form, flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm).

**ARMACELL GMBH** — ArmaProtect ABLC

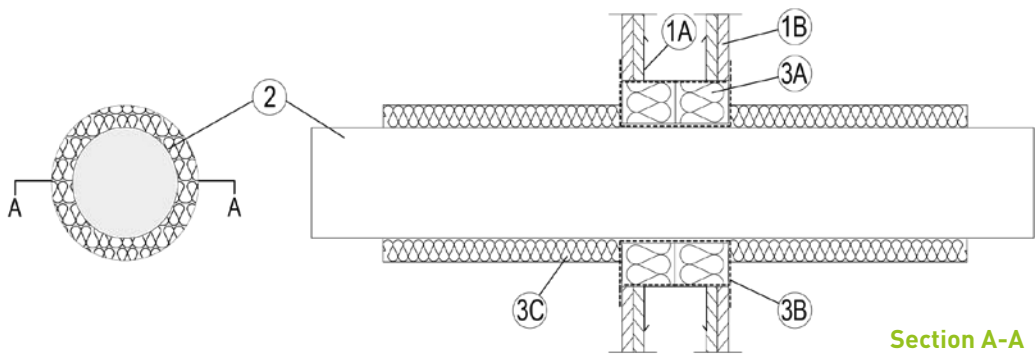
C. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick 'Klimarock' mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around duct for min. 10 in. (250 mm) on both faces and secured by min 24 AWG steel wire at 2in. (50 mm) and 8in. (200 mm) from the faces of the firestop.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-7328 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 2 Hr
	FTH Rating — 0 Hr



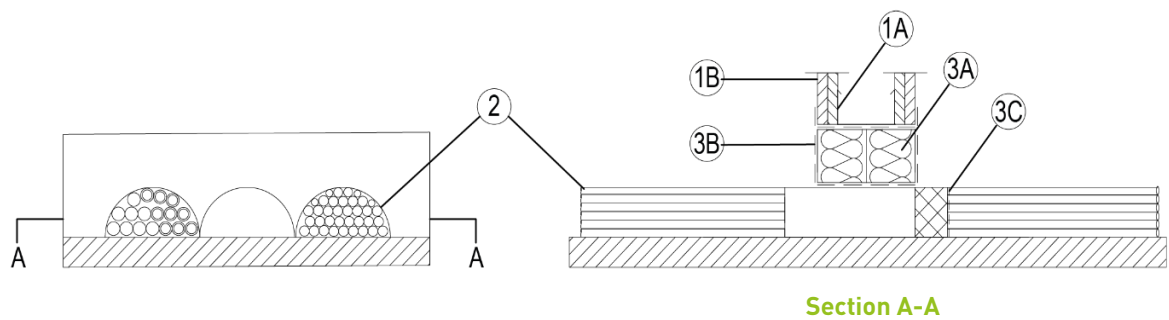
- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs (not shown in diagram)** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
- B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 15-3/4 in. (400 mm) high by 15-3/4 in. (400 mm) wide.
- 2 Duct** — Single duct to be installed within the opening. The annular space between the duct and the periphery of the opening to be 2 in (50 mm). Ducts to be rigidly supported on both sides of the wall assembly. The following penetrants may be used:
- A. Max 11-3/4 in. (300 mm) diameter galvanized steel duct, Min. 18 gauge (1 mm).
- 3 Firestop System** — The Firestop System shall consist of the following:
- A. **Packing Material** — Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.
- B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm) on both sides of wall.
- ARMACELL GMBH** — ArmaProtect ABLC
- C. **Duct Insulation** — Nom. 1-1/4 in. (30 mm) thick 'Klimarock' mineral fibre lamella mat, min density 2.5 pcf (40 kg/m<sup>3</sup>), wrapped around duct for min. 10 in. (250 mm) on both faces and secured by Min 24 AWG steel wire at 2in. (50 mm) and 8in. (200 mm) from the faces of the firestop.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-8139 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr



**1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 4-3/4 in. (120 mm) high by 17-3/4 in. (450 mm) wide.

**2 Services** — Cables and conduits max. 2-3/8 in. (100 mm) diameter semicircle bundles in ArmaProtect CT ML half shells, positioned at floor level. Annular space between the ArmaProtect CT ML half shells and the periphery of the opening to be 1 in (25 mm) and containing the following services:

- A. 5/8 in. (16 mm) diameter PE/PP flex conduit.
- B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
- C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.
- D. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.
- E. Max 20/C No. 23 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cable with PE jacket.
- F. Max 3/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with NYM insulation.

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## System No. W-L-8139 (contd.)

### 3 Firestop System — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form, flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 8 in. (200 mm) from both faces of the board.

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Firestop Device\*** — 7-7/8 in. (200 mm) long, half pipe wrap positioned centrally within the seal at floor level and wrapped around the cables.

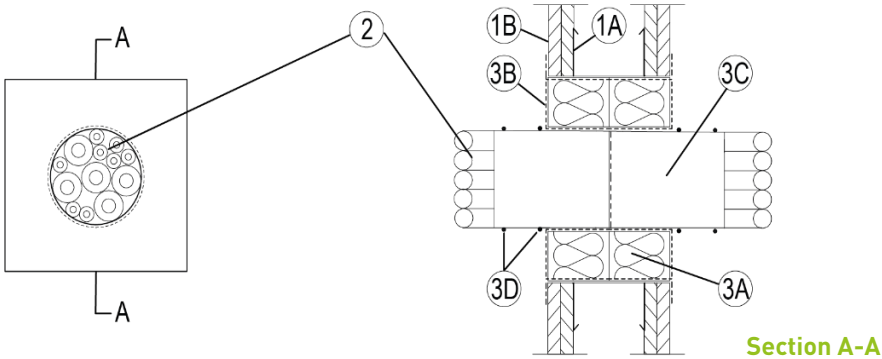
**ARMACELL GMBH** — ArmaProtect CT ML

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-8136 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr
	FH Rating — 2 Hr
	FTH Rating — 1-1/2 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

**1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.

B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 7-7/8 in. (200 mm) high by 7-7/8 in. (200 mm) wide.

**2 Services** — 1-1/4 in. (32 mm) diameter (or smaller) PE-HD conduit in bundles of diameter 4 in. (100 mm) or smaller, containing the following cables:

A. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.

B. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with XPLE insulation and EVA jacket.

C. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

D. Max 20/C No. 23 AWG (0.6 mm) diameter (or smaller), copper conductor telecommunication cable with PE jacket.

E. Max 3/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

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## System No. W-L-8136 (contd.)

### 3. Firestop System — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall or floor as a permanent form, flush with both surfaces of wall.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm) on both sides of wall.

**ARMACELL GMBH** — ArmaProtect ABLC

C. **Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the conduit to a total length of 10 in. (250 mm).

**ARMACELL GMBH** — ArmaProtect FW2

D. 24 AWG Steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

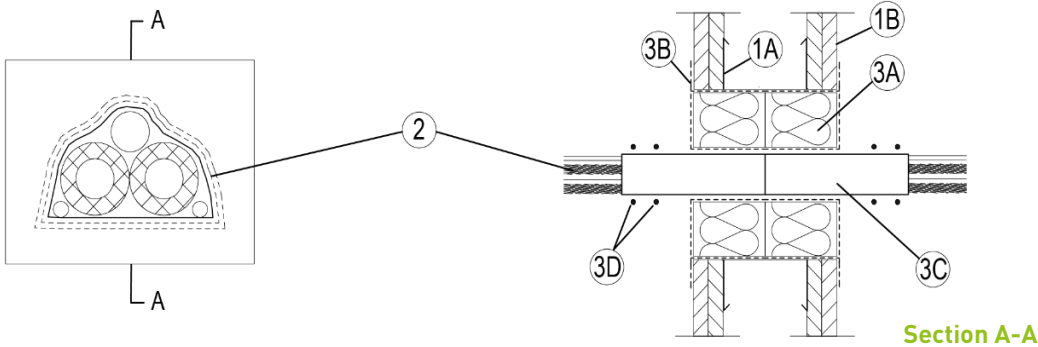
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. W-L-8137 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 2 Hr
	FTH Rating — 1 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - A. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
  - B. **Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 4-1/2 in. (116 mm) high by 4-1/2 in. (116 mm) wide.
- 2 Services** — ‘Climasplit’ bundle of max diameter 2 in. (50 mm) or smaller, annular space between the bundle and the periphery of the opening to be 1-1/4 in (33 mm) and containing the following services:
  - A. 1 max 1 in. (25 mm) diameter (or smaller), 1/16 in. (1.5 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - B. 1 max 3/4 in. (18 mm) diameter (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9 mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - C. 1 max 3/8 in. (10 mm) diameter (or smaller), 1/16 in. (1 mm) wall thickness, Copper pipe with 9mm PE-insulation for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - D. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with EPR insulation and Rubber jacket.
  - E. Max 5/C No. 15 AWG (1.5 mm) diameter (or smaller), copper conductor cable with PVC insulation and PVC jacket.

continued on next page



## System No. W-L-8137 (contd.)

### 3 Firestop System — The Firestop System shall consist of the following:

A. **Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m<sup>3</sup>) firmly packed into the opening of the wall as a permanent form.

B. **Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 10 in. (254 mm) from both faces of the board.

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C. **Fill, Void or Cavity Material\*** — 2 lengths of 2 layers of 1/16 in (1.5 mm) by 5 in. (125 mm) wrap butt jointed centrally within the depth of the seal around the bundle to a total length of 10 in. (250 mm).

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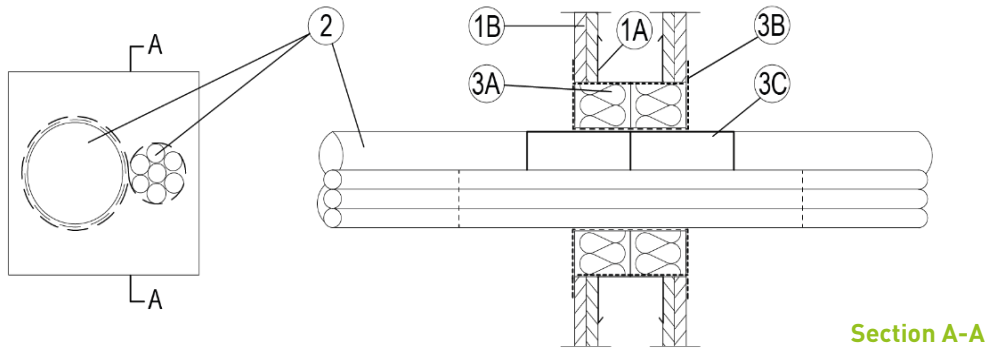
D. Min 24 AWG steel wire tied around 3C at nominally 1 in. (25 mm) and 2 in. (51 mm) from both faces of the seal.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. W-L-8138 - November 29, 2021

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 2 Hr
	FTH Rating — 1 Hr



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

- 1 Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - A. Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC. Additional studs used to completely frame the opening.
  - B. Gypsum Board\*** — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of framed opening to be 8 in. (200 mm) high by 8 in. (200 mm) wide.
- 2 Services** — Pipe and max. 2-3/8 in. (60 mm) diameter cable bundle without separation, annular space between the service and the periphery of the opening to be 1 in (25 mm) and containing the following services:
  - A.** 1 max 4-3/8 in. (110 mm) diameter (or smaller), 1/8 in. (2.7 mm) wall thickness, PVC-U pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - B.** Max 12, max 20/C No. 19 AWG (0.6 mm) diam (or smaller), copper conductor telecommunication cables PE jacket.
- 3 Firestop System** — The Firestop System shall consist of the following:
  - A. Packing material** — 2 layers of Nom. 2-3/8 in. (60 mm) thick mineral wool board min. 9.3 pcf (150 kg/m3) firmly packed into the opening of the wall as a permanent form, flush with both surfaces of wall.
  - B. Fill, Void or Cavity Material\*** — Min. 1/16 in. (2 mm) dry film thickness to be applied, coating the inside surface of the opening before installation of the packing material and over the full surface of the mineral wool boards, and overlapping onto the wall by min. 3/4 in. (20 mm). Min. 1/32 in. (1 mm) dry film thickness to be applied over the surface of the cables and tray to a minimum length of 8 in. (200 mm) from both faces of the board.

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  - C. Fill, Void or Cavity Material\*** — 2 lengths of 3 layers of 1/16 in (1.5 mm) by 4 in. (100 mm) wrap butt jointed centrally within the depth of the seal around the pipe to a total length of 10 in. (250 mm).

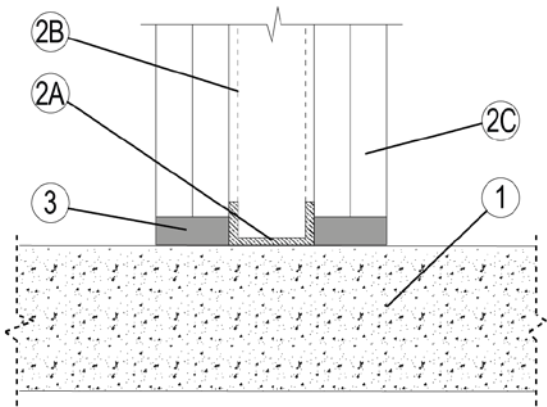
**ARMACELL GMBH** — ArmaProtect FW1

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. BW-S-0061 - November 29, 2021

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 1 and 2 Hr (See Item 2)	F Rating — 2 Hr (See Item 2)
Joint Width — 1 In. (25 mm) Max	FT Rating — 2 Hr (See Item 2)
	FH Rating — 2 Hr (See Item 2)
	FTH Rating — 2 Hr (See Item 2)
	Joint Width — 1 In. (25 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufactures.

- 2 Wall Assembly** — The 1 or 2 h fire-rated gypsum board/ stud wall assembly shall be constructed of the materials and in the manner describes in the individual U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor Runner** — Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/2 in. (40 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.
- B. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- C. **Gypsum Board\*** — Gypsum board installed to a min total thickness of 1 in. (25 mm) on each side of wall. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory, except that a max 1 in. (25 mm) gap shall be maintained between the bottom of gypsum board and top of concrete floor.

The hourly ratings of the joint system are equal to the hourly fire rating of the wall.

- 3 Fill, Void or Cavity Material\* — Sealant** — Max separation between top of floor and bottom of gypsum board is 1 in. (25 mm). Min 1 in. (25 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

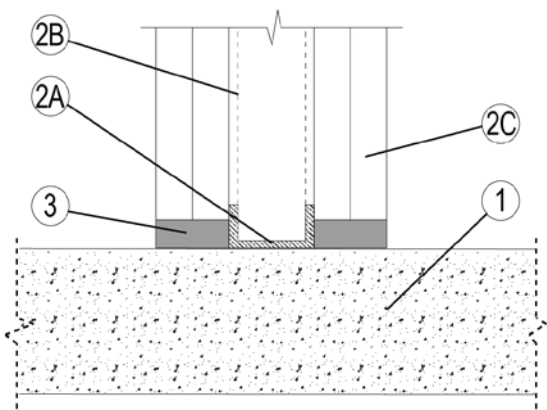
**ARMACELL GMBH** — ArmaProtect ACRS

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. BW-S-0062 - May 13, 2022

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 1 and 2 Hr (See Item 2)	F Rating — 2 Hr (See Item 2)
Joint Width — 1 In. (25 mm) Max	FT Rating — 2 Hr (See Item 2)
	FH Rating — 2 Hr (See Item 2)
	FTH Rating — 2 Hr (See Item 2)
	Joint Width — 1 In. (25 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

- 2 Wall Assembly** — The 1 or 2 h fire-rated gypsum board/ stud wall assembly shall be constructed of the materials and in the manner describes in the individual U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor Runner** — Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/2 in. (40 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.
- B. **Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- C. **Gypsum Board\*** — Gypsum board installed to a min total thickness of 1 in. (25 mm) on each side of wall. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory, except that a max 1 in. (25 mm) gap shall be maintained between the bottom of gypsum board and top of concrete floor.

The hourly ratings of the joint system are equal to the hourly fire rating of the wall.

- 3 Fill, Void or Cavity Material\* — Sealant** — Max separation between top of floor and bottom of gypsum board is 1 in. (25 mm). Min 1 in. (25 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

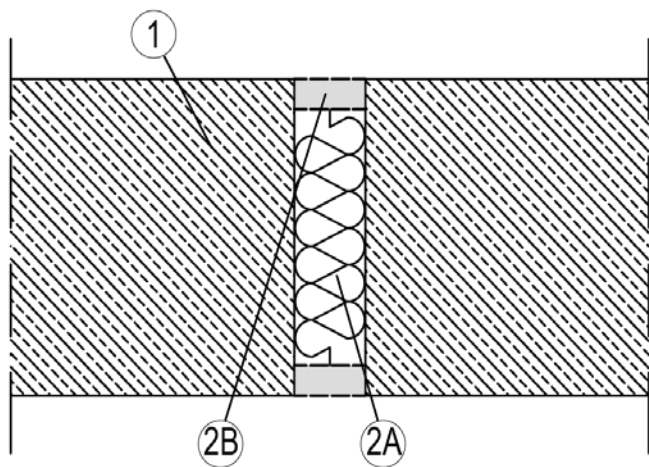
**ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. FF-S-0052 - May 13, 2022

ANSI/UL2079	CAN/ULC S115
Assembly Rating —3 Hr	F Rating —3 Hr
Joint Width — 1 In. Max	FT Rating —3Hr
	FH Rating —3 Hr
	FTH Rating —3 Hr
	Joint Width — 25 mm Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete.
- 2 Joint System** — Max width of joint is 1 in. (25 mm). The joint system shall consist of the following:
  - A. Packing Material** — Min 6-1/4 pcf (100 kg/m³) mineral wool batt insulation installed into opening as a permanent form. Batt cut to min widths of 3-3/8 in. (85 mm)) and installed edge first into opening such that the thickness of the wool is compressed tightly. Packing material to be recessed from both sides of floor to accommodate the required thickness of fill material.
  - B. Fill, Void or Cavity Material\*** — Sealant — Min 3/8 in. (10 mm) thickness of fill material applied within the joint, flush with both surfaces of the floor.

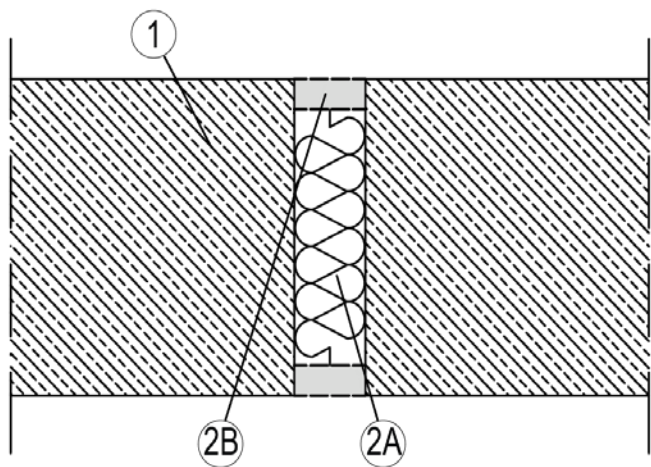
**ARMACELL GMBH** — ArmaProtect ABLF

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System No. FF-S-0053 - November 29, 2021

ANSI/UL2079	CAN/ULC S115
Assembly Rating —3 Hr	F Rating —3 Hr
Joint Width — 1 In. Max	FT Rating —3 Hr
	FH Rating —3 Hr
	FTH Rating —3 Hr
	Joint Width — 25 mm Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete.
- 2 Joint System** — Max width of joint is 1 in. (25 mm). The joint system shall consist of the following:
  - A. Packing Material** — Min 6-1/4 pcf (100 kg/m<sup>3</sup>) mineral wool batt insulation installed into opening as a permanent form. Batt cut to min widths of 3-3/8 in. (85 mm) and installed edge first into opening such that the thickness of the wool is compressed tightly. Packing material to be recessed from both sides of floor to accommodate the required thickness of fill material.
  - B. Fill, Void or Cavity Material\*** — Sealant — Min 3/8 in. (10 mm) thickness of fill material applied within the joint, flush with both surfaces of the floor.

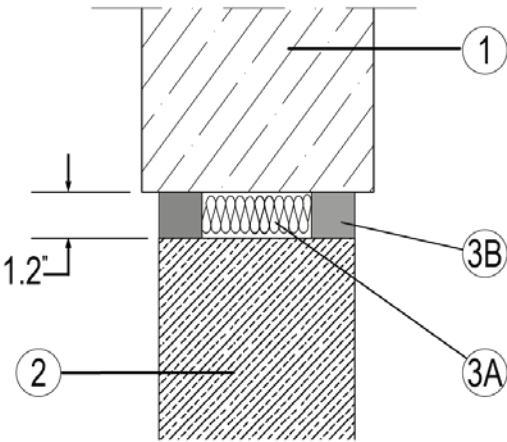
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System No. HW-S-0150 - November 29, 2021

ANSI/UL2079	CAN/ULC S115
Assembly Rating —2 Hr	F Rating —2 Hr
Joint Width — 1-1/5 In. (30 mm) Max	FT Rating —2 Hr
	FH Rating —2 Hr
	FTH Rating —2 Hr
	Joint Width — 1-1/5 In. (30 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*.
- See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufactures.
- 2 Wall Assembly** — Min 4-1/2 in. (115 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*.
- See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- 3 Joint System** — Max separation between top of wall and bottom of floor is 1-1/5 in. (30 mm). The joint system shall consist of the following:
- A. **Packing Material** — Min 6-1/4 pcf (100 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both sides of wall to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\*** — Sealant — Min 1/25 in. (1 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

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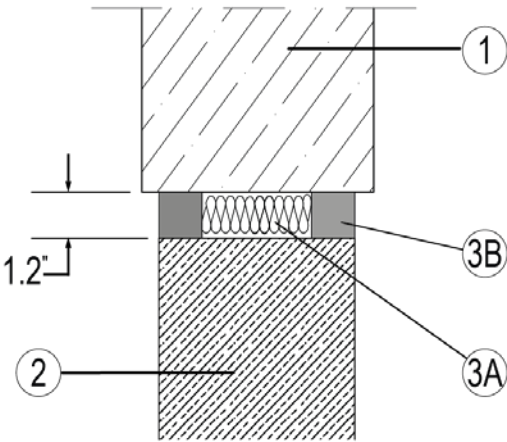
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. HW-S-0151 - November 29, 2021

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 1 Hr	F Rating — 1 Hr
Joint Width — 1-1/5 In. (30 mm) Max	FT Rating — 1 Hr
	FH Rating — 1 Hr
	FTH Rating — 1 Hr
	Joint Width — 1-1/5 In. (30 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

- 2 Wall Assembly** — Min 4-1/2 in. (115 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

- 3 Joint System** — Max separation between top of wall and bottom of floor is 1-1/5 in. (30 mm). The joint system shall consist of the following:

**A. Packing Material** — Min 6-1/4 pcf (100 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both sides of wall to accommodate the required thickness of fill material.

**B. Fill, Void or Cavity Material\*** — Sealant — Min 1/5 in. (5 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

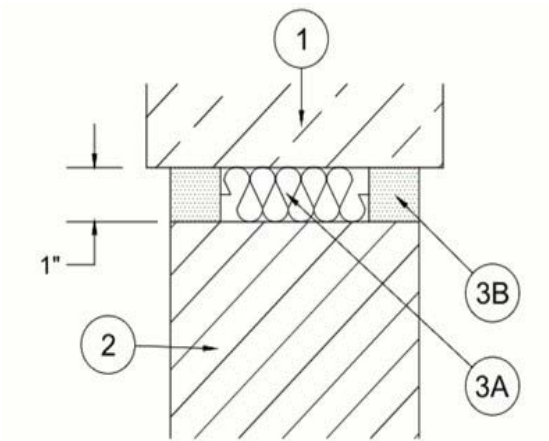
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\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. HW-S-0152 - November 29, 2021

ANSI/UL2079	CAN/ULC S115
Assembly Rating —3 Hr	F Rating —3 Hr
Joint Width — 1 In. (25 mm) Max	FT Rating —3 Hr
	FH Rating —3 Hr
	FTH Rating —3 Hr
	Joint Width — 1 In. (25 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

- 2 Wall Assembly** — Min 4-1/2 in. (115 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

- 3 Joint System** — Max separation between top of wall and bottom of floor is 1 in. (25 mm). The joint system shall consist of the following:

A. **Packing Material** — Min 6-1/4 pcf (100 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both sides of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\*** — Sealant — Min 2/5 in. (10 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

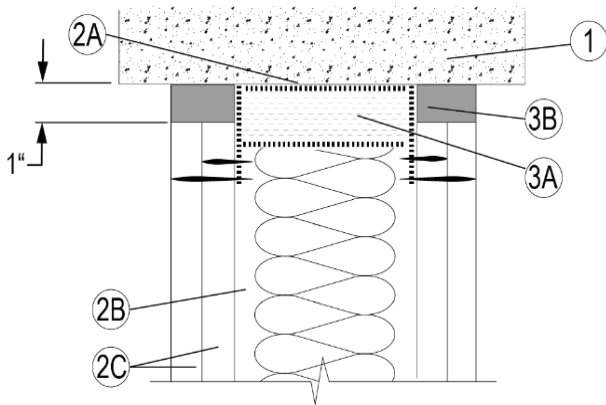
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System No. HW-S-0153 - November 29, 2021

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr (See Item 2)	F Rating — 2 Hr (See Item 2)
Joint Width — 1 In. (25 mm) Max	FT Rating — 2 Hr (See Item 2)
	FH Rating — 2 Hr (See Item 2)
	FTH Rating — 2 Hr (See Item 2)
	Joint Width — 1 In. (25 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*.

See Precast Concrete Units (CFTV) category in the Fire Resistance Directory for names of manufactures.

- 2 Wall Assembly** — The 1 or 2 h fire-rated gypsum board/ stud wall assembly shall be constructed of the materials and in the manner describes in the individual U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

**A. Steel Floor Runner and relief runner** — Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 2-2/5 in. (60 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC. Relief runners shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Relief runners to be provided with min 1-1/2 in. (40 mm) flanges.

**B. Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.

**C. Gypsum Board\*** — Gypsum board installed to a min total thickness of 1 in. (25 mm) on each side of wall. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory, except that a max 1 in. (25 mm) gap shall be maintained between the top of gypsum board and bottom of concrete floor.

The hourly ratings of the joint system are equal to the hourly fire rating of the wall.

- 3 Joint System** — Max separation between top of wall and bottom of floor is 1 in. (25 mm). The joint system shall consist of the following:

**A. Packing Material** — Min 1-1/2 in. (40 mm) thickness of min 3.1 pcf (50 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into the cavity formed in the top runner, as a permanent form.

**B. Fill, Void or Cavity Material\*** — Sealant — Min 1 in. (25 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

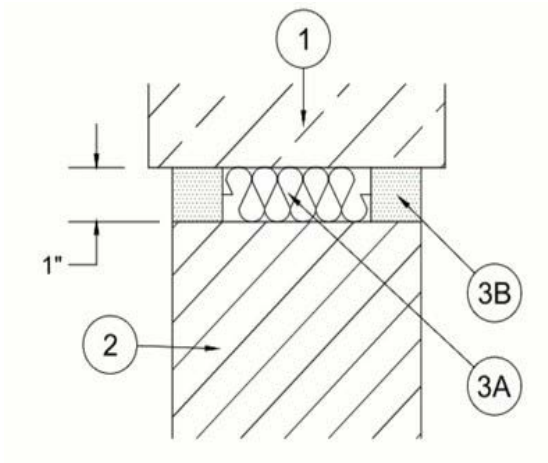
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\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. HW-S-0154 - May 13, 2022

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr	F Rating — 2 Hr
Joint Width — 1 In. (25 mm) Max	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr
	Joint Width — 1 In. (25 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

- 2 Wall Assembly** — Min 4-1/2 in. (115 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

- 3 Joint System** — Max separation between top of wall and bottom of floor is 1 in. (25 mm). The joint system shall consist of the following:

A. **Packing Material** — Min 6-1/4 pcf (100 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both sides of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\*** — Sealant — Min 1/5 in. (5 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

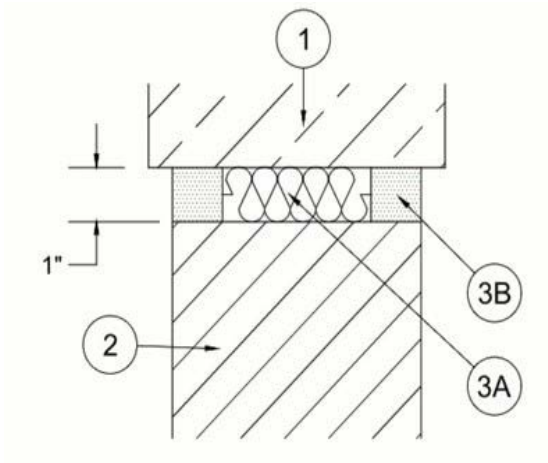
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System No. HW-S-0155 - May 13, 2022

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 1 Hr	F Rating — 1 Hr
Joint Width — 1 In. (25 mm) Max	FT Rating — 1 Hr
	FH Rating — 1 Hr
	FTH Rating — 1 Hr
	Joint Width — 1 In. (25 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*.

See Precast Concrete Units (CFTV) category in the Fire Resistance Directory for names of manufactures.

- 2 Wall Assembly** — Min 4-1/2 in. (115 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*.

See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

- 3 Joint System** — Max separation between top of wall and bottom of floor is 1 in. (25 mm). The joint system shall consist of the following:

A. **Packing Material** — Min 6-1/4 pcf (100 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both sides of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\*** — Sealant — Min 1/25 in. (1 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

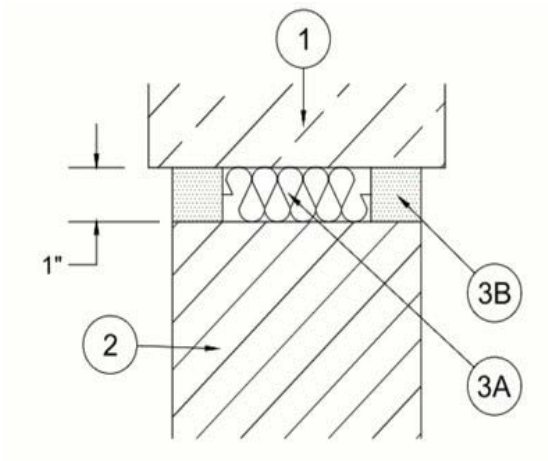
**ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. HW-S-0156 - May 13, 2022

ANSI/UL2079	CAN/ULC S115
Assembly Rating —3 Hr	F Rating —3 Hr
Joint Width — 1 In. (25 mm) Max	FT Rating —3 Hr
	FH Rating —3 Hr
	FTH Rating —3 Hr
	Joint Width — 1 In. (25 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

- 2 Wall Assembly** — Min 4-1/2 in. (115 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

- 3 Joint System** — Max separation between top of wall and bottom of floor is 1 in. (25 mm). The joint system shall consist of the following:

A. **Packing Material** — Min 6-1/4 pcf (100 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both sides of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\*** — Sealant — Min 2/5 in. (10 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

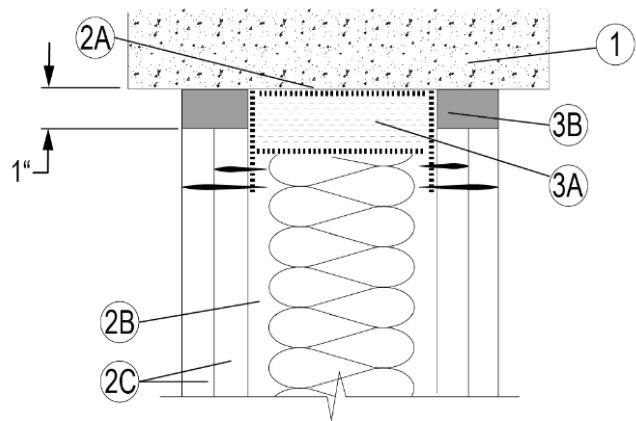
**ARMACELL GMBH** — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. HW-S-0157 - May 13, 2022

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr (See Item 2)	F Rating — 2 Hr (See Item 2)
Joint Width — 1 In. (25 mm) Max	FT Rating — 2 Hr (See Item 2)
	FH Rating — 2 Hr (See Item 2)
	FTH Rating — 2 Hr (See Item 2)
	Joint Width — 1 In. (25 mm) Max



- 1 Floor Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Floor may also be constructed of any 4.5 in. (114 mm) thick UL Classified hollow-core Precast Concrete Units\*. See Precast Concrete Units (CFTV) category in the Fire Resistance Directory for names of manufacturers.
- 2 Wall Assembly** — The 1 or 2 h fire-rated gypsum board/ stud wall assembly shall be constructed of the materials and in the manner describes in the individual U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
- A. Steel Floor Runner and relief runner** — Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 2-2/5 in. (60 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC. Relief runners shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Relief runners to be provided with min 1-1/2 in. (40 mm) flanges.
- B. Studs** — Steel studs to be min 2-3/4 in. (70 mm) wide spaced max 24 in. (610 mm) OC.
- C. Gypsum Board\*** — Gypsum board installed to a min total thickness of 1 in. (25 mm) on each side of wall. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory, except that a max 1 in. (25 mm) gap shall be maintained between the top of gypsum board and bottom of concrete floor.
- The hourly ratings of the joint system are equal to the hourly fire rating of the wall.
- 3 Joint System** — Max separation between top of wall and bottom of floor is 1 in. (25 mm). The joint system shall consist of the following:
- A. Packing Material** — Min 1-1/2 in. (40 mm) thickness of min 3.1 pcf (50 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into the cavity formed in the top runner, as a permanent form.
- B. Fill, Void or Cavity Material\*** — Sealant — Min 1 in. (25 mm) thickness of fill material, installed on each side of the wall between the top of the wall and the bottom of the concrete floor, flush with each surface of the wall.

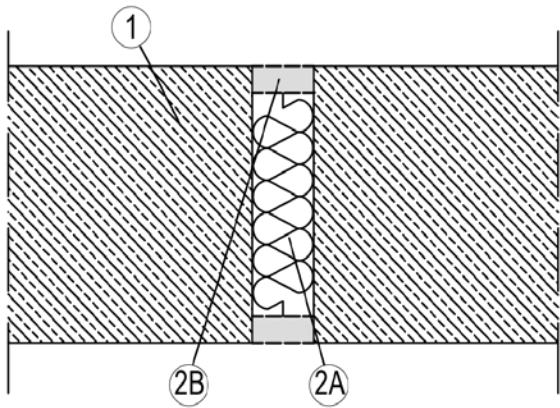
ARMACELL GMBH — ArmaProtect ABLF

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



System No. WW-S-0095 - May 13, 2022

ANSI/UL2079	CAN/ULC S115
Assembly Rating —3 Hr	F Rating —3 Hr
Joint Width — 1 In. Max	FT Rating —3Hr
	FH Rating —3 Hr
	FTH Rating —3 Hr
	Joint Width — 25 mm Max



- 1 Wall Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***.  
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- 2 Joint System** — Max width of joint is 1 in. (25 mm). The joint system shall consist of the following:
- A. **Packing Material** — Min 6-1/4 pcf (100 kg/m<sup>3</sup>) mineral wool batt insulation installed into opening as a permanent form. Batt cut to min widths of 3-3/8 in. (85 mm) and installed edge first into opening such that the thickness of the wool is compressed tightly. Packing material to be recessed from both sides of wall to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\*** — Min 3/8 in. (10 mm) thickness of fill material applied within the joint, flush with both surfaces of the wall.

**ARMACELL GMBH** — ArmaProtect ABLF

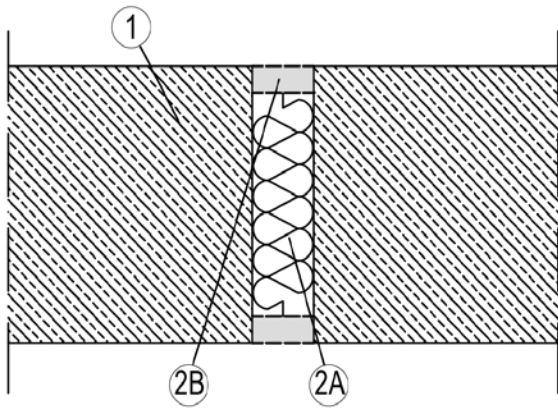
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.





System No. WW-S-0096 - November 29, 2021

ANSI/UL2079	CAN/ULC S115
Assembly Rating —3 Hr	F Rating —3 Hr
Joint Width — 3 Hr	FT Rating —3Hr
	FH Rating —3 Hr
	FTH Rating —3 Hr
	Joint Width — 25 mm Max



- 1 Wall Assembly** — Min 4-1/2 in. (114 mm) thickness of reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- 2 Joint System** — Max width of joint is 1 in. (25 mm). The joint system shall consist of the following:
- A. **Packing Material** — Min 6-1/4 pcf (100 kg/m<sup>3</sup>) mineral wool batt insulation installed into opening as a permanent form. Batt cut to min widths of 3-3/8 in. (85 mm)) and installed edge first into opening such that the thickness of the wool is compressed tightly. Packing material to be recessed from both sides of wall to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\*** — Sealant — Min 3/8 in. (10 mm) thickness of fill material applied within the joint, flush with both surfaces of the wall.

**ARMACELL GMBH** — ArmaProtect ACRS

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



## ArmaProtect Firestop products



### Firestop mortar

Item	Description	Content
PRO-CM-20kg	ArmaProtect CM Firestop mortar	20 kg



### Firestop coating. Colour: White

Item	Description	Content
PRO-ABLC-12.5kg	ArmaProtect ABLC Firestop coating packed in a pail	12.5 kg
PRO-ABLC-15kg	ArmaProtect ABLC Firestop coating packed in a pail	15 kg

### Firestop filler mastic. Colour: White

Item	Description	Content
PRO-ABLF-12.5kg	ArmaProtect ABLF Firestop filler mastic packed in a pail	12.5 kg
PRO-ABLF-15kg	ArmaProtect ABLF Firestop filler mastic packed in a pail	15 kg
PRO-ABLF-310ml	ArmaProtect ABLF Firestop filler mastic packed in a 310 ml cartridge	12 pieces

### Coated board system. Colour: White

Item	Description	Content
PRO-CB-60S1	ArmaProtect CB Coated firestop board 1000 mm x 600 mm x 60 mm S1 (one-sided coated board, dry-film thickness: 0.7 mm)	4 piece(s)
PRO-CB-60S2	ArmaProtect CB Coated firestop board 1000 mm x 600 mm x 60 mm S2 (double-sided coated board, dry-film thickness: 0.7 mm)	4 piece(s)



## ArmaProtect Firestop products



Firestop cushion. Packed in cartons

Item	Description	Length [mm]	Width [mm]	Height [mm]	Content
PRO-CU-L	Large firestop cushion	300	200	100	35 piece(s)
PRO-CU-M	Medium firestop cushion	300	200	40	80 piece(s)
PRO-CU-S	Small firestop cushion	200	150	40	125 piece(s)



Firestop wrap.

Item	Description	Content
PRO-FW1-10m	ArmaProtect FW1 Firestop wrap	10 m
PRO-FW2-10m	ArmaProtect FW2 Firestop wrap	10 m



## ArmaProtect Firestop products



### Firestop cable tube and plug


Item	Description	Content
PRO-CT-C060	ArmaProtect CT Firestop Cable tube plug Ø 60 mm packed as a set of 10 soft plugs	1 set(s)
PRO-CT-C090	ArmaProtect CT Firestop Cable tube plug Ø 90 mm packed as a set of 10 soft plugs	1 set(s)
PRO-CT-C116	ArmaProtect CT Firestop Cable tube plug Ø 116 mm packed as a set of 10 soft plugs	1 set(s)
PRO-CT-L090	ArmaProtect CT Firestop Cable tube 300 mm / Ø 90 mm packed as 1 cable tube with 2 soft plugs	12 set(s)
PRO-CT-L116	ArmaProtect CT Firestop Cable tube 300 mm / Ø 116 mm packed as 1 cable tube with 2 soft plugs	6 set(s)
PRO-CT-M090	ArmaProtect CT Firestop Cable tube 200 mm / Ø 90 mm packed as 1 cable tube with 2 soft plugs	18 set(s)
PRO-CT-M116	ArmaProtect CT Firestop Cable tube 200 mm / Ø 116 mm packed as 1 cable tube with 2 soft plugs	8 set(s)
PRO-CT-S060	ArmaProtect CT Firestop Cable tube 150 mm / Ø 60 mm packed as 1 cable tube with 2 soft plugs	30 set(s)
PRO-CT-S090	ArmaProtect CT Firestop Cable tube 150 mm / Ø 90 mm packed as 1 cable tube with 2 soft plugs	24 set(s)
PRO-CT-S116	ArmaProtect CT Firestop Cable tube 150 mm / Ø 116 mm packed as 1 cable tube with 2 soft plugs	12 set(s)



### Firestop sealant. Colour: Grey

Item	Description	Content
PRO-ACRS-310ml-gy	ArmaProtect ACRS Firestop sealant 310 ml cartridge	15 pieces
PRO-ACRS-600ml-gy	ArmaProtect ACRS Firestop sealant 600 ml cartridge	20 pieces



 **armacell** | ArmaProtect™

**WARNING!** - Passive Firestop System  
Notify building management of any damage  
Do not disturb or remove label

ArmaProtect product / system (including fire rating):

Location / Installation reference:

Installation date:


Last inspection:

Installed by (company):

Address:

Installed by (installer's name):

Phone number:



Firestop identification plate.

Item	Description	Content
PRO-ID-SET	ArmaProtect ID identification plate set	5 pieces

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## ABOUT ARMACELL

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As the inventors of flexible foam for equipment insulation and a leading provider of engineered foams, Armacell develops innovative and safe thermal, acoustic and mechanical solutions that create sustainable value for its customers. Armacell's products significantly contribute to global energy efficiency making a difference around the world every day. With more than 3,200 employees and 27 production plants in 19 countries, the company operates two main businesses, Advanced Insulation and Engineered Foams. Armacell focuses on insulation materials for technical equipment, high-performance foams for high-tech and lightweight applications and next-generation aerogel blanket technology.

For more information, please visit:  
[www.armacell.com](http://www.armacell.com)

