

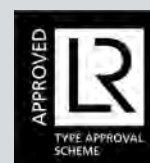


NH/ARMAFLEX

FLEXIBLE HALOGEN FREE TECHNOLOGY



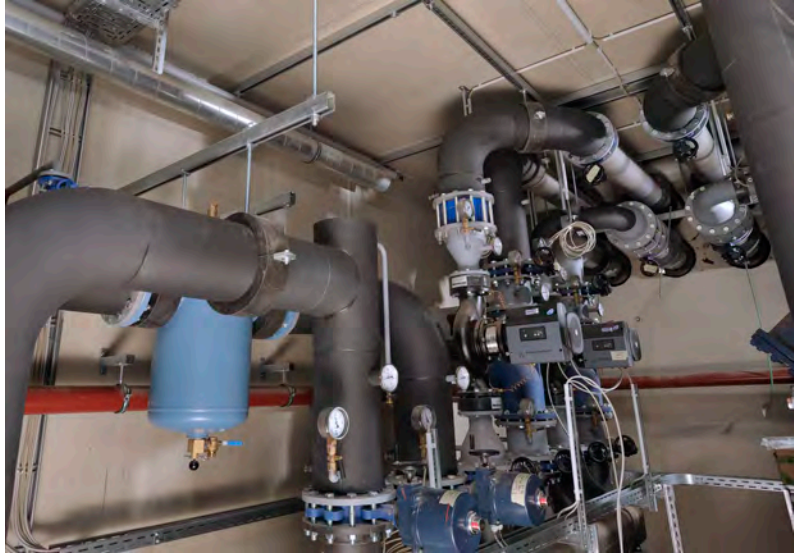
- Reliable solution for shipyard industry
- Professional insulation for clean rooms
- Prevents stress corrosion cracking when installed on stainless steel



NH/Armaflex in the new data centre of Comarch AG

DRESDEN, GERMANY

One of the most secure data centres in Central Germany and the heart of the German headquarters of Polish IT company Comarch was constructed in just under twelve months with an investment of 12 million euros.



CHALLENGE

A consistently low temperature must be guaranteed in order to protect the sensitive electronics in the data centre of Comarch AG in Dresden against overheating and failure. To air-condition the computer centre two water chillers with a cooling capacity of 550 kW each were installed. These cool four cold water storage units with a total water volume of 24,000 litres. The double-redundant system was constructed with pipes up to DN 300. The cooling requirement in data centres is enormous: if the worst comes to the worst, it can account for more than a third of energy consumption.

SOLUTION

The main parameter for increasing energy efficiency in refrigeration applications is the insulation. Because optimal insulation can significantly reduce energy losses. Therefore, AF/Armaflex was used to insulate the refrigeration plant and cooling-water lines as well as the ventilation plant and air ducts in Comarch's new building. The closed-cell insulation material has low thermal conductivity and high resistance to water-vapour transmission. It provides plant components with long-term protection against condensation and energy losses. The halogen-free NH/Armaflex was installed on the pipes in the data centre. In the event of a fire the product minimizes the risk of consequential damage which can cost many times more than the original fire damage. In a fire NH/Armaflex does not release corrosive gases which could form aggressive acids in combination with the water used for fighting the fire. Parts of the insulated systems were then clad with Okabell sheets.

Jörg Uhlig, Owner of Uhlig-Isolierung (Lübben):

"The servers in the new data centre emit a lot of heat and must be cooled continuously. Correctly calculated insulation ensures that the required line temperature is maintained as long as possible and the refrigeration machine does not need to start up so often to lower it. With AF/Armaflex it's possible to reduce the energy costs. What's more the highly flexible material is very easy to install."



Technical Data - NH/Armaflex

| | |
|------------------------|--|
| Brief description | Halogen free, flexible closed-cell insulation material with certification for use in marine environments, railway wagons and special building types. |
| Material type | Elastomeric foam based on synthetic rubber. Factory made flexible elastomeric foam (FEF) according to EN 14304. |
| Colour | dark grey / anthracite |
| Applications | Insulation / protection for pipes, air ducts, vessels (incl. Elbows, fittings, flanges etc.) of air-conditioning / refrigeration, ventilation and process equipment to prevent condensation and save energy. |
| Special Features | Without halogens (chloride, bromide) acc. to DIN / VDE 0472, part 815. Fulfils DIN 1988 Parts 200. |
| Safety and Environment | Type III Environmental Product Declaration (EPD): Declaration number "EPD-ARM-20150106-IBB1-DE", Institut Bauen und Umwelt e.V. (IBU) |
| Assembly | When installing NH/Armaflex sheets and tubes use special application advice available from Technical Department . |
| Remarks | Declaration of Performance is available in accordance with Article 7(3) of Regulation (EU) No 305/2011 on our homepage: www.armacell.com/DoP |

| Property | Value/Assessment | | | Test ^{*1} | Special Remark |
|-----------------------------------|---|----------------------------------|--|---|--|
| Temperature Range | | | | | |
| Temperature Range | max. service temperature | +110 °C | (+85 °C if sheet or tape is glued to the object with its whole surface.) | EU 5664 | Tested according to EN 14706 EN 14707 EN 14304 |
| | min. service temperature ¹ | -50 °C | | | |
| Thermal Conductivity | | | | | |
| Thermal Conductivity | ϑ _m | +/-0 | °C | λ= | EU 5664 Declared acc. to EN ISO 13787 Tested according to EN 12667 EN ISO 8497 |
| | λ | ≤ 0,040 | W/(m · K) | [40 + 0,1· ϑ _m + 0,0009 · ϑ _m ²]/1000 | |
| Water vapour diffusion resistance | | | | | |
| Water vapour diffusion resistance | μ | ≥ | 2.000 | EU 5664 | Tested according to EN 12086 EN 13469 |
| Fire performance | | | | | |
| Reaction to fire | tubes, open tubes | D _L -s2, d0 | | EU 5664 | Classified acc. to EN 13501-1 Tested according to EN 13823 and EN ISO 11925-2 |
| | sheets, tape | E | | | |
| Other Fire Class | Ship Building:Bureau Veritas, Det Norske Veritas | low- flammable | | Ship Building: D 5555 D 5348 EU 5475 EU 5971 | Ship Building: Classified acc. to MED 96/98/EC MODULE D and B Tested acc.to IMO Part 5 and Annex 2 Item 2.2 |
| | FTP Code 2010 part 5 | superpass | | | |
| | UL approved | HF-1 | | UL: D 5837 RUS 7036 | UL:Tested acc. to UL94, IEC 60695 and Can/CSA-C.22.2 No.0.17., UL 746C |
| | Russian Fire Certificate | G1, V2, D3, T2 | | | |
| Practical Fire Behaviour | Self-extinguishing, does not drip, does not spread flames | | | | |
| Other technical features | | | | | |
| Dimensions and tolerances | In accordance with EN 14304, table 1 | | | EU 5664 | Tested acc. to EN 822, EN 823, EN 13467 |
| Chemical behaviour | Resistant against commonly used building materials like concrete, lime, gypsum, cement. | | | | |
| UV resistance ² | Protection against UV-radiation is necessary. | | | TB 142 | |
| Storage & Shelf life | Self-adhesive tapes, self-adhesive sheets, self-adhesive tubes: 1 year | | | | Can be stored in dry, clean rooms at normal relative humidity (50% to 70%) and ambient temperature (0 °C – 35 °C). |
| AGI Designation Code | tubes sheets | 36.12.04.07.01 36.07.04.07.01 | | | |

¹ For temperatures below -50 °C please contact our Customer Service Center to request for the corresponding technical information.

² If Armaflex is applied under UV-radiation the material must be protected within 3 days with a covering.

^{*1} Further documents such as test certificates, approvals and the like can be requested using the registration number given.

All data and technical information are based on results achieved under typical application conditions. Recipients of this information should, in their own interest and responsibility, clarify with us in due time whether or not the data and information apply to the intended application area. Installation instructions are available in our Armaflex installation manual. Please consult our Customer Service Center before insulating stainless steels. For some refrigerants the discharge temperature may exceed +110 °C, please consult our Customer Service Center for further information. Armaflex 520 or Armaflex HT 625 Adhesive must be used to guarantee proper installation. For outside use, Armaflex should be protected with a suitable outer covering within 3 days of installation.

NH/Armaflex tubes



Length 2,0 m

| Pipe max. Outside-Ø [mm] | 9,0 mm insulation thickness | | 13,0 mm insulation thickness | |
|--------------------------|--------------------------------|----------|---------------------------------|----------|
| | Code | m/carton | Code | m/carton |
| 10 | NH-09X010 | 266 | NH-13X010 | 156 |
| 12 | NH-09X012 | 200 | NH-13X012 | 162 |
| 15 | NH-09X015 | 192 | NH-13X015 | 120 |
| 18 | NH-09X018 | 166 | NH-13X018 | 112 |
| 22 | NH-09X022 | 136 | NH-13X022 | 98 |
| 28 | NH-09X028 | 98 | NH-13X028 | 78 |
| 35 | NH-09X035 | 76 | NH-13X035 | 56 |
| 42 | NH-09X042 | 60 | NH-13X042 | 48 |
| 48 | NH-09X048 | 50 | NH-13X048 | 40 |
| 54 | - | - | NH-13X054 | 34 |
| 60 | - | - | NH-13X060 | 32 |
| 76 | - | - | NH-13X076 | 22 |
| 89 | - | - | NH-13X089 | 18 |

| Pipe max. Outside-Ø [mm] | 19,0 mm insulation thickness | | 25,0 mm insulation thickness | |
|--------------------------|---------------------------------|----------|---------------------------------|----------|
| | Code | m/carton | Code | m/carton |
| 15 | NH-19X015 | 78 | NH-25X015 | 40 |
| 18 | NH-19X018 | 60 | NH-25X018 | 40 |
| 22 | NH-19X022 | 56 | NH-25X022 | 40 |
| 28 | NH-19X028 | 48 | NH-25X028 | 32 |
| 35 | NH-19X035 | 36 | NH-25X035 | 24 |
| 42 | NH-19X042 | 32 | NH-25X042 | 22 |
| 48 | NH-19X048 | 24 | NH-25X048 | 18 |
| 54 | NH-19X054 | 24 | NH-25X054 | 16 |
| 60 | NH-19X060 | 18 | NH-25X060 | 12 |
| 76 | NH-19X076 | 12 | NH-25X076 | 10 |
| 89 | NH-19X089 | 12 | NH-25X089 | 8 |
| 114 | NH-19X114 | 8 | NH-25X114 | 6 |
| 125 | - | - | NH-25X125 | 4 |

| Pipe max. Outside-Ø [mm] | 32,0 mm insulation thickness | | | |
|--------------------------|---------------------------------|----------|---|---|
| | Code | m/carton | | |
| 15 | NH-32X015 | 32 | - | - |
| 18 | NH-32X018 | 28 | - | - |
| 22 | NH-32X022 | 24 | - | - |
| 28 | NH-32X028 | 24 | - | - |
| 35 | NH-32X035 | 22 | - | - |
| 42 | NH-32X042 | 16 | - | - |
| 48 | NH-32X048 | 12 | - | - |
| 54 | NH-32X054 | 12 | - | - |
| 60 | NH-32X060 | 10 | - | - |
| 76 | NH-32X076 | 8 | - | - |
| 89 | NH-32X089 | 6 | - | - |
| 114 | NH-32X114 | 4 | - | - |
| 140 | NH-32X140 | 4 | - | - |

Length tolerance for tubes

± 1,5 %

Thickness tolerance

3 - 6 mm ± 1,0 mm

9 - 13 mm ± 1,5 mm

>19 mm ± 2,5 mm

NH/Armaflex tubes self-adhesive



| Pipe max. Outside-Ø [mm] | 13,0 mm insulation thickness | | 19,0 mm insulation thickness | |
|--------------------------|---------------------------------|----------|---------------------------------|----------|
| | Code | m/carton | Code | m/carton |
| 15 | NH-13X015-A • | 120 | NH-19X015-A • | 78 |
| 18 | NH-13X018-A • | 112 | NH-19X018-A • | 60 |
| 22 | NH-13X022-A • | 98 | NH-19X022-A • | 56 |
| 28 | NH-13X028-A • | 78 | NH-19X028-A • | 48 |
| 35 | NH-13X035-A • | 56 | NH-19X035-A • | 36 |
| 42 | NH-13X042-A • | 48 | NH-19X042-A • | 32 |
| 48 | NH-13X048-A • | 40 | NH-19X048-A • | 24 |
| 54 | NH-13X054-A • | 34 | NH-19X054-A • | 24 |
| 60 | NH-13X060-A • | 32 | NH-19X060-A • | 18 |
| 76 | - | - | NH-19X076-A • | 12 |
| 89 | - | - | NH-19X089-A • | 12 |

Length tolerance for tubes

± 1,5 %

Thickness tolerance

9 - 13 mm ± 1,5 mm
>19 mm ± 2,5 mm

• Item not in stock. Delivery on request. [MTO]

NH/Armaflex sheets endless



Width 1,0 m

| Code | Insulation thickness [mm] | Roll length [m] | m²/carton |
|------------|---------------------------|-----------------|-----------|
| NH-03-99/E | 3,0 | 30 | 30 |
| NH-06-99/E | 6,0 | 15 | 15 |
| NH-10-99/E | 10,0 | 10 | 10 |
| NH-13-99/E | 13,0 | 8 | 8 |
| NH-19-99/E | 19,0 | 6 | 6 |
| NH-25-99/E | 25,0 | 4 | 4 |
| NH-32-99/E | 32,0 | 3 | 3 |

Length tolerance for sheets

± 1,5 %

Thickness tolerance for sheets

3-6 mm ± 1,0 mm
10-19 mm ± 1,5 mm
25-32 mm ± 2,0 mm

NH/Armaflex sheets endless self-adhesive



Width 1,0 m

| Code | Insulation thickness [mm] | Roll length [m] | m²/carton |
|-------------|---------------------------|-----------------|-----------|
| NH-03-99/EA | 3,0 | 30 | 30 |
| NH-06-99/EA | 6,0 | 15 | 15 |
| NH-10-99/EA | 10,0 | 10 | 10 |
| NH-13-99/EA | 13,0 | 8 | 8 |
| NH-19-99/EA | 19,0 | 6 | 6 |
| NH-25-99/EA | 25,0 | 4 | 4 |
| NH-32-99/EA | 32,0 | 3 | 3 |

Length tolerance for sheets

± 1,5 %

Thickness tolerance for sheets

3-6 mm ± 1,0 mm
10-19 mm ± 1,5 mm
25-32 mm ± 2,0 mm

NH/Armaflex tapes self-adhesive



| Code | Width [mm] | Length [m] | Thickness [mm] | Rolls/carton |
|---------|------------|------------|----------------|--------------|
| NH-TAPE | 50,0 | 15 | 3 | 12 |

