

# ArmaPET<sup>®</sup> Insights

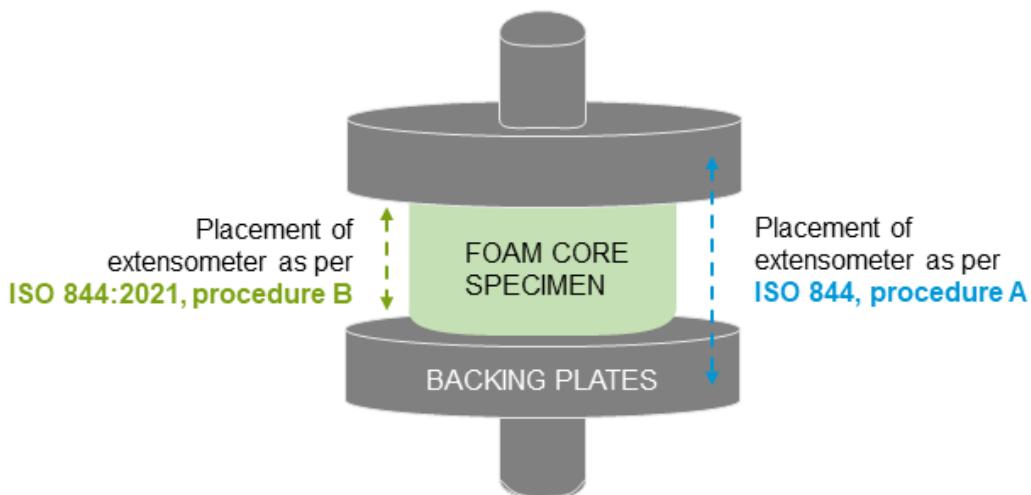
## COMPRESSION MODULUS TESTING

Armacell tests the compression properties for ArmaPET Struct as per **ISO 844, Rigid cellular plastics - Determination of compression properties**.

ISO 844 was updated recently and the new revision from 2021 includes a new procedure for measuring the compression modulus of elasticity. This document will explain the changes and related implications for testing and claimed values.

The old ISO 844 revisions required testing of the specimens for the compression modulus of elasticity on an apparatus that is fitted with a system, allowing continuous measuring of the displacements of the movable plates on the apparatus.

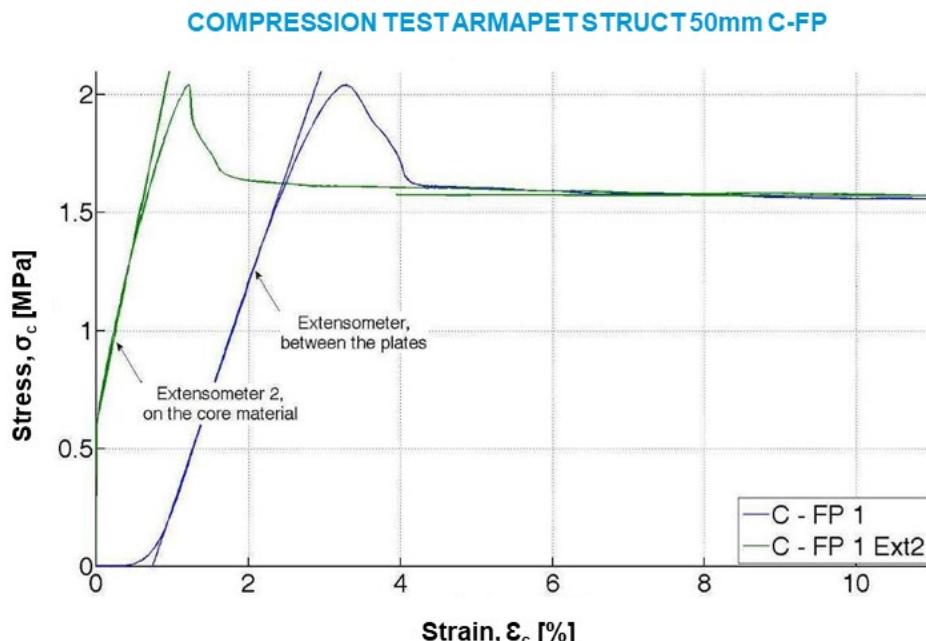
The latest revision ISO 844:2021 now also includes a test procedure B, which is recommended for accurately measuring the true compression modulus of the material. The old way of testing remains valid in the standard under procedure A, however, now relating to the *nominal* compression modulus of elasticity. The new procedure B requires the apparatus to be equipped with an extensometer that directly measures the specimen deformation. The illustration below shows the difference between procedures A and B.



Based on the new release of the 2021 version of ISO 844, we have validated different specimens for procedures A and B. It has been found that the placement of the

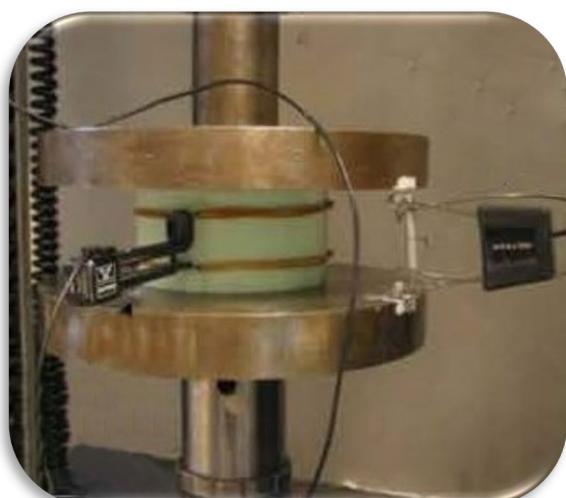
extensometer (measuring the displacement of the plates vs. measuring the specimen deformation) has a noticeable impact on the test results.

For example, ArmaPET Struct GR100 had a compression modulus of 77 MPa as per the previous ISO 844 revision. As per ISO 844:2021, procedure B, the value has increased to 160 MPa.



Graph: ArmaPET Struct 50mm; stress-strain plots of the cylindrical – filled surface pores specimen

The old procedure (procedure A) gives lower values for the compression modulus due to the crushing of the cells at the interface with the backing plates (that are cut open prematurely). But in a sandwich structure, the surface cells are normally filled with resin or adhesive and this phenomenon does not arise, so the results do not actually reflect the true modulus of the core material. ISO 844:2001 procedure B measures the modulus in the foam directly and therefore its data is more relevant for describing the actual foam performance and is recommended for use with all core materials.



Based on these findings, it has been decided to now change all compression

Image: Test setup for conducting Compression Test of cylindrical core material, with two extensometers.

properties related to quality testing as well as the officially claimed data on the Technical Datasheets to the new ISO 844:2021, procedure B.

These changes will appear in updates from January 2022 onwards to present the actual performance of our ArmaPET Struct for compression modulus more accurately.

The ASTM D1621, which is the ASTM equivalent of the ISO 844:2007 version, is also being reviewed by an international work group, which Armacell is part of. The objective is fully aligned both standards to avoid misinterpretation of the values and demonstrate the real performance of core foams.

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