



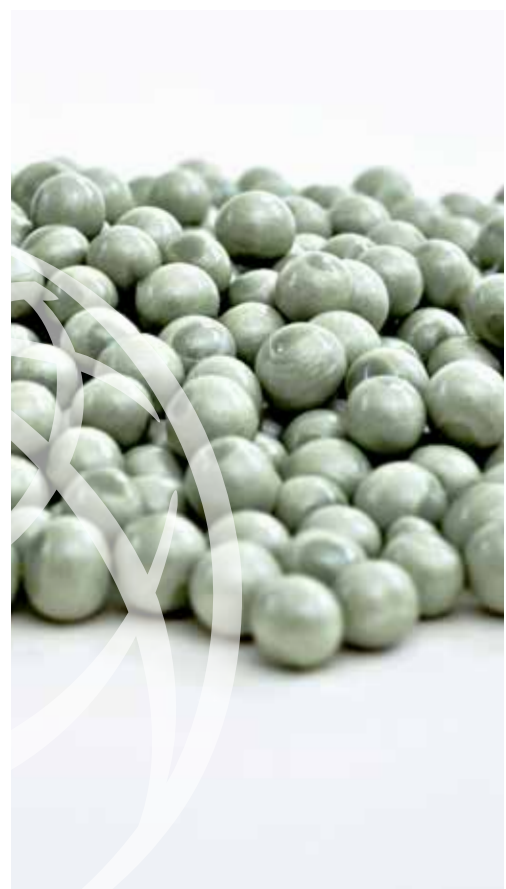
TECHNICAL DATA

ArmaPET® Shape

ArmaPET Shape particle foam offers maximum design flexibility to produce lightweight rigid 3D foam parts using innovative fusion technology.

- // Zero-waste production: no milling or cutting needed
- // Foaming directly inside the mould
- // Integrated functions: built-in concept with skins and inserts possible
- // Superior production efficiency thanks to reduced complexity
- // Outstanding thermal stability

www.armacell-core-foams.com



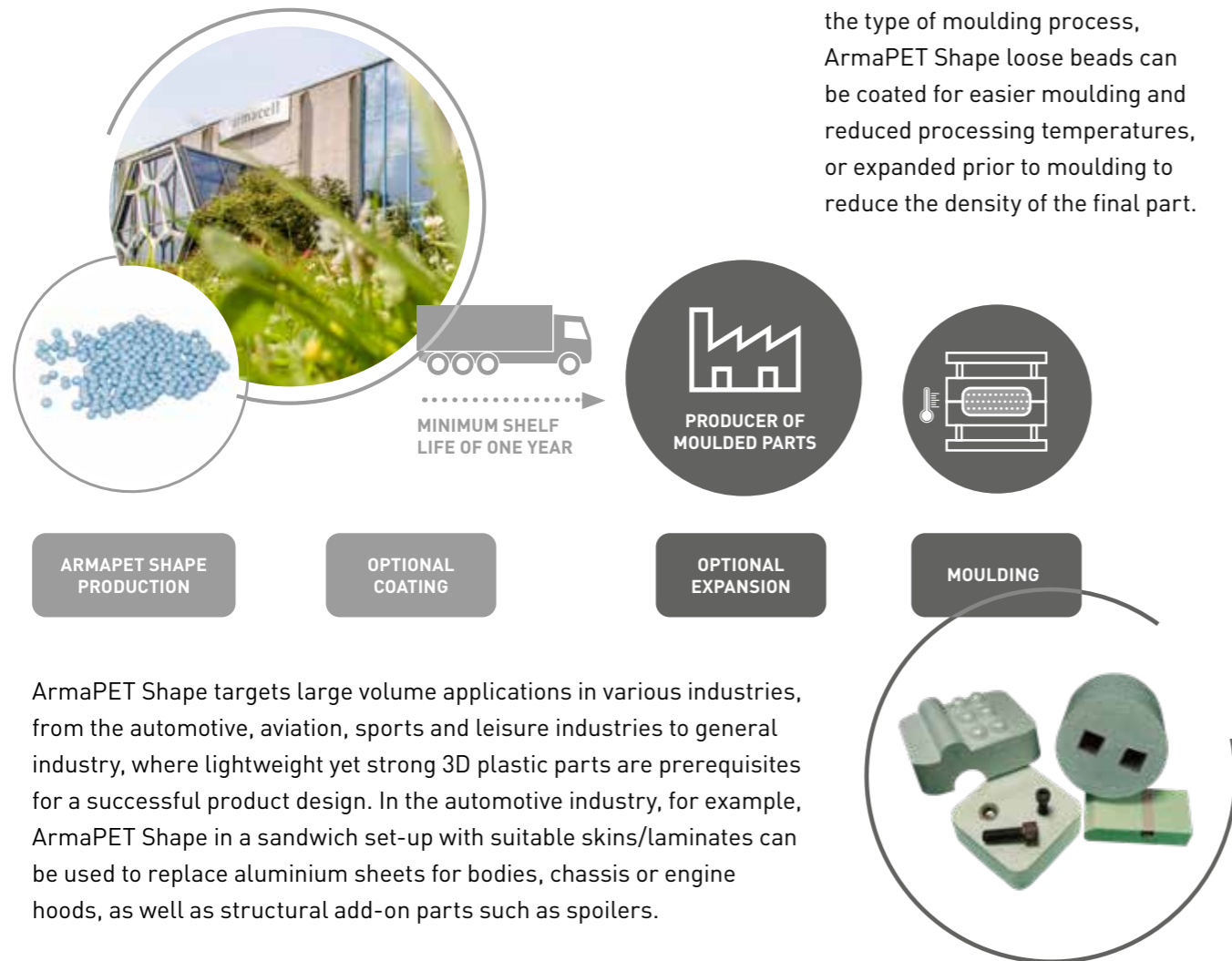
 **armacell**[®]
ArmaPET[®]

ARMAPET SHAPE

Combines the excellent mechanical properties of structural foam core with the advantages of particle foams to offer strong yet lightweight three-dimensional foam parts which can be produced in nearly any shape.

This fully recyclable mouldable particle foam is the first to be made entirely of recycled plastics and is Armacell's solution for the cost-effective production of ready-to-use 3D shaped structural foam parts. Starting from recycled PET beverage bottles (rPET), the rPET-based flakes are further processed using Armacell's patented technology to produce particle foam with different densities and expansion properties, tailored to the requirements of the final foam part and to the moulding technique used.

ArmaPET Shape is supplied in the form of loose beads, which are moulded to create the final foam part using different moulding techniques, at temperatures from +180 to +240 °C (+356 to +464 °F). Depending on the final density and thickness of the foam part and on the type of moulding process, ArmaPET Shape loose beads can be coated for easier moulding and reduced processing temperatures, or expanded prior to moulding to reduce the density of the final part.



ArmaPET Shape targets large volume applications in various industries, from the automotive, aviation, sports and leisure industries to general industry, where lightweight yet strong 3D plastic parts are prerequisites for a successful product design. In the automotive industry, for example, ArmaPET Shape in a sandwich set-up with suitable skins/laminates can be used to replace aluminium sheets for bodies, chassis or engine hoods, as well as structural add-on parts such as spoilers.

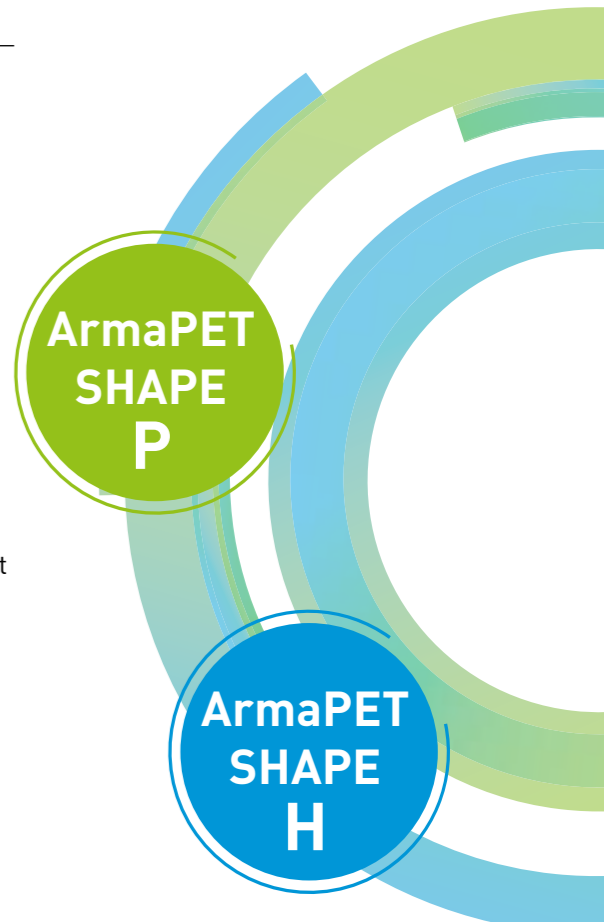
PRODUCT PORTFOLIO

ArmaPET Shape is available in two different versions that are tailored to suit different moulding processes.

ArmaPET Shape P comprises pure beads based on 100% recycled PET and is available in two different bulk densities. It is designed for moulding processes that use radio frequency or heat processes with temperatures above 230 °C (446 °F).

ArmaPET Shape H has additional surface functionalisation and has been developed to improve fusion, cycle times and adhesion to different skins, reinforcements and inserts for hybrid designs.

ArmaPET Shape H guarantees excellent adhesion, without adding additional resin, for bonding to different skins and inserts made from aluminium, steel, wood, polymeric layers including prepregs, glass fibres, carbon fibres and basalt or natural fibres. This opens up a broad range of material combinations and allows the application to be adjusted to the customer's needs.



	Unit	ArmaPET Shape P		ArmaPET Shape H
Bulk Density*	g/l	200	280	200
Bead Size	mm	3	3	3
Final Part Density**	kg/m ³	≥ 200	≥ 280 80-200 with pre-expansion	≥ 200
Application		For moulding using radio frequency or oil heating, press and steam with temperatures above +230 °C.		For moulding in oven or hot press with temperatures between +160 °C and +200 °C. For hybrid designs.

* The bulk density describes the initial density of the loose beads before moulding.

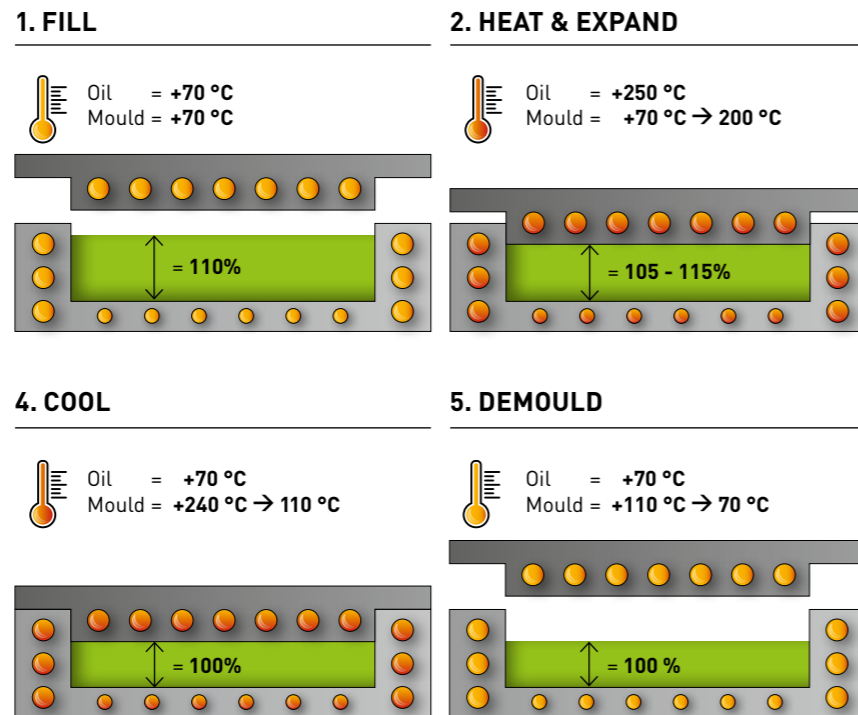
** With overfilling adding around 10% to the bulk density.

MOULDING TECHNIQUES

ArmaPET Shape P and ArmaPET Shape H can be moulded using various fusion technologies that are available on the market today.

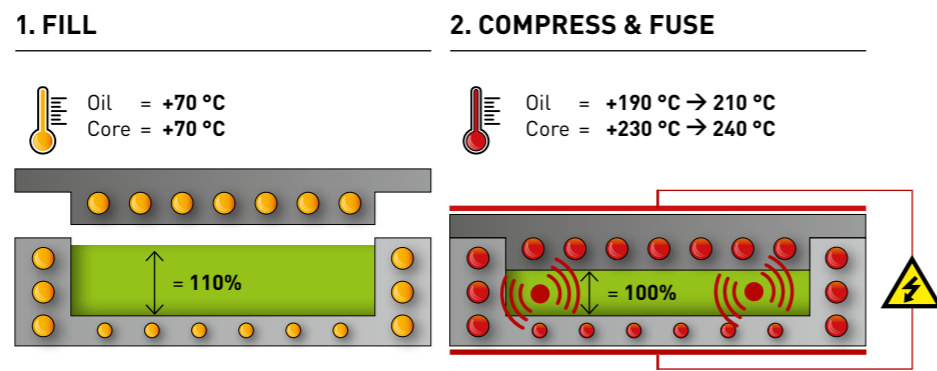
// CONDUCTIVE HEATING

Conductive heating moulding uses a fluid tempered mould and a related press or oven.



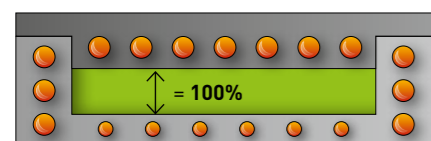
// RADIO FREQUENCY

Radio frequency is a new moulding technology that uses high voltage electromagnetic fields and the molecular absorption of energy. Variothermal heating can further support the process.



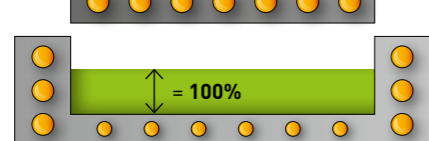
3. COOL

Oil = +70 °C
Core = +240 °C → 110 °C



4. DEMOULD

Oil = +70 °C
Core = +110 °C → 70 °C



// ANY QUESTIONS?

Please contact our technical service for guidance on moulding processes and product selection tailored to your specific project requirements.

MECHANICAL PERFORMANCE OF MOULDED PARTS

These mechanical test results are based on a typical ArmaPET Shape moulded foam part that uses different bulk densities and is fused by the heat press process. The properties will vary depending on the applied moulding process and the geometry of the final foam part.

Product		Shape P200	Shape P280	Shape H200	
Density (moulded part)	ISO845	[kg/m ³]	220	310	220
Density variance in the part		[kg/m ³]	±15	±15	±15
Compression strength (10% deformation, RT)	ISO844	[MPa]	2.1	3.9	2.1
Compression modulus	ISO844	[MPa]	> 45	> 60	> 45
Shear strength	ISO1922	[MPa]	1.25	1.75	1.25
Shear modulus	ISO1922	[MPa]	> 20	> 30	> 20
Shear elongation	ISO1922	[%]	> 5.0	> 3.0	> 5.0
Compression modulus (+150 °C)	ISO844	[MPa]	5.5	8.0	5.5

// EASE OF MOULDING

- Enhanced moulding process at lower temperatures
- One-step moulding of sandwich and hybrid set-up without additional resin
- Easy bonding to glass fibre, carbon fibre and metal/aluminium skins
- Integration of plastic or metal inserts during moulding

Processing guidelines are available in the dedicated **ArmaPET Shape H** brochure that give guidance on the processing parameters, preparation and process steps required to ensure proper moulding to create strong, lightweight 3D foam parts.

TEMPERATURE STABILITY

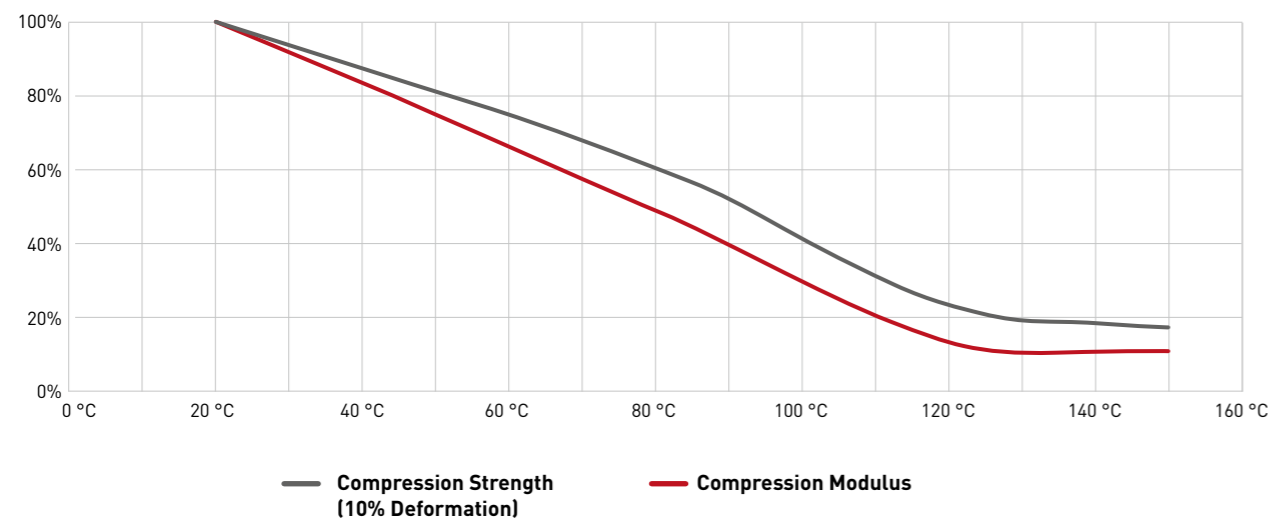
	EPS	EPP	ArmaPET Shape
+25 °C (77 °F)			
+140 °C (284 °F)			
+160 °C (320 °F)			
+180 °C (356 °F) 30 min			

Moulded ArmaPET Shape has excellent thermal stability for further processing at elevated temperatures, such as infusion and RTM. It is extremely tolerant to high-peak exothermic reactions and shows no degradation of material properties even in the case of hot spots.



When tested at elevated temperatures +20, 80, 120 and 150 °C (+68, 176, 248 and 302 °F), the values temporarily decrease as follows:

Relative compression behaviour at elevated temperature

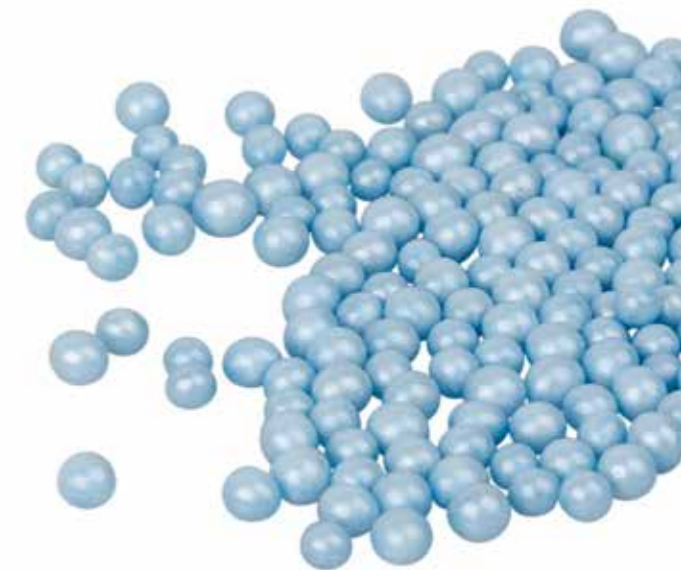
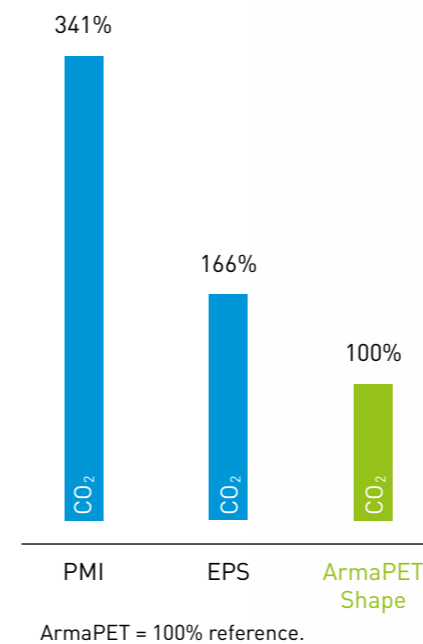


Testing showed that after continuous exposure for 3 weeks at +150 °C (+179 °F), the final properties did not significantly decrease. This proves the mechanical stability at high temperatures, even after longer-term exposure.

INSPIRED BY SUSTAINABLE THINKING

ArmaPET Shape is made by Armacell's unique and patented process technology, which enables the production of PET foam materials based on 100% recycled PET. Its positive eco-balance supports the industry's requirement for the design of more sustainable product solutions:

We convert post-consumer PET bottles into long-lifetime, high-value particle foams with **very low CO₂ emissions**:



100% RECYCLABILITY

For many industries, especially the automotive and infrastructure markets, where waste management and circular economy approaches are a primary concern, the recyclability of ArmaPET Shape is a key feature. We have performed a recyclability case study demonstrating that the surface functionalisation has no impact on the recyclability of ArmaPET Shape H moulded foam parts at the end of the life cycle.

All data and technical information are based on results achieved under the specific conditions defined according to the testing standards referenced. Despite taking every precaution to ensure that said data and technical information are up to date, Armacell does not make any representation or warranty, express or implied, as to the accuracy, content or completeness of said data and technical information. Armacell also does not assume any liability towards any person resulting from the use of said data or technical information. Armacell reserves the right to revoke, modify or amend this document at any moment. It is the customer's responsibility to verify if the product is suitable for the intended application. The responsibility for professional and correct installation and compliance with relevant building regulations lies with the customer. This document does not constitute nor is part of a legal offer to sell or to contract.

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ABOUT ARMACELL

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 3,000 employees and 23 production plants in 15 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 company information, please visit:
www.armacell.com

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