

Product Information

ROHACELL® WIND-F

STRUCTURAL FOAM FOR WIND TURBINE BLADES

ROHACELL® WIND-F is a closed-cell rigid foam based on polymethacrylimide (PMI) chemistry, which does not contain any CFC's and is specifically designed to meet the demands of the wind energy industry.

It is the most suitable ROHACELL® grade for use as a core material in sandwich structures of wind turbine blades, e.g., skin or spar section.

PROCESSING AND PRODUCTION

ROHACELL® WIND-F is compatible with all common epoxy and polyester resin systems and delivers excellent mechanical properties at low foam densities while sustaining continuous process temperatures up to 150 °C (302 °F).

The mechanical properties at the required density outperform those of other available polymer foams. Even at nominal densities as low as 50 kg/m³, the requirements for core materials can be met by ROHACELL® WIND-F.

Due to the small cell size, resin up-take during manufacturing is optimized compared to other polymer foams or balsa wood. Consequently, the lower resin up-take reduces the weight of wind turbine blades and the manufacturing costs.

With excellent resistance to high temperatures, processing or curing temperature can be increased significantly to reduce total cycle time without exothermal issues.

BENEFITS OF ROHACELL® WIND-F CORES

- Reduced blade mass › lower turbine loads
 - Significantly scales down resin absorption compared to PVC, Balsa and PET cores
 - Lower core density while maintaining mechanical properties
- Decrease in production costs due to shorter cycle times (pre-curing and post-curing)
 - Endures fast, high temperature processes with advanced resin systems
 - Higher mold efficiency
- Enables extended blade lifetime
 - Superior fatigue behavior (WöC > 16)
 - Increase in specific blade stiffness

Property		Test Method*	Unit	ROHACELL® 50 WIND-F	ROHACELL® 60 WIND-F	ROHACELL® 80 WIND-F	ROHACELL® 100 WIND-F
Density	Nominal	ISO 845 ASTM D 1622	kg/m ³ lbs/ft ³	50 + 8 3.12 + .50	60 + 10 3.75 + .62	80 + 15 4.99 + .94	100 + 20 6.24 + 1.25
Compressive Strength	Nominal Minimum	ISO 844 ASTM D 1621	MPa psi	0.9 0.5	1.2 0.8	1.9 1.3	2.7 1.9
Compressive Modulus	Nominal Minimum	ISO 844 ASTM D 1621	MPa psi	29.9 21.4	40.3 29.8	61.3 45.5	82.3 61.3
Tensile Strength	Nominal Minimum	ISO 527-2 ASTM D 638	MPa psi	1.5 1.1	1.9 1.4	2.7 2.1	3.5 2.7
Tensile Modulus	Nominal Minimum	ISO 527-2 ASTM D 638	MPa psi	69.3 54.1	88.3 69.3	126.2 97.7	164.1 126.2
Shear Strength	Nominal Minimum	DIN 53294 ASTM C 273	MPa psi	0.8 0.6	1.1 0.8	1.6 1.2	2.1 1.6
Shear Modulus	Nominal Minimum	DIN 53294 ASTM C 273	MPa psi	25.9 19.6	33.6 25.8	49.0 37.4	64.4 48.9

Technical data values presented above are typical for nominal density, subject to normal manufacturing variations. *Data values are based on ISO & DIN standard test methods, however ASTM values can be confirmed upon request. All ROHACELL® products are closed-cell rigid foams based on polymethacrylimide (PMI) chemistry and contain no CFC's.

FOR MORE INFORMATION

If you have questions or would like to discuss using **ROHACELL® WIND-F** in your application, we encourage you to talk with your local ROHACELL® representative.

Visit www.rohacell.com to locate and directly connect with the contact in your region, by phone or email.

Disclaimer

ROHACELL® is a registered trademark of Evonik Industries and its subsidiaries.

This information and all technical and other advice are based on Evonik's present knowledge and experience. However, Evonik assumes no liability for such information or advice, including the extent to which such information or advice may relate to third party intellectual property rights. Evonik reserves the right to make any changes to information or advice at any time, without prior or subsequent notice. EVONIK DISCLAIMS ALL REPRESENTATIONS AND WARRANTIES, WHETHER EXPRESS OR IMPLIED, AND SHALL HAVE NO LIABILITY FOR, MERCHANTABILITY OF THE PRODUCT OR ITS FITNESS FOR A PARTICULAR PURPOSE (EVEN IF EVONIK IS AWARE OF SUCH PURPOSE), OR OTHERWISE. EVONIK SHALL NOT BE RESPONSIBLE FOR CONSEQUENTIAL, INDIRECT OR INCIDENTAL DAMAGES (INCLUDING LOSS OF PROFITS) OF ANY KIND. It is the customer's sole responsibility to arrange for inspection and testing of all products by qualified experts. Reference to trade names used by other companies is neither a recommendation, nor an endorsement of the corresponding product, and does not imply that similar products could not be used.

Evonik Resource Efficiency GmbH

High Performance Polymers
Performance Foams
64293 Darmstadt, Germany
Phone +49 6151 18-1005

Evonik Corporation

Theodore, Alabama USA
Phone +1 866 764-6235

Evonik Specialty Chemicals (Shanghai) Co., Ltd.

Shanghai, China
Phone +86 21 6119 1544