

## ROHACELL® - PMI RIGID FOAM SOLUTIONS

ROHACELL® is the highest strength / lightest weight rigid foam material in the world.

Manufactured by Evonik Industries, ROHACELL® is the ideal solution for composite parts where light weight, high strength parts are needed.

ROHACELL® materials are capable of tolerating extreme high heat and cold temperatures.

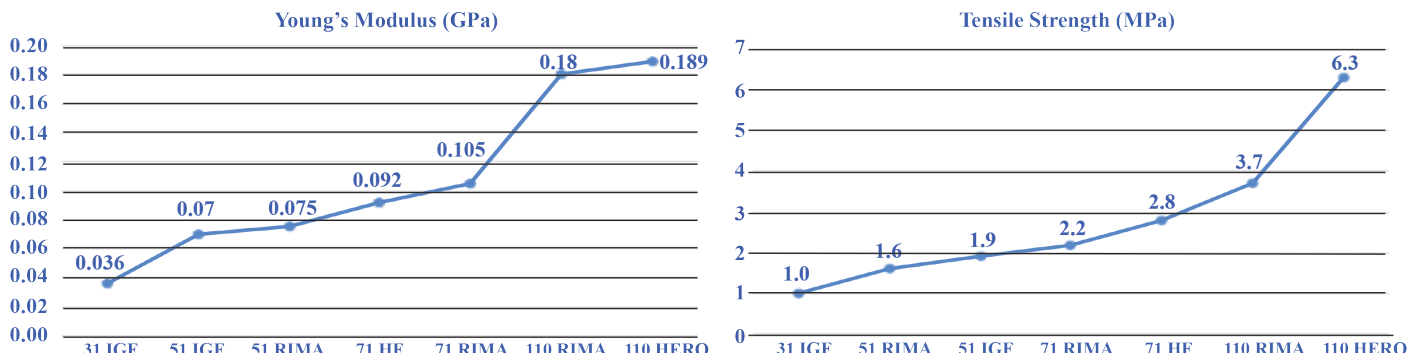
Evonik manufactures many types of ROHACELL® materials which are suitable for several different industries including: aerospace, automotive, electronics, marine, medical and sporting goods to name a few.

ROHACELL® is a closed-cell rigid foam with a fine cell structure capable of increasing the strength to 10x that of a part which does not use ROHACELL® foam.

Common attributes of ROHACELL® rigid foams include the following:

- ROHACELL® Outstanding Strength-to-Weight ratio
- Excellent Fatigue Behavior
- Good Dielectric Properties
- RoHS & SGS Approved – Environmentally Safe
- AITM and FAR Classified - Non-Toxic Material
- AITM and FAR Classified - Low Smoke Density
- Combustion - Non Release of Corrosive Emissions

ROHACELL® materials are a green friendly material and capable of being thermally recycled while emitting no toxic fumes, making it as safe to thermally recycle as if it were paper or wood.



Clarasonic (Thailand) Co LTD is the official distributor of ROHACELL® for Southeast Asia market and the official distributor to consumer electronics applications including audio speakers with +15 years of experience.

At our Thailand factory, we warehouse full blocks of Rohacell material and have the ability to slice materials at thicknesses from 1mm and higher with a +/- 0.3mm tolerance for full sheets providing fast shipments of materials which are often considered long-lead time materials.

Clarasonic is considered to have the worlds best slicing capability and often hired by our material suppliers for thin cut sheets or where sheet tolerances are crucial.

Ultra-thin slicing of ROHACELL® is available with selected material types at small cut sizes of 0.1mm (100µm) and higher.

## ROHACELL® 31 IG \ IGF –

### General Description of ROHACELL®:

ROHACELL® is a light weight, dense cell PMI foam manufactured by EVONIK. ROHACELL® can be thermally formed and bonded to many types of common materials including: carbon fiber, glass fiber, KEVLAR, aluminum, paper to name only a few of the common solutions ROHACELL® is used to make composite parts \ products.

There are several types of ROHACELL® materials offered. Clarasonic offers IG (Industrial Grade) \ IGF (Industrial Grade Fine) materials which are known as the general purpose ROHACELL® material.

ROHACELL® is RoHS and SGS approved as being environmentally safe.

ROHACELL® is an AITM \ FAR approved.

ROHACELL® has no toxic fumes when heated or burned.

ROHACELL® has low smoke density.

ROHACELL® does not release any combustive emissions.

ROHACELL® may safely be thermally recycled.

### General Description of ROHACELL®31 IG \ IGF:

1. Lowest grade density \ lightest weight ROHACELL® material offered.
2. Lowest price ROHACELL® of the three types of common ROHACELL® materials.

Common Applications: Drone & RC Aircraft, Automotive, sporting goods equipment and any other applications where a light weight \ high strength rigid foam material is required.

### ROHACELL® 31 IGF – Physical Properties:

Density 0.032 g/cc 0.00116 lb/in<sup>3</sup> DIN 53420, ISO 845, ASTM D 1622

### ROHACELL® 31 IGF Mechanical Properties:

- Tensile Strength at Break: 1 MPa 245 psi DIN 53455, ISO 527-2, ASTM D 638
- Elongation at Break: 3.5%, 3.5% DIN 53455, ISO 527-2 ASTM D 638
- Modulus of Elasticity: 0.036 GPa 5.22 ksi ISO 527-2, ASTM D 638
- Compression Strength: 0.4 MPa 58 psi DIN 53421, ISO 844, ASTM D 1621
- Shear Modulus: 0.013 GPa 1.89 ksi DIN 53294, ASTM C 273
- Shear Strength: 0.4 MPa 58 psi DIN 53294, ASTM C 273
- Thermal Properties: Maximum Service Temperature, Air 180 °C \ 356 °F Heat Distortion
- Resistance: DIN 53424

For further technical information – contact [Clarasonic@Sales.com](mailto:Clarasonic@Sales.com)

## ROHACELL® 51 IG \ IGF –

### General Description of ROHACELL®:

ROHACELL® is a light weight, dense cell PMI foam manufactured by EVONIK. ROHACELL® can be thermally formed and bonded to many types of common materials including: carbon fiber, glass fiber, KEVLAR, aluminum, paper to name only a few of the common solutions ROHACELL® is used to make composite parts \ products.

There are several types of ROHACELL® materials offered. Clarasonnic offers IG (Industrial Grade) \ IGF (Industrial Grade Fine) materials which are known as the general purpose ROHACELL® material.

ROHACELL® is RoHS and SGS approved as being environmentally safe.

ROHACELL® is an AITM \ FAR approved.

ROHACELL® has no toxic fumes when heated or burned.

ROHACELL® has low smoke density.

ROHACELL® does not release any combustive emissions.

ROHACELL® may safely be thermally recycled.

### General Description of ROHACELL®51 IG \ IGF:

3. Mid grade density of ROHACELL® materials – most popular material offered.
4. Mid price ROHACELL® of the three types of common ROHACELL® materials..

Common Applications: Automotive, Marine, Medical X-Ray & CATSCAN tables, RC Aircraft. ROHACELL® 51 IGF is the leading material choice for audio speakers for pro, hi-end home & car used by top name brands. ROHACELL® 51 IGF is a ideal candidate for mid weight \ dense cell material is required.

### Physical Properties of ROHACELL® 51 IGF -

- Density 0.0521 g/cc 0.00188 lb/in<sup>3</sup> DIN 53420, ISO 845, ASTM D 1622

### ROHACELL® 51 IGF Mechanical Properties:

- Tensile Strength at Break: 1.9 MPa 276 psi DIN 53455, ISO 527-2, ASTM D 638
- Elongation at Break: 4 % 4 % DIN 53455, ISO 527-2, ASTM D 638
- Modulus of Elasticity: 0.07 GPa 10.2 ksi ISO 527-2, ASTM D 638
- Compressive Strength: 0.9 MPa 131 psi DIN 53421, ISO 844, ASTM D 1621
- Shear Modulus: 0.019 GPa 2.76 ksi DIN 53294, ASTM C 273
- Shear Strength: 0.8 MPa 116 psi DIN 53294, ASTM C 273
- Thermal Properties: Maximum Service Temperature, Air 180 °C 356 °F Heat Distortion Resistance; DIN 53424

For more information contact [sales@clarasonnic.com](mailto:sales@clarasonnic.com)

## ROHACELL® 71 IG \ IGF –

### General Description of ROHACELL®:

ROHACELL® is a light weight, dense cell PMI foam manufactured by EVONIK. ROHACELL® can be thermally formed and bonded to many types of common materials including: carbon fiber, glass fiber, KEVLAR, aluminum, paper to name only a few of the common solutions ROHACELL® is used to make composite parts \ products.

There are several types of ROHACELL® materials offered. Clarasonic offers IG (Industrial Grade) \ IGF (Industrial Grade Fine) materials which are known as the general purpose ROHACELL® material.

ROHACELL® is RoHS and SGS approved as being environmentally safe.

ROHACELL® is an AITM \ FAR approved.

ROHACELL® has no toxic fumes when heated or burned.

ROHACELL® has low smoke density.

ROHACELL® does not release any combustive emissions.

ROHACELL® may safely be thermally recycled.

### General Description of ROHACELL®71 IG \ IGF:

1. High grade density of ROHACELL® materials – most popular material offered.
2. Highest price ROHACELL® of the three types of common ROHACELL® materials..

Common Applications: Aero Space, Aircraft, Automotive, Marine, audio speakers and any other applications were a high grade light weight \ dense cell material is required. ROHACELL® 71 IGF is used by professionals in surfboard competitions.

### Physical Properties of ROHACELL® 71 IGF:

- Density 0.0753 g/cc 0.00272 lb/in<sup>3</sup> ASTM D1622-63

### ROHACELL® 71 IGF Mechanical Properties

- Tensile Strength, Ultimate 2.74 MPa 398 psi ASTM D638-68
- Elongation at Break 4.5 % 4.5 % ASTM D638-68
- Modulus of Elasticity 0.0903 GPa 13.1 ksi ASTM D638-68
- Flexural Yield Strength 2.45 MPa 356 psi ASTM D790-66
- Compressive Yield Strength 1.47 MPa 213 psi ASTM D1621-64
- Shear Modulus 0.0284 GPa 4.12 ksi ASTM C273-61
- Shear Strength 1.28 MPa 185 psi ASTM C273-61
- Thermal Properties: Maximum Service Temperature, Air 180 °C 356 °F Heat Distortion Resistance; DIN 53424

For further technical information – contact [Clarasonic@Sales.com](mailto:Clarasonic@Sales.com)

## ROHACELL® 110 IG \ IGF –

### General Description of ROHACELL®:

ROHACELL® is a light weight, dense cell PMI foam manufactured by EVONIK. ROHACELL® can be thermally formed and bonded to many types of common materials including: carbon fiber, glass fiber, KEVLAR, aluminum, paper to name only a few of the common solutions ROHACELL® is used to make composite parts \ products.

There are several types of ROHACELL® materials offered. Clarasonnic offers IG (Industrial Grade) \ IGF (Industrial Grade Fine) materials which are known as the general purpose ROHACELL® material.

ROHACELL® is RoHS and SGS approved as being environmentally safe.

ROHACELL® is an AITM \ FAR approved.

ROHACELL® has no toxic fumes when heated or burned.

ROHACELL® has low smoke density.

ROHACELL® does not release any combustive emissions.

ROHACELL® may safely be thermally recycled.

### General Description of ROHACELL®110 IG \ IGF:

1. Ultra high grade density of ROHACELL® materials – most rigid IG \ IGF material offered.
2. Suitable for applications where light weight \ maximum strength is required

Common Applications: Aero Space, Aircraft, Automotive, Marine, Medical and any other applications where a high strength, light weight \ dense cell material is required.

### Physical Properties of ROHACELL® 110 IGF:

- Density, DIN 53420, ISO 845, ASTM D 1622

### ROHACELL® 110 IGF Mechanical Properties

- Tensile Strength at Break, DIN 53455, ISO 527-2, ASTM D 638
- Elongation at Break, DIN 53455, ISO 527-2, ASTM D 638
- Modulus of Elasticity, ISO 527-2, ASTM D 638
- Flexural Strength, DIN 53423, ISO 1209, ASTM D 790
- Compressive Strength, DIN 53421, ISO 844, ASTM D 1621
- Shear Modulus, DIN 53294, ASTM C 273
- Shear Strength, DIN 53294, ASTM C 273
- Maximum Service Temperature, Air, DIN 53424, Heat Distortion Resistance

For further technical information – contact [Clarasonnic@Sales.com](mailto:Clarasonnic@Sales.com)

## **ROHACELL® 31HF, 51HF, 71HF materials – (5G Technology capable)**

General Description of ROHACELL® HF materials:

ROHACELL® is a light weight, dense cell PMI foam manufactured by EVONIK. ROHACELL® can be thermally formed and bonded to many types of common materials including: carbon fiber, glass fiber, KEVLAR, aluminum, paper to name only a few of the common solutions ROHACELL® is used to make composite parts \ products.

There are several types of ROHACELL® materials offered including ROHACELL® HF.

ROHACELL® HF is a structural foam commonly used for antenna applications.

ROHACELL® HF is a closed-cell rigid foam based on polymethacrylimide (PMI) chemistry that is completely free of CFC's. With its extremely low dielectric constants and particularly favorable transmission properties at high frequencies.

ROHACELL® HF has a ultra fine cell structure that resembles common paper allowing less exposy absorption of parts.

ROHACELL® HF is 5G technology capable allowing full frequency information to pass thru unobstructed.

APPLICATIONS: From miniature antennas in cell phones to large fixed ship-based and stationary antenna structures, ROHACELL® HF is used worldwide. Other typical applications include usage as structural core for radomes and mammography plates.

ROHACELL® HF can be used on PCB circuits as a center core substrate for multi-layer circuits.

ROHACELL® HF is available for slicing at ultra-thin thicknesses of 200µm and higher.

PROCESSING BENEFITS: Featuring an extremely fine closed-cell structure, the foam ensures minimal resin uptake and problem free compatibility with metallic facing materials due to the absence of corrosive effects.

ROHACELL® HF foam is suitable for hand lay-up, prepreg processing and vacuum infusion at temperatures up to 130 °C (266 °F) and pressures up to 0.3 MPa (44 psi).

ROHACELL® is RoHS and SGS approved as being environmentally safe.

ROHACELL® is an AITM \ FAR approved.

ROHACELL® has no toxic fumes when heated or burned.

ROHACELL® has low smoke density.

ROHACELL® does not release any combustive emissions.

ROHACELL® may safely be thermally recycled.

## ROHACELL® HF 31, 51 & 71 Technical Specifications:

Property	Test Method	Unit	Rohacell 31 HF	Rohacell 51 HF	Rohacell 71 HF
Density		Kg / m3	32+/- 7	52 +/- 12	75 +/- 15
		Lbs / ft3	2.00 +/- 0.44	3.25 +/- 0.75	4.68 +/- 0.94
Compression Strength	ISO 844	MPa	0.4	0.9	1.5
		psi	58	130	217
Tensile Strength	ISO 527-2	MPa	1.0	1.9	2.8
		psi	145	275	406
Tensile Modulus	ISO 527-2	MPa	36	70	92
		psi	5,220	10,150	13,340
Elongation @ Break	ISO 527-2	%	3.5	4.0	4.5
Shear Strength	DIN 53294	MPa	0.4	0.8	1.3
		psi	58	116	188
Shear Modulus	DIN 53294	MPa	13	19	29
		psi	1,885	2,755	4,205
Coefficient of Thermal Expansion	DIN 53294	1/K*10E-5	N/A	3.34	3.23

## Electrical Properties of ROHACELL® HF

Property	Frequency (GHz)	31 HF	51 HF	71 HF
Dielectric constants	2.5	1.050	1.057	1.075
	5.0	1.043	1.065	1.106
	10.0	1.046	1.067	1.093
Loss tangent	26.5	1.041	1.048	1.093
	2.5	<0.0002	<0.0002	<0.0002
	5.0	0.0016	0.0008	0.0016
	10.0	0.0017	0.0041	0.0038
	26.5	0.0106	0.0135	0.0155

For further technical information – contact [Clarasonic@Sales.com](mailto:Clarasonic@Sales.com)



## **ROHACELL® RIMA 51, 71 & 110 (5G Technology Capable)**

General Description of ROHACELL® RIMA:

ROHACELL® is a light weight, dense cell PMI foam manufactured by EVONIK. ROHACELL® can be thermally formed and bonded to many types of common materials including: carbon fiber, glass fiber, KEVLAR, aluminum, paper to name only a few of the common solutions ROHACELL® is used to make composite parts \ products.

ROHACELL® RIMA is a rigid foam with a fine cell structure. ROHACELL® RIMA is a closed-cell rigid foam based on polymethacrylimide (PMI) chemistry that is completely free of CFC's and specially designed to ensure the minimum possible uptake of resin. ROHACELL® RIMA is available in three densities: 51, 71 and 110.

The ultra fine, closed-cell structure of ROHACELL® RIMA resembles common paper as the cell sizes are so small and provides the unique benefit of allowing a minimal resin uptake of only approx. 50 g/m<sup>2</sup>. This eliminates excess and unnecessary resin that adds undesirable weight and cost to a finished part. The end weight of the finished component remains extremely low.

ROHACELL® RIMA 110 is the highest strength rigid foam in the world that is commercially available material and very light in weight.

ROHACELL® RIMA is 5G technology capable allowing full frequency information to pass thru unobstructed.

ROHACELL® RIMA is ideal for miniature speaker & flat panel diaphragm solutions as well as PCB circuits, antenna and cover reinforcements for 5G technology products.

ROHACELL® RIMA can be used as used on PCB circuits as a center core substrate for multi-layer circuits, antenna & cover reinforcement.

ROHACELL® RIMA is available for slicing at ultra-thin thicknesses of 200µm and higher.

APPLICATIONS: ROHACELL® RIMA can be used as miniature speaker & flat panel diaphragms for mobile phone, tablet, notebook, headphone and similar applications as well as with 5G technology electronics including antennas in cell phones to large fixed ship-based and stationary antenna structures.

PROCESSING AND PRODUCTION ROHACELL® RIMA foam is particularly well-suited for vacuum infusion and RTM processes where the finecell foam can also be used purely as a fly-away tool. Processing is possible at a pressure of 0.7 MPa (102 psi) and temperatures up to 130 °C (266 °F). Heat-treated ROHACELL® RIMA-HT can be used at a temperature of 180 °C (356 °F) and pressures up to 0.7 MPa (102 psi).

THERMOFORMING AND SHAPING ROHACELL® RIMA can be easily thermoformed or CNC machined to meet customer requirements.



## ROHACELL® RIMA 51, 71, 110 Technical Specifications:

PROPERTIES	TEST METHOD	UNIT	ROHACELL RIMA 51	ROHACELL RIMA 71	ROHACELL RIMA 110
Density	ISO 845	Kg/m <sup>3</sup> Lbs/ft <sup>3</sup>	52 3.25	75 4.68	110 6.87
Compression Strength	ISO 844	MPa psi	0.8 116	1.7 246	3.6 522
Tensile Strength	ISO 527-2	MPa psi	1.6 232	2.2 319	3.7 536
Tensile Modulus	ISO 527-2	MPa psi	75 10,875	105 15,225	180 26,100
Elongation at Break	ISO 527-2	%	7	7	7
Shear Strength	DIN 53294	MPa psi	0.8 116	1.3 188	2.4 348
Sheer Modulus	DIN 53294	MPa psi	24 3,480	42 6,090	70 10,170
Coefficient of Thermal Expansion		1/K*10E-5	4.06	3.40	3.64

NOTE: Technical data values presented are typical for nominal density, subject to normal manufacturing variations. All products are closed-cell rigid foams on polymethacrylimide (PMI) chemistry and contain no CFC's.

- Density, ISO 845
- Tensile Strength at Break, ISO 527-2
- Elongation at Break, ISO 527-2
- Modulus of Elasticity, ISO 527-2
- Compressive Strength, ISO 844
- Shear Modulus, ASTM C273
- Shear Strength, ASTM C273

For further technical information – contact [Clarasonic@Sales.com](mailto:Clarasonic@Sales.com)

## ROHACELL® 51-S, 71-S, 110-S – Self Extinguishing Rigid Foam

### General Description of ROHACELL®:

ROHACELL® is a light weight, dense cell PMI foam manufactured by EVONIK. ROHACELL® can be thermally formed and bonded to many types of common materials including: carbon fiber, glass fiber, KEVLAR, aluminum, paper to name only a few of the common solutions ROHACELL® is used to make composite parts \ products.

There are several types of ROHACELL® materials offered.

ROHACELL® S rigid foam is self-extinguishing and particularly suitable for applications in rail vehicle and watercraft construction, as well as in the aeronautic industry.

ROHACELL® S is suitable for prepreg processing & vacuum infusion.

ROHACELL® S can be thermal formed as well as CNC machined to shape.

ROHACELL® is RoHS and SGS approved as being environmentally safe.

ROHACELL® is an AITM \ FAR approved.

- FAR 25.853 (a)(1)(i) AITM 2.0002 Small Burner Test vertical (60s)
- FAR 25.853 (a)(1)(ii) AITM 2.0002 Small Burner Test vertical (12s)
- FAR 25.853 (a)(1)(iv) AITM 2.0003 Small Burner Test horizontal (15s)
- FAR 25.853 (a)(1)(v) AITM 2.0003 Small Burner Test horizontal (15s)
- FAR 25.853 (d) AITM 2.0007 Determination of the specific optical smoke density of aircraft interior materials

ROHACELL® has no toxic fumes when heated or burned.

ROHACELL® has low smoke density.

ROHACELL® does not release any combustive emissions.

ROHACELL® may safely be thermally recycled.

### General Description of ROHACELL®S:

TYPES:

ROHACELL® 51 S

ROHACELL® 71 S

ROHACELL® 110 S

### ROHACELL® S – Compliancy

ASTM D 1692-59	Self Extinguishing
AFNOR NF 16-101	M1/F2 (ROHACELL 51 S), M2/F3 (ROHACELL 71S)
ASTM D 2863 (LOI)	23.8% (ROHACELL 51 S), 23.2% (ROHACELL 71S)
UL94	V-2 (ROHACELL 51 S)

**ROHACELL® 51-S, 71-S, 110-S – Technical Specifications:**

Property	Test Method*	Unit	ROHACELL® 51 S	ROHACELL® 71 S	ROHACELL® 110 S
Density**	ISO 845 ASTM D 1622	kg/m3 lbs/ft3	52 ± 12 3.25 ± 0.75	75 ± 15 4.68 ± 0.94	110 ± 21 6.87 ± 1.31
Compressive Strength	ISO 844 ASTM D 1621	MPa psi	0.7 101	1.5 217	2.8 406
Tensile Strength	ISO 527-2 ASTM D 638	MPa psi	1.1 159	1.9 275	3.2 464
Tensile Modulus	ISO 527-2 ASTM D 638	MPa psi	50 7,250	90 13,050	150 21,750
Elongation at Break	ISO 527-2 ASTM D 638	%	3.5	3.5	3.5
Shear Strength	DIN 53294 ASTM C 273	MPa psi	0.6 87	1.2 174	2.2 319
Shear Modulus	DIN 53294 ASTM C 273	MPa psi	20 2,900	34 4,930	55 7,975

For further technical information – contact [Clarasonic@Sales.com](mailto:Clarasonic@Sales.com)