AIREX® R82

GM--TDS-112

Radar Transparent with Fire and High Temperature Performance

DATA SHEET 03.2023 - Replaces 08.2022

DESCRIPTION

AIREX® R82 is a thermoplastic polymer foam that combines outstanding fire resistance with very low smoke and toxicity, along with excellent dielectric properties.

It has an outstanding strength to weight ratio, very low moisture absorption, is thermoformable and ductile.

AIREX® R82 is an exceptional core material for use in structural lightweight applications that demand high fire retardance, radar transparency or operation in extremely hot or cold environments.

CHARACTERISTICS

- Fulfills most stringent fire requirements
- Operating temperature from -194 °C to +160 °C (-317 °F to +320 °F)
- Remains ductile at cryogenic temperatures
- Excellent dielectric properties (radar outstanding transparency)
- Very low moisture absorption
- Good fatigue resistance
- High impact resistance (non-brittle failure mode)
- Thermoformable
- Good sound and thermal insulation

APPLICATIONS

- **Aircraft and Aerospace:** Interiors, cockpit doors, cryogenic tanks, insulating panels, radomes, helicopter rotor blades, general aviation (fuselage and wing)
- **Road and Rail:** Front-ends, side skirts, roof panels, interiors
- **Marine:** Fast-ferries, fire resistant interiors, radomes
- **Defense:** Naval superstructures, antennas, combat communication systems
- **Industrial:** High temperature tooling, radomes, x-ray tables

PROCESSING*

- Adhesive bonding
- Thermoformable
- Pre-preg processing (up to 180 °C, 355 °F)
- Hot press molding
- Thermoplastic processable
- Automated tape laying (ATL/CTL)

AEROSPACE QUALIFICATIONS

Airbus: ABS 5609
Bell Helicopter: BHS 299947304/ BPS
Liberty Aerospace: LMS 135A-925-001

Boeing: Multiple
Northrup Grumman: Multiple

Zodiac Aerospace: CDM 660
Diehl: DS-M0040

*For details refer to AIREX® Processing Guidelines.

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MECHANICAL PROPERTIES						
Typical properties for AIREX® R82		**Unit (metric)**	**Value**[1)]	**R82.60**	**R82.80**	**R82.110**
Density	ISO 845	kg/m³	Average *Typ. range*	60 *54 - 69*	80 *72 - 95*	110 *99 - 126*
Compressive strength perpendicular to the plane	ISO 844 ASTM C365	N/mm²	Average *Minimum*	0.70 *0.60*	1.1 *0.9*	1.6 *1.3*
Compressive modulus perpendicular to the plane	DIN 53421	N/mm²	Average *Minimum*	46 *40*	62 *56*	105 *80*
	ASTM C365		*Minimum*	*32*	*45*	*60*
Tensile strength in the plane	ISO 527 1-2	N/mm²	Average *Minimum*	1.7 *1.2*	2.0 *1.7*	2.7 *2.0*
Tensile modulus in the plane	ISO 527 1-2	N/mm²	Average *Minimum*	45 *35*	54 *50*	80 *60*
Shear strength	ISO 1922	N/mm²	Average *Minimum*	0.80 *0.65*	1.1 *0.9*	1.6 *1.2*
Shear modulus	ASTM C393	N/mm²	Average *Minimum*	18 *15*	23 *20*	33 *26*
	ISO 1922		Average *Minimum*	16 *13*	21 *18*	31 *24*
Shear elongation at break	ISO 1922	%	Average *Minimum*	25 *15*	23 *13*	17 *9*
Impact strength	DIN 53453	kJ/m²	Average	0.8	1.1	1.6
Thermal conductivity at room temperature	ISO 8301	W/m.K	Average	0.036	0.037	0.040
Standard sheet	Width	mm ± 5		1350	1200	1000
	Length	mm ± 5		2800	2700	2300
	Thickness	mm ± 0.5		3 to 60	3 to 60	5 to 30
Color				off white	off white	off white

Finishing Options, other dimensions and closer tolerances upon request

[1)] Statistical minimum values; test sample thickness 20 mm except tensile / impact properties (10 mm) and compressive modulus (40 mm)

Fire performance	**Standard**		**R82.60**	**R82.80**	**R82.110**
Aircraft	FAR 25.853/ABD0031	Flammability	passed	passed	passed
	FAR 25.853/ABD0031	Smoke density	passed	passed	passed
	ABD0031	Toxicity	passed	passed	passed
	FAR 25.853/ABD0031	Heat release	passed	passed	passed
Rail	CEN TS 45545-2		HL3[2)] Final certification depending on sandwich design		

[2)] Indicative test; further details on request

The data provided gives approximate values for the nominal density and minimum values based on statistics.

The information contained herein is believed to be correct and to correspond to the latest state of scientific and technical knowledge. However, no warranty is made, either expressed or implied, regarding its accuracy or the results to be obtained from the use of such information. No statement is intended or should be construed as a recommendation to infringe any existing patent.

MECHANICAL PROPERTIES						
Typical properties for AIREX® R82		**Unit (imperial)**	**Value[1)]**	**R82.60**	**R82.80**	**R82.110**
Density	ISO 845	lb/ft³	Average *Typ. range*	3.75 *3.4 - 4.3*	5.0 *4.5 - 5.9*	6.85 *6.2 - 7.9*
Compressive strength perpendicular to the plane	ISO 844 ASTM C365	psi	Average *Minimum*	100 *87*	160 *131*	232 *189*
Compressive modulus perpendicular to the plane	DIN 53421	psi	Average *Minimum*	6'700 *5'800*	9'000 *8'120*	15'229 *11'603*
	ASTM C365		*Minimum*	*4'640*	*6'500*	*8'702*
Tensile strength in the plane	ISO 527 1-2	psi	Average *Minimum*	250 *174*	290 *247*	392 *290*
Tensile modulus in the plane	ISO 527 1-2	psi	Average *Minimum*	6'500 *5'075*	7'800 *7'250*	11'603 *8'702*
Shear strength	ISO 1922	psi	Average *Minimum*	120 *94.3*	160 *131*	232 *174*
Shear modulus	ASTM C393	psi	Average *Minimum*	2'610 *2'175*	3'300 *2'900*	4'786 *3'771*
	ISO 1922		Average *Minimum*	2'320 *1885*	3'045 *2'610*	4'496 *3'480*
Shear elongation at break	ISO 1922	%	Average *Minimum*	25 *15*	23 *13*	17 *9*
Impact strength	DIN 53453	Ft.lb/in²	Average	0.38	0.52	0.76
Thermal conductivity at room temperature	ISO 8301	BTU.in/ft².hr.°F	Average	0.25	0.26	0.28
Standard sheet	Width	in ± 0.2		53.1	57.2	39.4
	Length	in ± 0.2		110.2	106.3	90.6
	Thickness	in ± 0.02		⅛ to 2.3	⅛ to 2.3	⅕ to 1.2
Color				off white	off white	off white

Finishing Options, other dimensions and closer tolerances upon request

[1)] Statistical minimum values; test sample thickness 20 mm (3/4") except tensile / impact properties 10 mm (3/8") and compressive modulus 40 mm (1 ½")

Fire performance	**Standard**		**R82.60**	**R82.80**	**R82.110**
Aircraft	FAR 25.853/ABD0031	Flammability	passed	passed	passed
	FAR 25.853/ABD0031	Smoke density	passed	passed	passed
	ABD0031	Toxicity	passed	passed	passed
	FAR 25.853/ABD0031	Heat release	passed	passed	passed
Rail	CEN TS 45545-2		HL3[2)]		
			Final certification depending on sandwich design		

[2)] Indicative test; further details on request

The data provided gives approximate values for the nominal density and minimum values based on statistics.

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