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AIREX® T90

GM--TDS-122

The Fire Resistant Structural Foam

DATA SHEET 11.2016 - Replaces 09.2016

DESCRIPTION

AIREX® T90 is a closed-cell, thermoplastic and recyclable polymer foam with excellent fire, smoke & toxicity (FST) properties.

It has very good mechanical properties and an extraordinary resistance to fatigue, is chemically stable, UV-resistant and has negligible water absorption. It is thermally stable during high temperature processing and post curing. T90 is designed for easy use with all resin systems and processing technologies.

AIREX® T90 is the ideal core material for structural sandwich applications requiring high fire resistance.

CHARACTERISTICS

- Superior fire resistance (FAR 25.853; NF 16-101; DIN 5510)
- Outstanding fatigue strength
- Excellent long term thermal stability up to 100 °C (212 °F)
- Best thermal stability in process up to 150 °C (302 °F)
- Good thermal insulation
- Highly consistent material properties
- Easy to process with all types of resin and lamination processes
- Good adhesion (skin-to-core bond)
- Very high chemical stability
- No water absorption, no after-expansion, no outgassing

APPLICATIONS

- **Road and Rail:** Floors, sidewalls, front ends, interiors, roofs, engine covers
- **Marine:** Decks, interiors, superstructures
- **Industrial:** Covers, containers, x-ray tables, sporting goods
- **Architecture and Construction:** Roofs, claddings, domes, portable building

PROCESSING

- Contact molding (hand/spray)
- Vacuum infusion
- Resin infusion / injection (VARTM / RTM)
- Adhesive bonding
- Pre-preg processing
- Compression molding (GMT, SMC)
- Thermoforming

AIREX

MECHANICAL PROPERTIES							
Typical properties for AIREX® T90		**Unit (metric)**	**Value[1)]**	**T90.60**	**T90.100**	**T90.150**	**T90.210**
Density	ISO 845	kg/m³	Average *Typ. range*	65 *60 - 70*	110 *105 - 115*	145 *140 - 150*	210 *200 - 220*
Compressive strength perpendicular to the plane	ISO 844	N/mm²	Average *Minimum*	0.80 *0.7*	1.4 *1.2*	2.2 *2.0*	3.8 *3.2*
Compressive modulus perpendicular to the plane	ISO 844	N/mm²	Average *Minimum*	50 *35*	80 *70*	105 *95*	170 *145*
Tensile strength perpendicular to the plane	ASTM C297	N/mm²	Average *Minimum*	1.5 *1.2*	2.2 *1.6*	2.7 *2.2*	3.0 *2.4*
Tensile modulus perpendicular to the plane	ASTM C297	N/mm²	Average *Minimum*	85 *70*	120 *90*	170 *140*	225 *180*
Shear strength	ISO 1922	N/mm²	Average *Minimum*	0.46 *0.4*	0.8 *0.7*	1.2 *1.1*	1.85 *1.5*
Shear modulus	ISO 1922	N/mm²	Average *Minimum*	12 *10.5*	20 *18*	30 *26*	50 *44*
Shear elongation at break	ISO 1922	%	Average *Minimum*	25 *15*	10 *5*	8 *4*	5 *3*
Thermal conductivity at 10°C	EN 12667	W/m.K	Average	0.037	0.035	0.038	0.045
Standard sheet	Width[2)]	mm ± 5		1220	1220	1220	1220
	Length[2)]	mm ± 5		2440	2440	2440	2440
	Thickness	mm ± 0.5		5 to 100	5 to 100	5 to 100	5 to 100

Finishing Options, other dimensions and closer tolerances upon request
[1)] Minimum values acc. DNV definition; test sample thickness 20 mm except thermal conductivity (50mm)
[2)] Alternative width 610 mm, alternative length 1220 mm

Fire performance	**Standard**		**T90.60**	**T90.100**	**T90.150**	**T90.210**
Aircraft	FAR/CS 25.853/ABD0031	Flammability (60s)	passed	passed	passed	passed
	FAR/CS 25.853/ABD0031	Smoke density	passed	passed	passed	passed
	FAR/CS 25.853/ABD0031	Toxicity	passed	passed	passed	passed
Rail	DIN 5510/2 / DIN 54837	Burning behavior	S4	S4	S4	S4
	DIN 5510/2 / DIN 54837	Smoke density	SR2	SR2	SR2	SR2
	DIN 5510/2 / DIN 54837	Dripping	ST2	ST2	ST2	ST2
	DIN 5510/2 / DIN 53438-2	Edge flaming	S1/K1	S1/K1	S1/K1	tbd
	DIN 5510/2	Toxicity (FED)	<0.1	<0.1	<0.1	<0.1
Rail	NF 16-101	Flammability	M2	M1	M1	M1
	NF 16-101	Smoke density	F1	F1	F1	F1
Rail	EN 45545-2	Sandwich	HL3 achievable, depending on sandwich design [3)]			
		Core alone	HL3 achievable [4)]			
Building & Construction	DIN 4102-1	Material Class	tbd	B1	tbd	B1
Building & Construction	EN 13501-1 EN 13501-1 EN 13501-1	Fire reaction behaviour Smoke production Flaming droplets	tbd	C s2 d0	tbd	C s2 d0

[3)] Certificates available for specific sandwich designs
[4)] Depending on density, thickness and application; test results on request

The data provided gives approximate values for the nominal density and DNV minimum values according to DNV type approval certificate.

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® T90		**Unit (imperial)**	**Value[1)]**	**T90.60**	**T90.100**	**T90.150**	**T90.210**
Density	ISO 845	lb/ft³	Average *Typ. range*	4.1 *3.7 - 4.4*	6.8 *6.6 - 7.2*	9.1 *8.7 - 9.4*	13 *12.5 - 13.7*
Compressive strength perpendicular to the plane	ISO 844	psi	Average *Minimum*	116 *102*	203 *174*	319 *290*	551 *464*
Compressive modulus perpendicular to the plane	ISO 844	psi	Average *Minimum*	7'250 *5'075*	11'600 *10'150*	15'230 *13'780*	24'650 *21'025*
Tensile strength perpendicular to the plane	ASTM C297	psi	Average *Minimum*	218 *174*	319 *232*	392 *319*	435 *350*
Tensile modulus perpendicular to the plane	ASTM C297	psi	Average *Minimum*	12'325 *10'150*	17'400 *13'050*	24'650 *20'300*	32'630 *26'100*
Shear strength	ISO 1922	psi	Average *Minimum*	67 *58*	116 *102*	174 160	268 *215*
Shear modulus	ISO 1922	psi	Average *Minimum*	1'740 *1'520*	2'900 *2'610*	4'350 *3'770*	7'250 *6'380*
Shear elongation at break	ISO 1922	%	Average *Minimum*	25 *15*	10 *5*	8 *4*	5 *3*
Thermal conductivity at 50°F	EN 12667	Btu.in/ hr.ft².F	Average	0.257	0.243	0.263	0.312
Standard sheet	Width[2)]	in ± 0.2		48	48	48	48
	Length[2)]	in ± 0.2		96	96	96	96
	Thickness	in ± 0.02		⅛ to 4	⅛ to 4	⅛ to 4	⅛ to 4

Finishing Options, other dimensions and closer tolerances upon request

[1)] Minimum values acc. DNV definition; test sample thickness 20 mm (3/4") except thermal conductivity 50mm (2")

[2)] Alternative width 24", alternative length 48"

Fire performance	**Standard**		**T90.60**	**T90.100**	**T90.150**	**T90.210**
Aircraft	FAR/CS 25.853/ABD0031	Flammability (60s)	passed	passed	passed	passed
	FAR/CS 25.853/ABD0031	Smoke density	passed	passed	passed	passed
	FAR/CS 25.853/ABD0031	Toxicity	passed	passed	passed	passed
Rail	DIN 5510/2 / DIN 54837	Burning behavior	S4	S4	S4	S4
	DIN 5510/2 / DIN 54837	Smoke density	SR2	SR2	SR2	SR2
	DIN 5510/2 / DIN 54837	Dripping	ST2	ST2	ST2	ST2
	DIN 5510/2 / DIN 53438-2	Edge flaming	S1/K1	S1/K1	S1/K1	tbd
	DIN 5510/2	Toxicity (FED)	<0.1	<0.1	<0.1	<0.1
Rail	NF 16-101	Flammability	M2	M1	M1	M1
	NF 16-101	Smoke density	F1	F1	F1	F1
Rail	EN 45545-2	Sandwich	HL3 achievable, depending on sandwich design [3)]			
		Core alone	HL3 achievable [4)]			
Building & Construction	DIN 4102-1	Material Class	tbd	B1	tbd	B1
Building & Construction	EN 13501-1 EN 13501-1 EN 13501-1	Fire reaction behaviour Smoke production Flaming droplets	tbd	C s2 d0	tbd	C s2 d0

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