Fire Resistant Modified Phenolic Resin System

HPR7626-1 / 7581 / 650

HANKUK CARBON

HPR 7626-1/7581/650 prepreg is phenolic resin impregnated glass fabric, which has inherent flame retardant properties and is suitable for interior application of railcars.

HPR 7626-1/7581/650 are meet BS6853:1999 & Ministry of land requirement.

FEATURES

- Applied in interior of railcars.
- Processing can be easily adapted to most Autoclave or vacuum molding.
- Good tack.
- Excellent FST properties.

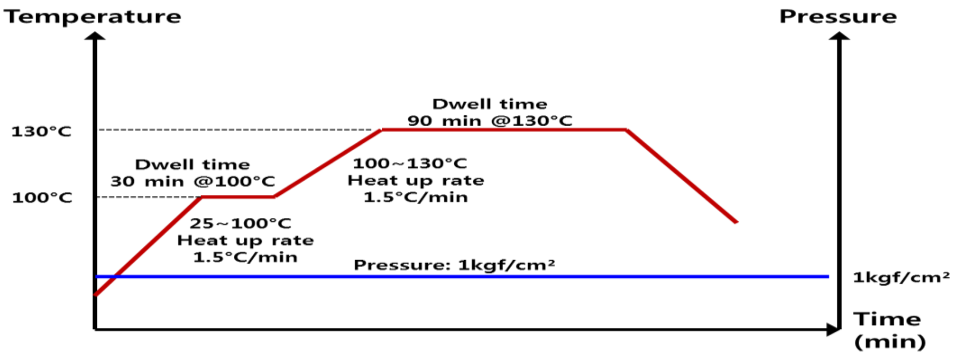
PHYSICLA PROPERTIES

Reinforcement

PROPERTIES		REQUIREMENTS			TEST METHODS
		HPR 7626-1	HPR 7581	HPR 650	
Weave		Plain	8 shaft satin	Plain	-
Width (mm)		1,030	1,020	1,020	-
Thickness (mm)		0.18 ± 0.025	0.23 ± 0.025	0.5 ± 0.075	ASTM D 1777
Fiber Areal Weight (g/m^2)		173 ± 10	294 ± 10	492 ± 30	ASTM D 3776
Count (Count/in.)	Warp	34	54	10	ASTM D 3775
	Fill	30	53	8	
Resin Content (%)		45 ± 2	45 ± 2	37 ± 2	ASTM D 3529
Volatile Content (%)		6.0 ± 0.5	6.0 ± 0.5	7.0 ± 0.5	ASTM D 3530
Prepreg Gel Time (sec.)		160 ± 10	160 ± 10	160 ± 10	BSS 7276 Method II Modified

CURING CYCLE

Typical Bagging cure cycle is shown as below.



Tel 82-55-350-8888, Fax 82-55-350-0088, Web www.hcarbon.com

PANEL PROPERTIES

Nomex Honeycomb Panel Lay-up Pattern

[HPR7626-1 / HPR7581 x 2 plies / HPR650 / Nomex Honeycomb / HPR650]

Core

MATERIAL	PROPERTIES	VALUES
Nomex Honeycomb Core	Thickness (mm)	8.64
	Density (lb/ft^3)	3
	Cell Size (in.)	1/8

Laminate Lay-up Pattern

[HPR650 x 4 plies / HPR7581 / HPR7626-1]

Mechanical Properties

PROPERTIES			TEST RESULTS	TEST METHOD
Nomex Honeycomb Panel	Drum Peel Strength (in.-lbf/3in.)		13.6	ASTM D 1781
	Long Beam Flexure (N)		1,687	ASTM C 393
	Stabilized Core Compression (N)		1.74	ASTM C 365
Laminate	Tensile	Strength	252 MPa	ASTM D 638
		Modulus	23.2 GPa	
	Flexure	Strength	466 MPa	ASTM D 790
	Compression	Strength	327 MPa	ASTM D 695
		Modulus	22.5 GPa	

Flammability

PROPERTIES		REQUIREMENTS	TEST RESULTS	TEST METHOD
60 sec. Vertical	Self-Extinguish Time (sec.)	< 5	1	FAR 25.853
	Burn Length (in.)	< 4.5	1.4	
	Drip Extinguish Time (sec.)	No Drip	No Drip	

HANKUK CARBON

Flame Properties : BS6853 : 1999 – by Exova Warrington Fire

PROPERTIES	REQUIREMENT		TEST RESULTS		TEST METHOD
	I a	I b	Nomex Honeycomb Panel	Laminate	
Fire Propagation	I1 ≤ 6 I ≤ 12	I1 ≤ 6 I ≤ 12	I1 = 1.6 I = 5.0	I1 = 1.2 I = 5.9	BS 476 Part 6
Surface Spread of Flame	Class 1	Class 1	Class 1	Class 1	BS 476 Part 7
Panel Smoke Emission	A_o (on) ≤ 2.6 A_o (off) ≤ 3.9	A_o (on) ≤ 4.2 A_o (off) ≤ 6.3	A_o (on) = 1.56 A_o (off) = 1.91	A_o (on) = 1.53 A_o (off) = 1.80	BS 6853 Annex D 8.4
Toxic	R ≤ 1.0	R ≤ 1.6	R = 0.29	R = 0.37	BS 6853 B.2

Flame Properties : Rapid Transit (Ministry of Land) – by Exova Warrington Fire

PROPERTIES	REQUIREMENT		TEST RESULTS		TEST METHOD
	Level 3	Level 4	Nomex Honeycomb Panel	Laminate	
Oxygen Index	LOI ≥ 35	LOI ≥ 40	LOI = 44.9	LOI = 49.9	ISO 4589-2
Fire Propagation	Qsb (MJ/m^2) ≥ 1.5 CFE (Kw/m^2) ≥ 20	Qsb (MJ/m^2) ≥ 1.5 CFE (Kw/m^2) ≥ 20	Qsb (MJ/m^2) = 1.79 CFE (Kw/m^2) = 32.6	Qsb (MJ/m^2) = 1.25 CFE (Kw/m^2) = 41.8	ISO 5658-2
Smoke Density	Ds (1.5 min) ≤ 75 Ds (4 min) ≤ 150 Ds (Max.) ≤ 300	Ds (1.5 min) ≤ 50 Ds (4 min) ≤ 100 Ds (Max.) ≤ 200	Ds (1.5 min) = 7 Ds (4 min) = 19 Ds (Max.) = 31	Ds (1.5 min) = 0 Ds (4 min) = 9 Ds (Max.) = 25	ASTM E 662
Toxic	R ≤ 1.6	R ≤ 1.6	R = 0.29	R = 0.37	BS 6853 B.2

SHELF LIFE

STORAGE TEMPERATURE	SHELF LIFE
Room Temperature 23℃	10 day
Frozen below -18℃	6 month