PROFESSIONAL PLASTICS

Dura-Core 1000™ ... Tested and Proven in Transit.

Typical Light Rail Industry Specifications Test Results

	Description	Standard	Results		Remarks
			Specified	Actual	
1	**Fire Test**				
		ASTM E 119	30 mins	42+ mins	unloaded
2	**Load Test as per TP 17**				
a	Indentation Resistence Test	BTP 1261	Permanent deformation <0.010"	Less than 0.010"	at 360#
b	Staic Load - Average Loading	BTP 1271	Max Surface deflection <0.088"	0.060"	Pass
			Permanent deformation <0.010"	.005"	Pass
c	Static Load Test - Maximum Load	BTP 1281	Permanent deformation <0.010"	0.009"	Pass
d	Small Area Static Load Test	BTP 1291	Max Surface deflection <0.200"	0.089"	Pass
			Permanent deformation <0.010"	0.001"	Pass
e	Small Object Impact Test	BTP 1311	Permanent deformation <0.063"	0.050"	Pass
			Small core damage & skin		
			seperation permitted Max 6.5"	None observed	Pass
f	Large Object Impact Test	BTP 1321	Permanent deformation <0.125"	0.063"	Pass
g	Rolling Load Test	BTP 1331	Permanent deformation <0.010"	Less than 0.010"	Pass
h	Testing for Crack Propagation / Cycle Test	TP 010	Total 300K cycles. Localized	0.043" at impact	Pass
			failure permitted for Max dia. 11"	no delam or cracks	
3	**Mechanical Properties Test – H1000 Skins**				
a	Tensile Strength	ASTM D 638	12000 psi	13500 psi	Pass
b	Flexural Strength	ASTM D 790	15000 psi	25800 psi	Pass
c	Compressive Strength	ASTM D 695	18000 psi	30000 psi	Pass
d	Impact Strength	ASTM D 256	8 ft-lb / in	12 ft-lb / in	Pass
4	**Other Tests**				
a	Toxicity	BSS 7239/SMP800			
		Carbon Monoxide CO	3500 ppm	180 ppm	Pass
		Hydrogen Flouride HF	200 ppm	0.50 ppm	Pass
		Nitrogen Dioxide HCL	100 ppm	10.5 ppm	Pass
		Hydrogen Cloride HCL	500 ppm	1.0 ppm	Pass
		Hydrogen Cyanide HCN	150 ppm	0 ppm	Pass
		Sulfur Dioxide SO^2	100 ppm	0 ppm	Pass
b	Surface Flammability	ASTM E 162	Flame Spread Index <35	11.8	Pass
c	Optical Density of Smoke Generated	ASTM D 662			
	Flaming Mode	Specific Optical Density at 1.5 min	Maximum - 100	0.9	Pass
		Specific Optical Density at 4 min	Maximum - 200	15	Pass
	Non - Flaming Mode	Specific Optical Density at 1.5 min	Maximum - 100	0.2	Pass
		Specific Optical Density at 4 min	Maximum - 200	0.3	Pass
d	Heat & Visible Smoke Release	ASTM E 1354	Heat Flux 50KW/M2	see report	No values spec

DURA-CORE 1000 DESIGN SPECIFICATIONS:

Current Standard Dura-Core 1000 Size Specifications Include

- Standard gray color in sheet thicknesses from 1/2" to 2" (2.4 – 51 mm).
- Standard Sheet Sizes: 36" x 72" (914mm x 1828mm), 48" x 96" (1220mm x 2440mm), 48" x 60" (1220mm x 1524mm), and 48" x 72" (1220mm x 1828mm)
- **Custom widths/lengths available by design**
- **Engineered close-outs designed as needed**

Dura-Core 1000™

DURA-CORE 1000™

Haysite Reinforced Plastics new grade Dura-Core 1000™ is uniquely engineered for use as a floor material in light transit rail car interiors, and multi-wheeled vehicle applications. The new compression molded composite panel combines high strength fiberglass reinforced plastic (FRP) laminate skins with a lightweight thermoplastic foam core material. The panel exhibits excellent flame, smoke, and toxicity properties (FST) that meet stringent transit industry specifications for FST and is halogen free.

Dura-Core 1000 is compression molded in a 'sandwich' core construction yielding a strong, durable, one-piece composite. The composite system's physical properties also offer excellent corrosion and chemical resistance; providing very low moisture absorption and excellent resistance to a variety of harsh weather environments.

Whereas traditional plymetal flooring material is comprised of wood and metal weighing approximately 3.5 lbs. per sq. ft., Dura-Core 1000's composite weight is much lighter at 2.5 lbs. per sq. ft. This 28.6% weight reduction (SG=0.63), coupled with Haysite's unique compression molding process, offers viable energy savings and cost-efficiencies versus plymetal configurations.

Given the transit industry's critical concern of flame/smoke generation and smoke toxicity, Dura-Core 1000 has been tested using the following ASTM methods and provided excellent results.

ASTM E-162: Surface Flammability of Materials Using a Radiant Heat Energy Source.

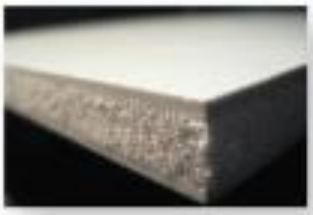
ASTM E-662: Specific Optical Density of Smoke Generated by Solid Materials.

BSS 7239: Toxic Gas Generation by Materials on Combustion.

TESTING / CONCLUSION:

Dura-Core 1000 has also been successfully tested for a small scale fire resistance to meet the ASTM E119 Flame Specification–the principal method to test the fire-resistance of a variety of flooring materials.

The test implemented a mocked up portion of a rail car using a 4' x 6' specimen of Dura-Core 1000 to withstand flame under a time vs. temperature curve. The final testing results indicated that the specimen did not emit smoke and gasses hot enough to ignite cotton waste at any time during the exposure. Notably, the testing exposure time for Dura-Core 1000 was in excess of 40 minutes–over 2.5 times more than the standard required minimum time of 15 minutes, and significantly longer than the new projected standard of 30 minutes.



haysite

ENGINEERING DATA			
	Dura - Core 1000		2/15/12
	Test Method	Units	Performance Value
Flame Resistance Properties			
Small Scale Fire Test	E-119	Time/Temp.	42 min
UL Flame Resistance	UL 94	Class	94 V-0
Radiant Panel - Flame Spread	E162	Flame Spread	11.79
Smoke Density @ 4.0 Minutes, Flaming	E-662	Optical Density	15.0
Smoke Density @ 1.5 Minutes, Flaming	E-662	Optical Density	0.9
Smoke Density @ 4.0 Min,Non- Flaming	E-662	Optical Density	0.3
Smoke Density @ 1.5 Min,Non- Flaming	E-662	Optical Density	0.2
Smoke and Toxicity Data			
Hydrogen Fluoride	SMP 800-C	PPM	0.5
Hydrogen Chloride	SMP 800-C	PPM	1.0
Hydrogen Bromide	SMP 800-C	PPM	0
Hydrogen Cyanide	SMP 800-C	PPM	0
Hydrogen Sulfide	BSS7239	PPM	0
Vinyl Chloride	BSS7239	PPM	0
Ammonia	BSS7239	PPM	0
Sulfur Dioxide	SMP 800-C	PPM	0
Oxides of Nitrogen	SMP 800-C	PPM	10.5
Carbon Dioxide	SMP 800-C	PPM	16,250
Carbon Monoxide	SMP 800-C	PPM	180
Mechanical Properties - Composite			
Tensile Strength - Flatwise	C-297	PSI	340
Flexural Properties - Peak Load	C-393	lbs.	442
Compressive Strength (Flatwise)	C-365	PSI	1,246
Shear Strength - Flatwise	C-273	PSI	280
Shear Modulus	C-273	PSI	23,500
Drum Peel	D-1781	lb/in	19.4
Indentation Resistance Test	SEPTA 3.3.5a BTP 1261	LBF	360#
Specific Gravity (¾")	D-792	g/cm3	0.63
Barcol Hardness	D-2583	Barcol Scale	57
Water Absorption - Composite	D-570	%/wgt.	0.51
Mechanical Properties - Core			
Water Absorption - Core Only	D-2842	lb/sq. ft.	0.0014
Foam Core Density	D-1622	lb/ft^3	9.4
Foam Core Compressive Strength	D-1621	PSI	261

Unless otherwise indicated, all properties published are based on test performed on standard ASTM test samples and according to ASTM test methods. Values shown are for test samples made from production materials and they are believed to be conservative. No warranty is to be construed, however, in fabricated or molded form, parts may vary considerably from this standard test data. Where specific or unusual applications arise, test should be made on actual parts, and test procedures agreed upon between Haysite Reinforced Plastics and the customer.