

MATERIAL PROPERTIES DATA SHEET

SOLID | STANDARD



High pressure decorative laminates (HPL), having thickness 2 mm or greater, according to EN 438-1:2016, EN 438-2:2016, EN 438-4:2016 and EN 438-8:2009, consisting of a surface of decorative paper(s), on one or both sides, impregnated with aminoplastic resins and a core made of layers of kraft paper impregnated with phenolic thermosetting resins. All the layers are bonded together with simultaneous application of heat (approximately 150°C) and high specific pressure (> 7 MPa) to obtain a homogeneous non-porous material with increased density.

When these laminates are self-supporting they are ready for installation.

They are available in the standard CGS and ATS and in the flame retardant CGF and ATF types.

The type suitable to be bent is also available, whose physical characteristics are identical to the CGS and ACS types, except for the fire property.

	Decor		Plain colours	Printed decors	Iridescent colours
	EN 438 classification		CGS/CGF	CGS/CGF	ACS/ATF
	Standard		EN 438-4	EN 438-4	EN 438-8

PROPERTIES	TEST METHOD	PROPERTY OR ATTRIBUTE	UNIT	VALUES
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SURFACE QUALITY

Surface quality	EN 438-2.4	Spots, dirt and similar surface defects	mm <sup>2</sup> /m <sup>2</sup>	≤ 1
		Fibres, hairs and scratches	mm/m <sup>2</sup>	≤ 10

DIMENSIONAL TOLERANCES

Dimensional tolerances	EN 438-2.5	Thickness tolerance	mm	± 0,20 for thickness 2,0 ≤ t < 3,0
			mm	± 0,30 for thickness 3,0 ≤ t < 5,0
			mm	± 0,40 for thickness 5,0 ≤ t < 8,0
			mm	± 0,50 for thickness 8,0 ≤ t < 12,0
			mm	± 0,60 for thickness 12,0 ≤ t < 16,0
			mm	± 0,70 for thickness 16,0 ≤ t < 20,0
			mm	± 0,80 for thickness 20,0 ≤ t < 25,0 to be agreed for thickness t ≥ 25,0
EN 438-2.6	Length and width	mm	+ 10 / - 0	
EN 438-2.7	Straightness of edges	mm/m	≤ 1,5	
EN 438-2.8	Squareness	mm/m	≤ 1,5	
EN 438-2.9	Flatness (measured on full-size sheet).	mm/m	≤ 8 for thickness 2,0 t < 6,0	
		mm/m	≤ 5 for thickness 6,0 ≤ t < 10,0	
		mm/m	≤ 3 for thickness 10,0 ≤ t	

GENERAL PROPERTIES

Resistance to surface wear	EN 438-2.10	Initial Point	Revolutions	≥ 150	≥ 100	n.a.	
Resistance to immersion in boiling water	EN 438-2.12	Mass increase - 2 ≤ t < 5 mm	%			CGS e ATS ≤ 5,0 - CGF e ATF ≤ 7,0	
		Mass increase - 5 ≤ t mm	%			CGS e ATS ≤ 2,0 - CGF e ATF ≤ 3,0	
		Thickness increase - 2 ≤ t < 5 mm	%				CGS e ATS ≤ 6,0 - CGF e ATF ≤ 9,0
		Thickness increase - 5 ≤ t mm	%				CGS e ATS ≤ 2,0 - CGF e ATF ≤ 6,0
		Appearance - Gloss Finish	Rating				≥ 3
Appearance - Other finish	Rating				≥ 4		
Resistance to water vapour	EN 438-2.14	Appearance - Gloss Finish	Rating			≥ 3	
		Appearance - Other finish	Rating			≥ 4	
Resistance to dry heat (160 °C/20')	EN 438-2.16	Appearance - Gloss Finish	Rating			≥ 3	
		Appearance - Other finish	Rating			≥ 4	
Resistance to wet heat (100 °C/20')	EN 438-2.18	Appearance - Gloss Finish	Rating			≥ 3	
		Appearance - Other finish	Rating			≥ 4	
Dimensional stability at elevated temperatures	EN 438-2.17	Cumulative dimensional change - 2 ≤ t < 5 mm	Longitudinal %			≤ 0,40	
		Cumulative dimensional change - 5 ≤ t mm	Longitudinal %			≤ 0,30	
		Cumulative dimensional change - 2 ≤ t < 5 mm	Transversal %			≤ 0,80	
		Cumulative dimensional change - 5 ≤ t mm	Transversal %			≤ 0,60	
Resistance to impact with large diameter ball	EN 438-2.21	Indentation diameter - 2 ≤ t < 6 mm with 1.4 m drop height	mm			h 1400 / d ≤ 10	
		Indentation diameter - 6 ≤ t mm with 1.8 m drop height	mm			h 1800 / d ≤ 10	
Resistance to crazing	EN 438-2.24	Appearance	Rating			≥ 4	
Resistance to scratching	EN 438-2.25	Appearance - Smooth Finishes	Rating			≥ 2	
		Appearance - Textured Finishes	Rating			≥ 3	
Resistance to staining	EN 438-2.26	Appearance - Group 1 & 2	Rating			≥ 5	
		Appearance - Group 3	Rating			≥ 4	
Light fastness (Xenon-arc)	EN 438-2.27	Contrast	Grey scale rating			≥ 4	
Flexural modulus	EN ISO 178	Stress	Mpa			≥ 9000	
Flexural strength	EN ISO 178	Stress	Mpa			≥ 80	
Electrostatic properties	EN 61340-4-1	Point to point resistance	Ω			1 x 10 <sup>9</sup> ÷ 1 x 10 <sup>11</sup>	
		Vertical resistance	Ω			1 x 10 <sup>9</sup> ÷ 1 x 10 <sup>11</sup>	
Density	EN ISO 1183	Density	g/cm <sup>3</sup>			≥ 1,35	

FIRE PERFORMANCES

Reaction to fire / CGS e ACS types	EN 13501	Classification - 6 ≤ t < 12 mm - metal frame	Class			C-s1,d0
		Classification - t ≥ 12 mm - metal frame	Class			ask for information
Reaction to fire / CGF e ACF types	EN 13501	Classification - 2,5 ≤ t - metal frame	Class			B-s1,d0
		Classification - 3 ≤ t < 6 mm - wood frame	Class			C-s2,d0
		Classification - t ≥ 6 mm - wood frame	Class			B-s1,d0

OTHER PROPERTIES

Thermal resistance / conductivity	EN 12664	Thermal resistance / conductivity	W/mK			0,2 to 0,5
Hygiene	NSF	NSF/ANSI 35	passing/not passing			pass
Formaldehyde emission	EN 717- 1	Chamber method	mg/m <sup>3</sup> ppm			0,020 - 0,035 0,015 - 0,030
	EN ISO 12460-3	Gas analysis	mg/(m <sup>2</sup> x h)			0,3 ÷ 0,4
	EN 13986	Classification	Class			E1
Volatile Organic Chemical Emissions	Greenguard Certification Low Chemical Emission UL 2818 according to EPA TO-17 e ASTM D 6196 EPA TO-11A e ASTM D 5197	Individual VOCs	TLV			≤ 0,1
		Formaldehyde	ppm			≤ 0,025
		Total VOC	mg/m <sup>3</sup>			≤ 0,25
		Total Aldehydes	ppm			≤ 0,05
		4-Phenylcyclohexene	mg/m <sup>3</sup>			≤ 0,0033
Total respirable particles	mg/m <sup>3</sup>			≤ 0,025		
Contact with food - Overall migration	EN 1186-3	3% acetic acid 24h at 40°C				< 10
	EN 1186-3	50% ethanol 24h at 40°C				< 10
	EN 1186-14	95% ethanol 24h at 40°C				< 10
	EN 1186-14	isooctane 24h at 40°C				< 10
Contact with food - Formaldehyde specific migration	EN 13130-23	3% acetic acid 24h at 40°C	mg/kg			< 15
Evaluation of micro-organisms action	EN ISO 846	Microbial growth - Smooth finish	Rating			0 - no microbial growth
		Microbial growth - Textured finish	Rating			1 - slight and slow microbial growth

Note to laminates with adhesive protective film

The protective films are designed for temporary surface protection against dirt, scratches and tool marks; they are not designed for protection against corrosion, humidity or chemicals.

The laminates covered with the protective film shall be stored in a clean, dry place at room temperature (optimum 20°C), avoiding weathering and UV exposure.

The protective film must be removed from the surface of the laminates after the application and before putting into use the finite element.

In case of thick laminate with the protective film on both sides, it must always be removed from both sides at the same time.

In any case, the removal must be made within six months from the date of shipment by Arpa Industriale.

Pay close attention to heating in case of postforming. The Customer has to test the postforming process conditions and carry a trial prior to go in a full scale production.

Arpa Industriale cannot be responsible for the misuse of the laminates covered with the protective film, nor for the consequences for non-recommended applications.

Note to digital printing decoratives

For the chemical-physical characteristics of digital printing, the laminates with these decors may present a limitation in the applications, such as the repeated and intense contact with water or vapour. Customers are asked to contact the Customer Service Arpa Industriale to evaluate the best solution.

Note to surface wear resistance

In the case of structured finishes, the surface wear resistance values may be 10 or more revolutions lower than the nominal values in proportion to how much more is accentuated the shape.

Disclaimer

The Product Technical Sheets provide all the technical information relevant to the performance of the product as tested by Arpa Industriale or certified testing agencies. Arpa Industriale maintains the right to change and alter the product composition and production process and thereby the performance characteristics of the product at all times, as reported to the Arpa Industriale website. Customers and end-users of the product are requested to check for the latest technical information regarding the products performance on the website of Arpa Industriale before application. In any case, Arpa Industriale, in every contractual relationship, will refer only to the technical information published on its website. Arpa Industriale will not assume any liability if the end-user or customer refer to any other technical information of the products.