

G-Defence-Lam HPL / CPL Technical Data Sheet (1)

Characteristics	Test Method	Tested Value	Required Value
Thickness	EN 438-2 Section 5	According to the Required Thickness	$0.5 \leq t \leq 1.0 \text{ mm} : \pm 0.10 \text{ mm}$ $1.0 < t < 2.0 \text{ mm} : \pm 0.15 \text{ mm}$
Density	ISO 1183 - 1	1.4 gr/cm ³	Min. 1.35 gr/cm ³
Flatness	EN 438-2 section 9 HGS ⁽¹⁾ , HGP ⁽²⁾ VGS ⁽³⁾ , VGP ⁽⁴⁾	35 mm 40 mm	60 mm/m max. deviation
Wear Resistance⁽⁷⁾	EN 438-2 section 10 HGS, HGP VGS, VGP	IP = 185 Rev. Wear Value = 485 Rev. IP = 76 Rev. Wear Value = 198 Rev.	Initial Point $\geq$ 150 Rev. Wear Value $\geq$ 350 Rev. Initial Point $\geq$ 50 Rev. Wear Value $\geq$ 150 Rev.
Scratch Resistance⁽⁷⁾	EN 438-2 section 25 VGS, VGP HGS, HGP	2 N 4 N	Flat Surface Min. 1 N Textured Surface Min. 2 N Flat Surface Min. 2 N Textured Surface Min. 3 N
Impact Resistance	EN 438-2 Small Ball section 20 VGS, VGP HGS, HGP Big Ball section 21 VGS, VGP HGS, HGP	18 N 22 N No Crack, 4.5 mm No Crack, 3.5 mm	Min. 15 N Min. 20 N 600 mm height : no crack, 10 mm Max. 800 mm height : no crack, 10 mm Max.

Characteristics	Test Method	Tested Value	Required Value ⁽²⁾
Dimensional Stability at Elevated Temp.	EN 438-2 section 17 VGS , VGP HGS , HGP	 %L = 0.45 ; %T = 1.08 %L = 0.38 ; %T = 0.92	Max. values %L = 0.75 ; %T = 1.25 %L = 0.55 ; %T = 1.05
Resistance to Immersion in Boiling Water	EN 438-2 section 12 VGS , VGP Glossy Surface Finish Other Surface Finish HGS , HGP Glossy Surface Finish Other Surface Finish	 4 5 4 5	Rating Min. 3 4 3 4

G-Defence-Lam HPL / CPL Technical Data Sheet (2)

Characteristics	Test Method	Tested Value	Required Value
Resistance to Dry Heat (@ 180°C)	EN 438-2 section 16		Rating Min.
	VGS , VGP		
	Glossy Surface Finish	4	3
	Other Surface Finish	5	4
	HGS , HGP		
	Glossy Surface Finish	4	3
	Other Surface Finish	5	4
Resistance to Wet Heat (@ 100°C)	EN 12721:1997		Rating Min.
	VGS , VGP		
	Glossy Surface Finish	4	3
	Other Surface Finish	5	4
	HGS , HGP		
	Glossy Surface Finish	4	3
	Other Surface Finish	5	4
Resistance to Water Vapor	EN 438-2 section 14		Rating Min.
	VGS , VGP		
	Glossy Surface Finish	4	3
	Other Surface Finish	5	4
	HGS , HGP		
	Glossy Surface Finish	4	3
	Other Surface Finish	5	4
Resistance to Cigarette Burn	EN 438-2 section 30		Min. Level
	VGS , VGP	4	3
	HGS , HGP	4	3
Resistance to Staining	EN 438-2 section 26		Rating Min.
	VGS , VGP		
	Group 1 & 2	5	5
	Group 3	4	4
	HGS , HGP		
	Group 1 & 2	5	5
	Group 3	4	4
Flatness	EN 438-2 section 9 CGS		
	$2.0 \leq t < 6.0$ mm	1.23 mm	Max. 8 mm / 1 M length
	$6.0 \leq t < 10.0$ mm	1.46 mm	Max. 5 mm / 1 M length
	$t \geq 10.0$ mm	1.87 mm	Max. 3 mm / 1 M length

G-Defence-Lam HPL / CPL Technical Data Sheet (3)

Characteristics	Test Method	Tested Value	Required Value
Determination of Formaldehyde Release HPL 0.7 mm HGP	EN 717-2 : 1999 Gas Analysis	0.191 mg/m ² h	≤ 3.5 mg/m ² h
Formaldehyde Emission	EN 717-1 0.7 mm CPL HGP / VGP	≤ LOQ(9) mg/m ³ ≤ LOQ(9) ppm	≤ 0.124 0.1 ppm (E0 Class)
	0.9 mm HPL HGS / VGS	0.03 mg/m ³ 0.02 ppm	≤ 0.124 0.1 ppm (E1 Class)
Release of Dangerous Substances	UNI EN 16516 : 2020 0.7 mm CPL HGP / VGP	0.037 mg/m ³ 0.03 ppm	≤ 0.124 0.1 ppm (E0.5 Class)
	0.9 mm HPL HGS / VGS	0.075 mg/m ³ 0.06 ppm	≤ 0.124 0.1 ppm (E0.5 Class)
PAH Content (Polycyclic Aromatic Hydrocarbons)	AfPS GS 2014:01 PAK Category 2	< 0.2 mg/kg	< 0.5 mg/kg
Light fastness (Xenon Arc)	EN 438-2 section 27		Contrast Grey Scale Rating
	VGS , VGP HGS , HGP	5 5	4 – 5 4 - 5

Characteristics	Test Method	Tested Value	Required Value ⁽²⁾
Formability Radius	EN 438-2 section 31 / 32 HGP , VGP		
	L (Machine Direction)	R5	≤ 10 x laminate nominal thickness
	T (Cross Direction)	R6	≤ 20 x laminate nominal thickness
Fire Classification⁽⁸⁾	EN 13501-1		
	t ≥ 0.9 mm CPL HGS/VGS	B S1 d0	C S2 d0
	t ≥ 0.6 mm HPL HGF/VGF	B S1 d0	C S2 d0
	IMO Resolution(8a) MSC 307(88) (2010 FTP Code) Annex 1 : Part 2 & Part 5	See G-Lam-Marine TDS	See G-Lam-Marine TDS
Resistance to Immersion in Boiling Water	EN 438-2 section 12		Rating Min.
	VGS , VGP		
	Glossy Surface Finish	4	3
	Other Surface Finish	5	4
	HGS , HGP		
	Glossy Surface Finish	4	3
	Other Surface Finish	5	4

G-Defence-Lam HPL / CPL Technical Data Sheet (4)

Characteristics	Test Method	Tested Value	Required Value
Antibacterial Activity^{(10),(13)}	JIS Z 2801 : 2012		
	Staphylococcus Aureus (DSM 346) ⁽¹¹⁾	$R^{(12)} = 4.0$	$R^{(12)} \geq 2.00$
	E. Coli (DSM 1576) ⁽¹¹⁾	$R^{(12)} = 4.0$	$R^{(12)} \geq 2.00$
	ISO 22196 : 2011		
	Staphylococcus Aureus (DSM 346) ⁽¹¹⁾	$R^{(12)} = 4.0$	$R^{(12)} \geq 2.00$
	E. Coli (DSM 1576) ⁽¹¹⁾	$R^{(12)} = 4.0$	$R^{(12)} \geq 2.00$
Resistance to Blister	EN 438-2 section 33 / 34 HGP , VGP $t_2 - t_1$ (Sec)		
	Nominal Thickness < 0.8 mm	15	≥ 10
	Nominal Thickness ≥ 0.8 mm	18	≥ 15
Antiseptics & Sanitizers Surface Resistance	Gentas Internal test Method	See Table below	---
Contact With Food – Overall Migration⁽⁶⁾	EN 1186-3 ⁽⁵⁾ Acetic Acid 3% w/w	9.6 mg/dm ²	< 10 mg/dm ²
	EN 1186-14 ⁽⁵⁾ Ethanol 10% w/w	4.3 mg/dm ²	< 10 mg/dm ²
	EN 1186-14 ⁽⁵⁾ Ethanol 95% w/w	< 2 mg/dm ²	< 10 mg/dm ²

Characteristics	Test Method	Tested Value	Required Value ⁽²⁾
Chlorine Surface Resistance	Gentas Internal test Method	See Table below	---
Hydrogen Peroxide Surface Resistance	Gentas Internal test Method	See Table below	---

Remarks:

- (1) HGS = Horizontal Grade Standard Laminate
- (2) HGP = Horizontal Grade Post Forming Laminate
- (3) VGS = Vertical Grade Standard Laminate
- (4) VGP = Vertical Grade Post Forming Laminate
- (5) Migration test conducted at 40°C for 24 hours
- (6) CoC available upon request (ISEGA 37314 U 14)
- (7) The Wear and Scratch resistance represent an average values between different types of decors and Finishes tested with a decorative laminate (HPL / CPL) applied with an Overlay layer .
For a specific value of a decorative laminate with / without overlay layer , please contact sales Department .
- (8) The Fire Classification refer to thin laminates bonded with FR adhesive on Non Combustible A Class Core substrate (Such as Calcium Silicate boards) . For further detailed information , Please Refer to Fire Resistance Explanation Sheet .
- (8a) Fire classification and certifications for marine use laminates are available within the G-Lam-Marine TDS
- (9) LOQ : Limit Of Quantification (0.02 mg/m³)
- (10) The Antibacterial activity is tested with 2 different types of Bacteria and according to 2 standards . For each test method of bacteria , test reports are available upon request
- (11) DSM Number refers to a specific accession number assigned to bacterial strains and other microorganisms in the DSMZ (Deutsche Sammlung von Mikroorganismen und Zellkulturen)
- (12) Log₁₀ reduction from initial CFU cm⁻²
- (13) G-Defence-Lam is available in 2 surfaces : Bute (CPL) and Velur (HPL) . For any other surface please ask sales team.

Chlorine Surface Resistance Test⁽⁶⁾**3096⁽¹⁾ / 4596⁽²⁾ ; 1 mm⁽³⁾ ; Velur Finish ; 1000 ppm concentration⁽⁴⁾**

Duration ⁽⁵⁾ Decor	1 Hour	2 Hour	4 Hour	8 Hour	12 Hour	24 Hour
3096⁽¹⁾ Rating Scale⁽⁷⁾	0	0	0	0	0	0
4596⁽²⁾ Rating Scale⁽⁷⁾	0	0	0	0	0	0

3096⁽¹⁾ / 4596⁽²⁾ ; 1 mm⁽³⁾ ; Velur Finish ; 10,000 ppm concentration⁽⁴⁾

Duration ⁽⁵⁾ Decor	1 Hour	2 Hour	4 Hour	8 Hour	12 Hour	24 Hour
3096⁽¹⁾ Rating Scale⁽⁷⁾	0	0	0	0	0	0
4596⁽²⁾ Rating Scale⁽⁷⁾	0	0	0	0	0	0

Remarks:

(1) 3096 Plain décor HGS

(2) 4596 Printed décor HGS

(3) 1 mm pressed in Velur finish

(4) 1000 and 10,000 ppm water base solutions

(5) Duration according to Tables ; Test method according to the below instructions ; Rating Scale according to the below instructions

(6) Test method :

- With a pipette drop 5 drops from the tested concentration and cover with a laboratory glass cover
- After the required duration , remove the glass cover , rains with water and wiper with a dry cotton cloth
- Examine the tested samples according to the below rating scale and advice with a test report

(7) Rating Scale : Level 0 – No Detectable Change for naked eye

Level 1 – Slight Change in Color or Gloss or surface structure

Level 2 – Slight Surface Etching or Severe Staining

Level 3 – Pitting / Cracking / Swelling / Erosion of the surface

Level 4 - Obvious & Significant Deterioration of the surface

Hydrogen Peroxide Surface Resistance Test^(1,5) :3103⁽²⁾ ; 1 mm Matt Finish⁽³⁾

Duration ⁽⁴⁾ Decor	12 Hours	24 Hours
3103 ⁽²⁾ Rating Scale ⁽⁶⁾	0	0

Remarks :

- 1) Hydrogen Peroxide 30% (H₂O₂ 30%)
- 2) 3103 Plain décor HGS
- 3) 1 mm pressed in Matt Finish
- 4) Exposure Duration according to Tables
- 5) Test method :
 - With a pipette place 5 drops from the tested H₂O₂ 30% and cover with a laboratory glass cover
 - After the required duration , remove the glass cover , rains with water and wiper with a dry cotton cloth
 - Examine the tested samples according to the below rating scale and advice with a test report
- 6) Rating Scale : Level 0 – No Detectable Change for naked eye
 - Level 1 – Slight Change in Color or Gloss or surface structure
 - Level 2 – Slight Surface Etching or Severe Staining
 - Level 3 – Pitting / Cracking / Swelling / Erosion of the surface
 - Level 4 - Obvious & Significant Deterioration of the surface

Antiseptics & Sanitizers Surface Resistance Test^(1,8) :3103⁽²⁾ ; 1 mm Matt Finish⁽³⁾

Duration(4) Reagent	12 Hours Rating ⁽⁹⁾	24 Hours Rating ⁽⁹⁾
Benzethonium Chloride 2%⁽⁵⁾	0	0
Domiphen Bromide 4% ⁽⁶⁾	0	0
Benzalkonium Chloride 4%⁽⁷⁾	0	0
Isopropyl Alcohol (IPA 70%)	0	0

Remarks:

- 1) The surface resistance is tested against common Antiseptics and Sanitizers available and common in the market
- 2) 3103 Plain décor HGS
- 3) 1 mm pressed in Matt Finish
- 4) Exposure Duration according to Tables .
- 5) Benzethonium Chloride 2% (Antiseptic & Disinfectant)
- 6) Domiphen Bromide 4% (Antiseptic)
- 7) Benzalkonium Chloride 4% (Antiseptic)
- 8) Test method :
 - With a pipette place 5 drops from the tested reagent and cover with a laboratory glass cover
 - After the required duration, remove the glass cover , rains with water and wiper with a dry cotton cloth
 - Examine the tested samples according to the below rating scale and advice with a test report
- 9) Rating Scale : Level 0 – No Detectable Change for naked eye
 Level 1 – Slight Change in Color or Gloss or surface structure
 Level 2 – Slight Surface Etching or Severe Staining
 Level 3 – Pitting / Cracking / Swelling / Erosion of the surface
 Level 4 - Obvious & Significant Deterioration of the surface