MOTIV IN RESOPAL® HPL
PRODUCT DATA SHEET

1. MATERIAL DESCRIPTION AND COMPOSITION

Motiv in RESOPAL HPL is a decorative high-pressure laminate (HPL) board according to DIN EN 438 and ISO 4586.

Motiv in RESOPAL HPL is boarding that consists of layers of fibrous cellulose (normally paper) impregnated with thermoset synthetic resin. These harden under heat and high pressure. The process of simultaneously applying heat (> 120°C) and high specific pressure (> 5 MPA) allows the thermoset synthetic resin to flow and then harden. This creates a homogeneous and pore-free material (bulk density > 1.35 g/cm³) with the desired surface.

More than 60% of Motiv in RESOPAL HPL is comprised of paper. The remaining 30-40% is comprised of phenol-formaldehyde resin for core layers and melamine-formaldehyde resin for the decorative layer.

In contrast to the general standard construction of HPL, these boards feature customised digital prints as opposed to printed or dyed decorative paper. High-resolution and print-ready data are printed on special paper with light and heat-resistant ink which is subsequently pressed into the HPL.

These motifs are permanently protected under the crystal-clear melamine resin layer to allow them to withstand general wear and tear in interior spaces.

Motiv in RESOPAL HPL is available in a variety of dimensions, thicknesses and surfaces. The product is available in two grades: Standard (S); and Flame-retardant (F).

If greater protection against fire is required, the laminate core may be treated with a halogen-free additive.

A product structure that enables the high-quality printed motif layer to be embedded between the core and top layer has been specially chosen. This HPL modification must also be taken into account when handling and machining (see point 6).

2. FORMATS

Sheet format Length x width x thickness (mm)	Maximum utilisable area Length x width x thickness (mm)	Surface / texture	Notes
3650 x 1320 x 1.0	3600 x 1300 x 1.0	see RESOPAL Collection	
3050 x 1320 x 1.0	3000 x 1300 x 1.0	see RESOPAL Collection	Excludes texture “AJ”
2350 x 1320 x 1.0	2300 x 1300 x 1.0	-60, -EM	
2180 x 1320 x 1.0	2150 x 1300 x 1.0	-60, -EM, -WH, -WS	
2180 x 1020 x 1.0	2150 x 1000 x 1.0	-60, -EM, -WH, -WS	
2180 x 0915 x 1.0	2150 x 0890 x 1.0	-60, -EM, -WH, -WS	

Protective film: upon request

This overview does not constitute our entire range of available products. Find all available products at: **www.resopal.de/infobook**

3. TECHNICAL DATA

3.1 TECHNICAL PROPERTIES ACCORDING TO DIN EN 438-3 (MOTIV IN RESOPAL® HPL)

PROPERTY	TEST METHOD	UNIT	HGS - HGF	VGS - VGF
Physical and Dimensional properties				
Density	EN ISO 1183-1	g/cm³	1.35	1.35
Thickness	DIN EN 438-2 – 5	mm	1.0mm ≤ t < 2.0mm ± 0.15mm	1.0mm ≤ t < 2.0mm ± 0.15mm
Length and width	DIN EN 438-2 – 6	mm	+10mm / -0mm	+10mm / -0mm
Edge straightness	DIN EN 438-2 – 7	mm/m	≤ 1.5mm/m	≤ 1.5mm/m
Edge squareness	DIN EN 438-2 – 8	mm/m	≤ 1.5mm/m	≤ 1.5mm/m
Flatness	DIN EN 438-2 – 9	mm/m	≤ 60mm/m	≤ 60mm/m
Dimensional stability at elevated temperature	DIN EN 438-2 – 17	Cumulative dimensional change	0.55 1.05	0.75 1.25
Mechanical properties				
Resistance to immersion in boiling water	DIN EN 438-2 – 12	Rating (min.) [1] Glossy surfaces Other surfaces	 1 1	 1 1
Resistance to impact by small-diameter ball	DIN EN 438-2 – 20	N (min.)	20	15
Resistance to impact by large-diameter ball (optional)	DIN EN 438-2 – 21	Drop height mm (min.) Indent diameter mm (max.)	800 10	600 10
Resistance to cracking under stress	DIN EN 438-2 – 23	Rating (min.)	3	3
Surface properties				
Dirt, spots and similar surface defects Fibres, hairs and scratches	DIN EN 438-2 – 4	mm²/m² (max.) mm/m²	1,0 10	1,0 10
Resistance to surface wear	DIN EN 438-2 – 10	Number of revolutions (min.) Initial abrasion point	150	50
Resistance to water vapour	DIN EN 438-2 – 14	Rating (min.) Glossy surfaces Other surfaces	 1 1	 1 1
Resistance to dry heat (160°C)	DIN EN 438-2 – 16	Rating (min.) Glossy surfaces Other surfaces	 3 3	 3 3
Resistance to wet heat (100°C)	DIN EN 438-2 – 18	Rating (min.) Glossy surfaces Other surfaces	 3 3	 3 3
Resistance to scratching	DIN EN 438-2 – 25	Rating[2] (min.) Glossy surfaces Other surfaces	 2 3	 1 2
Resistance to staining	DIN EN 438-2 – 26	Groups 1 and 2 Group 3	5 4	5 4
Light fastness (xenon arc)	DIN EN 438-2 – 27	Grey scale rating	4 to 5	4 to 5

HGS: H (horizontal grade), G (general purpose), S (standard grade) | **HGF**: H (horizontal grade), G (general purpose), F (flame-retardent grade)
VGS: V (vertical grade), G (general purpose), S (standard grade) | **VGF**: V (vertical grade), G (general purpose), F (flame-retardent grade)
[1] Rating 5 (no visible change); 4 (slight change of gloss and/or colour, only visible at certain viewing angles); 3 (moderate change in gloss and/or colour); 2 (Marked change of gloss and/or colour or surface blistering); 1 (Surface layers delamination)
[2] ≥ 90 % continuous double circle of scratch marks clearly visible rating: 1 – 1N, 2 – 2N, 3 – 4N, 4 – 6N, 5 – > 6N.

PROPERTY	TEST METHOD	UNIT	HGS - HGF	VGS - VGF
Postforming properties (postformability)				
Postformability	DIN EN 438-2 – 31 or 32	Radius (mm) longitudinally transversely	Not postformable	Not postformable
Fire behaviour				
Fire behaviour[3] (type HGS/VGS)	DIN EN 13501-1	Building material class	D-s2, d0	D-s2, d0
Fire behaviour [3] (type HGF/ VGF)	DIN EN 13501-1	Building material class	C-s2, d0	C-s2, d0
Thermal value	EN ISO 1716	MJ/kg	18 – 20	18 – 20
Health and environment				
Certificate of Compliance (contact with food)	DIN EN 1186 / 13130 / CEN/TS 14234	Passed	Yes	Yes
Formaldehyde	EN 16516	Classification	E1	E1
Resistance to impact Volatile organic compounds (VOC)	EN ISO 16000-9	Emissions class pursuant to French regulation (Décret no. 2011-321)	A	A
Environmental product declaration (EPD)[4]	ISO 14025 / DIN EN 15804	Available	Yes	Yes
Antibacterial effect	JIS Z 2801	Reduction in %	99.99	99.99

HGS: H (horizontal grade), G (general purpose), S (standard grade) | **HGF**: H (horizontal grade), G (general purpose), F (flame-retardent grade)
VGS: V (vertical grade), G (general purpose), S (standard grade) | **VGF**: V (vertical grade), G (general purpose), F (flame-retardent grade)
[3] See details (e.g. classification report / European Union Official Journal); i.a. validity in conjunction with substrate / adhesive system
[4] ICDLI environmental declaration (EPD - EPD-ICL-20170155-CBE1-EN) from 13/11/2017

3.2 ADDITIONAL TECHNICAL PROPERTIES

Physical state	Solid
Solubility	Insoluble in water, oil, methanol, diethyl ether, n-octanol, acetone
Boiling point	None
Evaporation rate	None
Melting point	Motiv in RESOPAL HPL does not melt
Calorific value	18 – 20 MJ/kg
Heavy metals	Motiv in RESOPAL HPL contains no toxic compounds based on antimony / barium / cadmium / chromium III / chromium VI, lead / mercury / selenium
Asbestos	Motiv in RESOPAL HPL contains no asbestos
Pentachlorophenol (PCP)	No particles present
RoHS	Motiv in RESOPAL HPL meets the requirements of EU guidelines 2011/65, 2015/863 RoHS (Restriction of Hazardous Substances). Motiv in RESOPAL HPL contains none of the following restricted substances: lead, mercury, cadmium, chromium, polybrominated biphenyls (PBB), polybrominated diphenyl ether (PBDE), pentabromodiphenyl ether (PentaBDE), octabromodiphenyl ether (OctaBDE); Bis(2-ethylhexyl)phthalate (DEHP) butyl benzyl phthalate (BBP) dibutyl phthalate (DBP) diisobutyl phthalate (DIBP)
Safety data sheet	Motiv in RESOPAL HPL boards are not hazardous substances within the meaning of the Chemicals Act / no special labelling or safety data sheet is required.
Stability	Motiv in RESOPAL HPL is stable and durable; it is neither reactive nor corrosive
Hazardous reactions	None
Incompatibility	Strong acids or alkaline solutions may damage the surface
Ignition temperature	approx. 400°C
Flashpoint	None
Thermal decomposition	Possible above 250°C. Toxic gases (e.g. carbon monoxide, carbon dioxide, ammonia) may arise depending on the fire conditions (temperature, oxygen content, etc.).
Flammability	Motiv in RESOPAL HPL is classified as non-flammable. It only burns in real fires in which open flames are present.
Extinguishing agent	Class A
Explosion hazards	ST-1
Explosion limits	60mg/m³
Electrostatic behavior	It mimimizes the generation of charge by contact-separation or rubbing with another material. It does not need to be earthed. Surface resistivity is between 109 – 10^{12} ohms and a chargeability of V < 2 kV according to DIN EN 61340-4-1 is V < 2 kV. Thus, so that HPL are antistatic material.

4. CERTIFICATIONS AND TESTS

PROPERTY	TEST METHOD	UNIT	HGS - HGF	VGS - VGF
Certifications				
Fire behaviour: structural engineering[3]	DIN EN 13501-1	Building material class	HGF : C-s2,d0 (wood-based substrate chipboard) HGS : D-s2,d0 (CWFT)	VGF: C-s2,d0 (wood-based substrate chipboard) VGS: D-s2,d0 (CWFT)
Fire behaviour: transport trains[3]	DIN EN 45545-2	Class	HGF: 0.8mm – 2.0mm HL 2	VGF: 0.8mm – 2.0mm HL 2
Volatile organic compounds (VOC)	ISO 16000	Emissions class pursuant to French regulation (Décret n°.2011-321)	A (Scenario Wall) A+ (Scenario Door)	A (Scenario Wall) A+ (Scenario Door)
Formaldehyde	EN 16516	Classification	E1	E1
Certificate of compliance (contact with food)	DIN EN 1186 / 13130 / CEN/TS 14234	Passed	Yes	Yes
Environmental product declaration (EPD)4	ISO 14025 / DIN EN 15804	Available	Yes	Yes
Antibacterial effect	JIS Z 2801	Reduction in %	99.99	99.99
PEFC			Upon request	Upon request
FSC			Upon request	Upon request

5. STORAGE AND TRANSPORT

Motiv in RESOPAL HPL must be stored in a closed storage area under normal indoor conditions (10-30°C and 40-65% relative humidity). In addition, Motiv in RESOPAL HPL must be protected against moisture and mechanical damage. It must be transported and stored flat, horizontal, with full-surface contact and flush on a sufficiently large pallet, and covered with plastic. The top sheet in a stack must be covered with protective film and weighted down with a (laminated) cover plate. These storage conditions must also be maintained whenever one or more sheets is removed from the stack. If being stored for a longer time, it is important to ensure that Motiv in RESOPAL HPL is stored flat, as it may otherwise warp or deform. If horizontal storage is not possible, we recommend storing in an inclined position at an angle of 80° with full-surface support and a counterbearing on the floor to prevent slipping.

Motiv in RESOPAL HPL must be transported on a horizontal, level surface of sufficient size (e.g. pallet) to prevent the panels from slipping.

Under these transport conditions, Motiv in RESOPAL HPL panels are not considered dangerous goods; labelling as such is not required.

6. HANDLING AND MACHINING

Conventional safety regulations with regard to dust removal and fire protection must be observed when handling and machining Motiv in RESOPAL HPL. Because of possible sharp edges, protective gloves should always be worn when handling Motiv in RESOPAL HPL. Contact with dust does not cause any particular problems; however, a small number of people may have an allergic reaction to processing dust of any kind (and thus also to HPL dust).

Motiv in RESOPAL HPL is a wood-based product and its dimensions are constantly adapting to ambient conditions. The product can be machined with woodworking machines.

Manufacturing tolerances of ±8 mm in length and ± 3 mm in width must be taken into account with Motiv in RESOPAL HPL panels. This can lead to deviations in the dimensional accuracy. Due to these manufacturing-related dimensional tolerances, concurrent lengthwise and widthwise repeats are only possible to a limited extent.

For this reason, panels with unfolding motif must be cut starting from the centre. A cut starting from the outside can lead to the pattern becoming misaligned.

All panels must be laid out around the circumference, based on the usable area (see point 2 Models), with a trim allowance of at least 10 mm. If the motif unfolds over several panels, the accuracy of the fit decreases as the size of the motif increases. The allowance for cutting must therefore be increased proportionally.

Due to production-related reasons, the motif may not run parallel to the edge of the plate.

If Motiv in RESOPAL HPL is equipped with plain or printed decors in combination with RESOPAL HPL / Compact, checks must be carried out to ensure that possible deviations in the decor colour between the two products are within the desired specification.

Cut marks are placed outside the motif and serve solely as a cutting guide. Ultimately, the cut must be based on the positioning of the motif.

Motiv in RESOPAL HPL's special structure ensures each individual decor is protected. This should be taken into account when selecting tools and especially during conditioning.

Motiv in RESOPAL HPL and its substrate must be stacked and conditioned together before processing (> 3 days). Good conditioning is achieved in a moderate interior climate (10-30°C and 40-65% relative humidity). These conditions are also recommended for the location where the product will later be used. These recommendations apply to temperate climates.

If the composite element to be manufactured will be exposed to consistently low humidity during its subsequent use, it is advisable to expose the HPL and substrate to a correspondingly low level of humidity or increased temperature during conditioning.

The following adhesives can be used to adhere Motiv in RESOPAL HPL to a wood substrate:

- Dispersion adhesive: e.g. PVAc (polyvinyl acetate) adhesive
- Condensation resin adhesive: e.g. urea resin adhesive
- Melt adhesive: e.g. hot melt

Tension-free composite elements are most safely produced at press temperatures of 20°C.

Higher press temperatures allow for a reduction in setting time. Because the dimensional changes of Motiv in RESOPAL HPL compared to the substrate are temperature-dependent, press temperatures should not exceed 60°C in order to avoid increased tension.

With regard to selecting the proper adhesive for Motiv in RESOPAL HPL, we recommend consulting the manufacturer.

When manufacturing composite elements with Motiv in RESOPAL HPL, it is especially important to ensure that tension is equalised in the element. We therefore always recommend a symmetrical structure or using special backer. This must be taken into account especially when using self-supporting or non-structural composite elements (e.g. fronts in furniture construction). In the case of structural or non-self-supporting composite elements (e.g. ceiling and wall cladding), asymmetrical composite elements can also be produced depending on the application.

The production of non-symmetrical elements is the responsibility of the manufacturer. If the structure is not symmetrical, we recommend conducting preliminary tests to check feasibility with regard to the respective application.

If a protective film is used for transport, it must be removed on both sides no later than six months after delivery.

More information on the handling and machining of Motiv in RESOPAL HPL can be found in the technical handbook in chapter 3: General Processing recommendations for RESOPAL HPL.

7. CLEANING AND CARE

Motiv in RESOPAL HPL is neither corrosive nor does it oxidate. No further surface treatment (e.g. paint or varnish) is required. All decorative Motiv in RESOPAL HPL surfaces can be cleaned with a mild soap solution. Stubborn marks (e.g. paint) can be removed using organic solvents (e.g. ethanol, acetone). Do not use abrasive cleaning supplies (e.g. scouring powder, steel wool) as they will alter the surface.

We recommend always testing an inconspicuous area with the cleaning agent before cleaning.

Further information about cleaning and care of RESOPAL HPL can be found in cleaning and care technical data sheets.

Please note:
Changes in the HPL surface (e.g. scratches, abrasion, dirt) from daily use are influenced, among other things, by the decor used and its texture.

8. Sustainability and the Environment

Resopal is DIN EN ISO 14001 and DIN EN ISO 50001 certified.

Motiv in RESOPAL HPL is a cured and therefore inert duroplast. The release of formaldehyde from Motiv in RESOPAL HPL (< 0.05 ppm in testing according to DIN EN 16516) is far below the legally permissible level (< 0.1 ppm according to the German chemical prohibition ordinance).

Furthermore, the emissions of volatile organic compounds (VOC) are so low that, depending on the test scenario, the following classifications according to the French VOC regulation have been given:

- Class A+ (with the test scenario for small areas (e.g. doors) with a loading factor of 0.05 m^2/m^3)
- Class A (with the test scenario for walls with a loading factor of 1.0 m^2/m^3)

Motiv in RESOPAL HPL can come into direct contact with all foods and can safely be used as intended in food processing.

Motiv in RESOPAL HPL is an excellent and durable surface material that is used in a wide variety of applications. The ICDLI's Environmental Product Declaration (EPD) outlines HPL's excellent environmental properties. Using clearly defined parameters, it provides quantitative, verified and objective information about the effects of HPL on the environment. The entire lifecycle of HPL (raw material extraction, production, transport, use, disposal) is taken into consideration.

Motiv in RESOPAL HPL can be produced as a PEFC or FSC certified product upon request.

Plus, all paper used (core paper and decorative paper) comes from non-controversial or controlled sources and meets EUTR Act (EU) No. 995/2010 requirements.

Motiv in RESOPAL HPL is a product and not a chemical substance, so the REACH ordinance is not applicable. It is, however, important to ensure information is exchanged with raw material suppliers in regard to REACH-relevant components (see REACH ordinance technical data sheet for more information).

9. DISPOSAL AND ENERGY RECOVERY

Motiv in RESOPAL HPL can be disposed of at controlled waste disposal facilities (e.g. landfills) that comply with current national and regional regulations. According to the regulation on the European Waste Catalogue, HPL waste is classified with the code 200301 (mixed municipal waste).

Due to its high calorific value (18-20 MJ/kg), Motiv in RESOPAL HPL is particularly well-suited for thermal recycling. When completely combusted at 700°C, the boards burn to water, carbon dioxide and nitrogen oxides. Motiv in RESOPAL HPL boards thus meet the requirements for energy recovery in accordance with § 8 of the German Recycling Management Act.

The conditions for good combustion are met in modern, officially approved industrial incineration facilities. The ashes from these incineration processes can be brought to controlled landfills.

10. AREAS OF APPLICATION

Pursuant to DIN EN 438, typical areas of application for HPL classifications HGS (horizontal use, general use, standard quality) and HDF (horizontal use, general use, flame-retardant) are areas such as:

- Kitchen and office worktops
- Restaurant and hotel tables
- Doors and wall cladding in public spaces
- Interior wall claddings for public transport
- Transportation (trains, buses)

11. OVERVIEW OF TECHNICAL DOCUMENTS NAMED ABOVE

Brochures

Official Journal European Union 13501-1 D-s2,d0

Declaration of Conformity RoHS

Classification report DIN EN 13501 Cs2, d0

Test Report DIN EN 45545-2 HL2

Test Report VOC Indoor Air Comfort Gold A Wall

Certificate of Compliance foodstuff (contact with food)

Environmental Product Declaration (EPD) for HPL (ICDLI)

Environmental Product Declaration (EPD) Background information (ICDLI)

PEFC certificate

FSC certificate

Technical manual: "3. General Processing recommendations for RESOPAL HPL"

Cleaning and care data sheet

Certificate DIN EN ISO 14001

Certificate DIN EN ISO 50001

Regulation REACH

Rating System LEED

All information contained in this data sheet is based on the current state of technical knowledge, but does not constitute a guarantee. There is no guarantee regarding suitability for particular uses or applications.