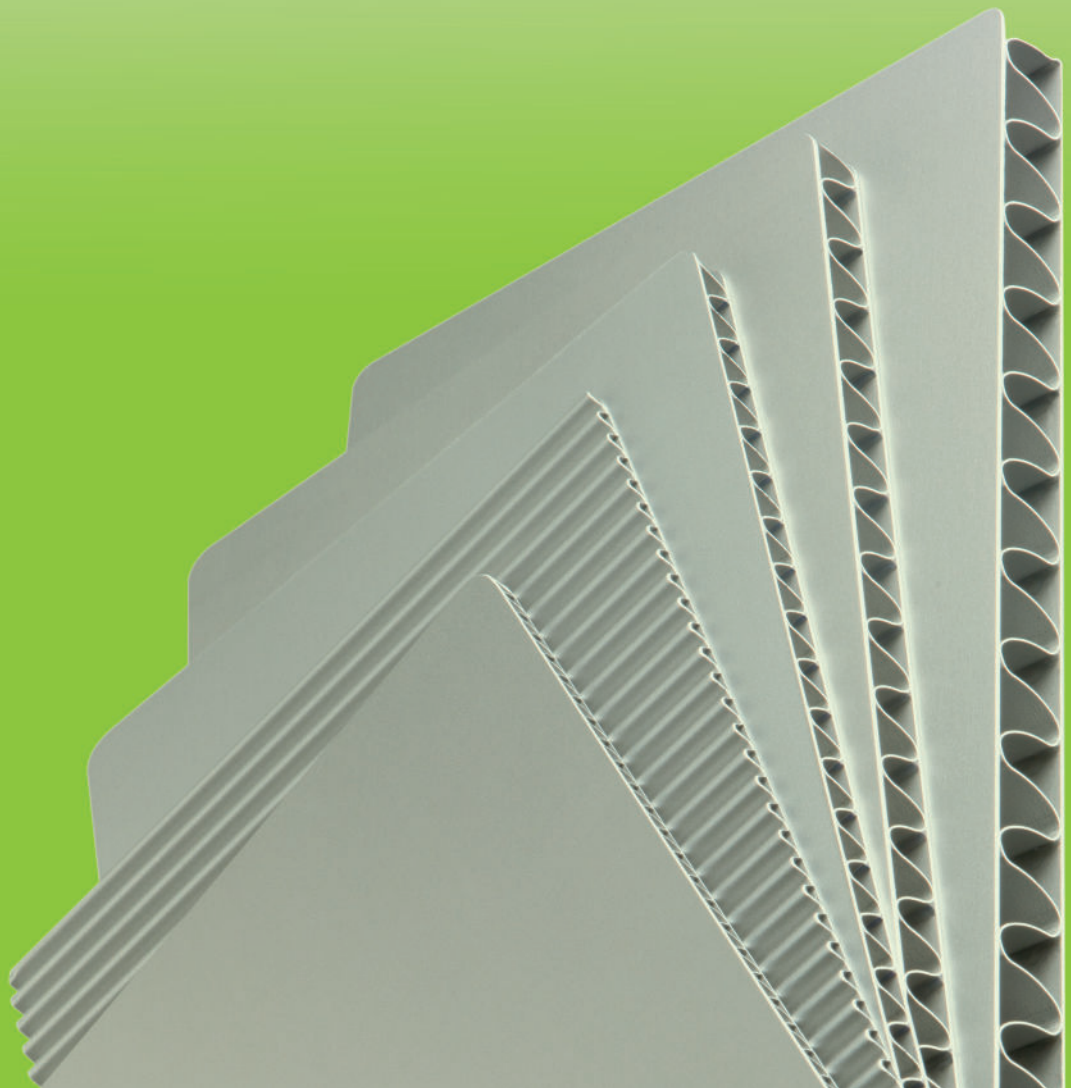




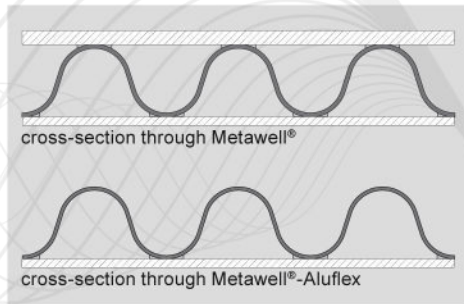
Metawell®

the lightweight panel



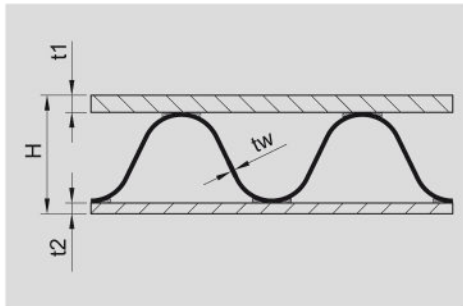
WHAT IS METAWELL®?

Metawell® is a patented lightweight aluminium sandwich panel with two aluminium cover sheets and a corrugated core. Metawell® Aluflex is an aluminium lightweight panel with only one cover sheet.



PANEL DESIGN

The product designation of the Metawell GmbH is composed of the following items:



Typ – Alu or Aluflex

t1 – thickness of top cover sheet

tw – thickness of corrugation

t2 – thickness of bottom cover sheet

H – panel height in millimetres

Further information regarding the surface coating and the used painting system may be included:

cc – coil coating

hl – bonding primer

sf – protective film

ADVANTAGES

The ingeniously simple structure makes it a very light and extremely rigid sandwich panel with an even surface. Metawell® Aluflex allows easy forming.

Significant weight savings are realized - particularly when used in big formats.

To produce the products only primerd aluminium is used. The primer guarantees a significantly better corrosion protection and is also an ideal basis for subsequent surface coating and bonding. Thanks to the little material usage, an easy machining with conventional tools is possible.

GLUEING SYSTEM

The innovative Metawell® hot-melt glueing system, which is used to bond the corrugation to the cover sheets, provides the benefits of conventional glueing systems. However, there is no creeping of the compound - as it is typical with viscoelastic hot-melt systems nor the classical danger of brittle failure which normally appears with brittle hard compounds. Moreover, the specific glueing system of Metawell® guarantees a high chemical, physical and thermal consistency.

STRENGTH AND STABILITY

The corrugated core itself possesses a high inherent stiffness. Thanks to its optimized geometry the corrugation and the cover sheet result in a harmonic compound. Therewith Metawell® reaches a particularly high static strength and an extremely good dynamic stability.

EXPERIENCE

For more than 40 years Metawell® has been used worldwide in the fields of transport (railway, shipbuilding, automotive), construction (radiant ceilings, facades, interior design) and in general engineering.

PORTFOLIO

Metawell® is available with different cover sheets, surface coatings and corrugation heights, which can be adapted specifically to the particular requirements.

Thanks to the continuous production process almost any length can be supplied.

In addition to standardized panel formats, pre-cutted and CNC-machined panels as well as ready-to-be-installed elements can be supplied for larger projects. Also for larger projects, the production of special products are offered, where parameters requested by the customer are included in the panel design, so that the optimal solution can be found.

STORING AND HANDLING

Metawell® panels should be stored horizontally in a dry and airy place. During handling and transport, care should be taken to ensure that the panel corners do not suffer damage. To avoid injuries the wearing of safety gloves is recommended.

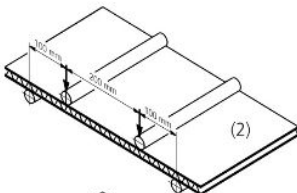
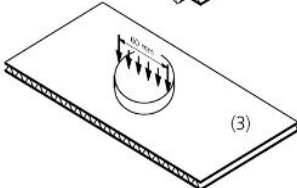
RECYCLING

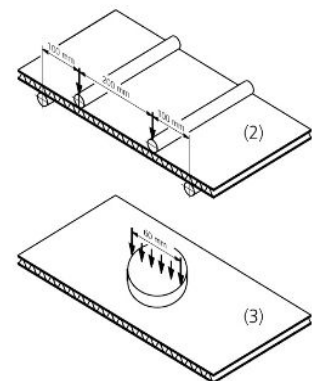
Metawell® can be recycled to 100% without separation and sorting. There is a high proportion of secondary aluminium in Metawell® products.

Data sheet

**Very rigid panel
with high load-bearing capacity**



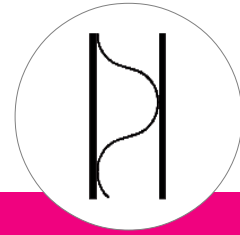
Panel type		Alu hl 10-03-10 hl / H15	
Top cover sheet			
Thickness of sheet		1.0 mm	(US: 0.039 in)
Surface		primered	
Alloy / Condition		EN AW-5754 H48	
Proof stress $R_{p0,2}$ [N/mm ²]		≥ 220	
Tensile stress R_m [N/mm ²]		≥ 280	
Back cover sheet			
Thickness of sheet		1.0 mm	(US: 0.039 in)
Surface		primered	
Alloy / Condition		EN AW-5754 H48	
Proof stress $R_{p0,2}$ [N/mm ²]		≥ 220	
Tensile stress R_m [N/mm ²]		≥ 280	
Dimensions			
Overall thickness [mm]		15 ± 0.2	(US: 0.591 in ± 0.008 in)
Standard width [mm]		1,500 -0/+6 ⁽⁴⁾	(US: 4.92 ft -0/+0.236 in) ⁽⁴⁾
Standard length [mm]		3,000 -0/+6	(US: 9.84 ft -0/+0.236 in)
other dimensions on request			
Mechanical and physical properties ⁽⁷⁾			
Weight [kg/m ²]		7.3	
Rigidity [Nmm ² /mm] ⁽²⁾ E I/b, longitudinal / transverse		8.0 E+6 / 6.8 E+6	
Bending moment [Nmm/mm] ⁽²⁾ Limit of elasticity M_{el} , longitudinal / transverse Max. bending moment M_{max} , longitudinal / transverse		≥ 3,200 / 2,650* ≥ 4,200 / 2,650*	
Compressive strength [N/mm ²] punch-Ø 60.0 mm ⁽³⁾ punch-Ø 6.0 mm		≥ 2.2 ≥ 25	
Temperature stability ⁽⁶⁾		-40 to 100 °C (US: -40 to 212 °F)	
Approvals / Certificates		on request	



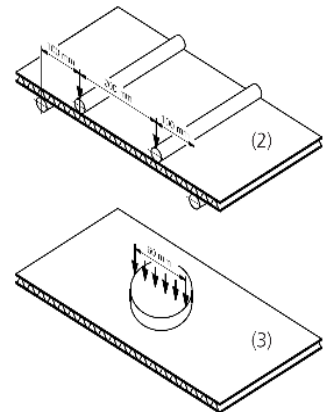
Alu hl 10-03-10 hl / H15

- (1) High Durable Polyester (HDP) coilcoated
Other colours and paint-systems on request
- (2) Bending test at room temperature
Depending on the direction of the corrugated core the bending tests are done:
longitudinal: bending axis perpendicular to the corrugation
4-point bending test following DIN 53293
transverse: bending axis parallel to the corrugation
* values for shear-resistant fixing or large span (Euler's – buckling)
by a short and flexible shear fixing bending values are lower,
limited by a shear of the core material
- (3) Pressure test at room temperature following DIN 53291
- (4) Border margin max. 5 mm (US: max. 0.197 in)
- (6) Others on request
- (7) Further characteristics can be supplied on demand

**Very rigid panel with
high load-bearing capacity**



Panel type	Alu hl 10-03-10 hl / H11.5
Top cover sheet	
Thickness of sheet	1.0 mm
Surface	primered
Alloy / Condition	EN AW-5754 H48
Proof stress $R_{p0.2}$ [N/mm ²]	≥ 220
Tensile stress R_m [N/mm ²]	≥ 280
Back cover sheet	
Thickness of sheet	1.0 mm
Surface	primered
Alloy / Condition	EN AW-5754 H48
Proof stress $R_{p0.2}$ [N/mm ²]	≥ 220
Tensile stress R_m [N/mm ²]	≥ 280
Dimensions	
Overall thickness [mm]*	11.5 ± 0.2
Standard width [mm]*	1,500 -0/+6 ⁽⁴⁾
Standard length [mm]*	3,000 -0/+6
* other dimensions on request	
Mechanical and physical properties ⁽⁷⁾	
Weight [kg/m ²]	7.2
Rigidity [Nmm ² /mm] ⁽²⁾ EI/b, longitudinal / transverse	5.1 E+6 / 3.5 E+6
Bending moment [Nmm/mm] ⁽²⁾ Limit of elasticity M_{el} , longitudinal / transverse Max. bending moment M_{max} , longitudinal / transverse	≥ 2,200 / ≥ 900 ≥ 3,000 / ≥ 1,000
Compressive strength [N/mm ²] ⁽³⁾	≥ 3.75
Temperature stability ⁽⁶⁾	-40 to 100 °C
Approvals / Certificates	on request



Alu hl 10-03-10 hl / H11.5

(1) High Durable Polyester (HDP) coilcoated
Other colours and paint-systems on request

(2) Bending test at room temperature following DIN 53293

The bending stiffness is a value that describes the bending behavior of the panel. The tolerances permitted by the standard for the specified sheets and the thickness tolerance of the panel can lead to deviations from the specified values.

Since the panel core is a corrugated sheet, two different load cases have to be considered:

longitudinal: bending axe perpendicular to the corrugation

transverse: bending axe parallel to the corrugation, specified values refer to spans > 400 mm

(3) Pressure test at room temperature following DIN 53291

(4) Border margin max. 5 mm

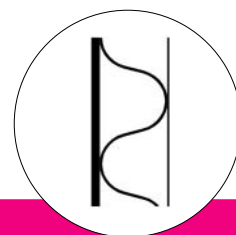
(5) Cut by hammer shears

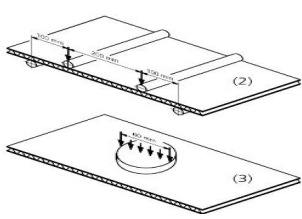
(6) Others on request

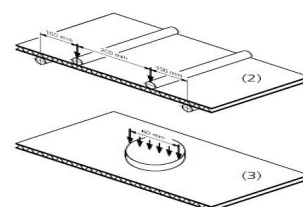
(7) Further characteristics can be supplied on demand

Data sheet

Rigid panel
primered



Panel type	Alu hl 10-03-05 hl / H10	
Top cover sheet		
Thickness of sheet	1.0 mm	(US: 0.039 in)
Surface	primered	
Alloy / Condition	EN AW-5754 H48	
Proof stress $R_{p0.2}$ [N/mm ²]	≥ 220	
Tensile stress R_m [N/mm ²]	≥ 280	
Back cover sheet		
Thickness of sheet	0.5 mm	(US: 0.020 in)
Surface	primered	
Alloy / Condition	EN AW-5182 H48	
Proof stress $R_{p0.2}$ [N/mm ²]	≥ 300	
Tensile stress R_m [N/mm ²]	≥ 330	
Dimensions		
Overall thickness [mm]	10.0 ± 0.2	(US: 0.394 in ± 0.008 in)
Standard width [mm]	1,500 -0/+6 ⁽⁴⁾	(US: 4.92 ft -0/+0.236 in) ⁽⁴⁾
Standard length [mm]	3,000 -0/+6	(US: 9.84 ft -0/+0.236 in)
other dimensions on request		
Mechanical and physical properties ⁽⁷⁾		
Weight [kg/m ²]	5.7	
Rigidity [Nmm ² /mm] ⁽²⁾ EI/b, longitudinal / transverse	3.0 E+6 / 2.1 E+6	
Bending moment [Nmm/mm] ⁽²⁾ Limit of elasticity M_{el} , längs / quer Max. bending moment M_{max} , longitudinal / transverse	≥ 1,550 / ≥ 850 ≥ 2,000 / ≥ 1,000	
Compressive strength [N/mm ²] ⁽³⁾	≥ 3.5	
Temperature stability ⁽⁶⁾	-40 to 100 °C (US: -40 to 212 °F) on request	
Approvals / Certificates		

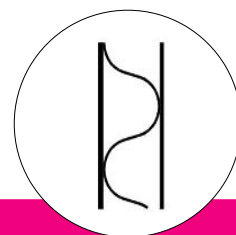


Alu hl 10-03-05 hl / H10

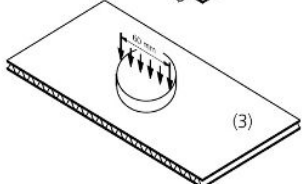
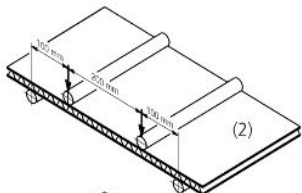
- (1) High Durable Polyester (HDP) coilcoated
Other colours and paint-systems on request
- (2) Bending test at room temperature following DIN 53293
Since the panel core is a corrugated sheet,
two different load cases have to be considered:
longitudinal: bending axis perpendicular to the corrugation
transverse: bending axis parallel to the corrugation
- (3) Pressure test at room temperature following DIN 53291
- (4) Border margin max. 5 mm (US: max. 0.197 in)
- (5) Cut by hammer shears
- (6) Others on request
- (7) Further characteristics can be supplied on demand

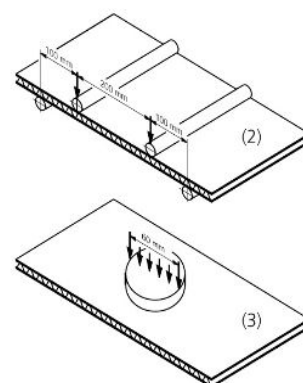
Data sheet

White top sheet
coilcoated



Panel type		Alu cc 08-03-05 hl / H10	
Top cover sheet			
Thickness of sheet		0.8 mm	(US: 0.032 in)
Surface		HDP RAL 9010 (white) ⁽¹⁾	
Alloy / Condition		EN AW-5754 H42	
Proof stress R _{p0,2} [N/mm ²]		≥ 140	
Tensile stress R _m [N/mm ²]		≥ 220	
Back cover sheet			
Thickness of sheet		0.5 mm	(US: 0.020 in)
Surface		primed	
Alloy / Condition		EN AW-5182 H48	
Proof stress R _{p0,2} [N/mm ²]		≥ 300	
Tensile stress R _m [N/mm ²]		≥ 330	
Dimensions			
Overall thickness [mm]		10.0 ± 0.2	(US: 0.394 in ± 0.008 in)
Standard width [mm]		1,500 -0/+6 ⁽⁴⁾	(US: 4.92 ft -0/+0.236 in) ⁽⁴⁾
Standard length [mm]		3,000 -0/+6	(US: 9.84 ft -0/+0.236 in)
other dimensions on request			
Mechanical and physical properties ⁽⁷⁾			
Weight [kg/m ²]		5.2	
Rigidity [Nmm ² /mm] ⁽²⁾ E I/b, longitudinal / transverse		2.2 E+6 / 1.6 E+6	
Bending moment [Nmm/mm] ⁽²⁾ Limit of elasticity M _{el} , longitudinal / transverse Max. bending moment M _{max} , longitudinal / transverse		≥ 1,250 / ≥ 750 ≥ 1,800 / ≥ 800	
Compressive strength [N/mm ²] ⁽³⁾		≥ 3.2	
Temperature stability ⁽⁶⁾		-40 to 100 °C (US: -40 to 212 °F)	
Approvals / Certificates		on request	





- (1) High Durable Polyester (HDP) coilcoated.
Other colours and paint-systems on request.
- (2) Bending test at room temperature following DIN 53293
Since the panel core is a corrugated sheet,
two different load cases have to be considered:
longitudinal: bending axis perpendicular to the corrugation
transverse: bending axis parallel to the corrugation
- (3) Pressure test at room temperature following DIN 53291
- (4) Border margin max. 5 mm (US: max. 0.197 in)
- (5) Cut by hammer shears
- (6) Others on request
- (7) Further characteristics can be supplied on demand

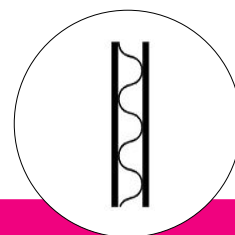
Protective film

If panels are supplied with a protective film, it must be taken off not later than 6 months after delivery. Bigger temperature changes and exposure to direct sunlight should be avoided since this may reduce the duration. Partial removal of the film, e.g. during processing, may lead to dirt marks along the borders.

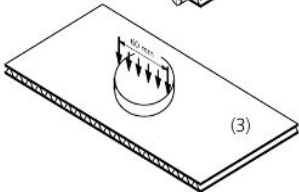
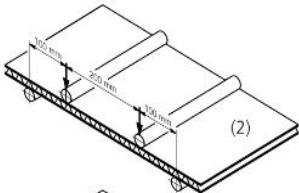
Alu cc 08-03-05 hl / H10

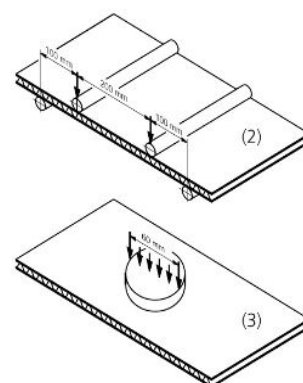
Data sheet

High compressive strength
ideal for floors



Panel type	Alu hl 10-03-10 hl / H6	
Top cover sheet		
Thickness of sheet	1.0 mm	(US: 0.039 in)
Surface	primered	
Alloy / Condition	EN AW-5754 H48	
Proof stress $R_{p0.2}$ [N/mm ²]	≥ 220	
Tensile stress R_m [N/mm ²]	≥ 280	
Back cover sheet		
Thickness of sheet	1.0 mm	(US: 0.039 in)
Surface	primered	
Alloy / Condition	EN AW-5754 H48	
Proof stress $R_{p0.2}$ [N/mm ²]	≥ 220	
Tensile stress R_m [N/mm ²]	≥ 280	
Dimensions		
Overall thickness [mm]	6 ± 0.2	(US: 0.236 in ± 0.008 in)
Standard width [mm]	1,500 -0/+6 ⁽⁴⁾	(US: 4.92 ft -0/+0.236 in) ⁽⁴⁾
Standard length [mm]	3,000 -0/+6	(US: 9.84 ft -0/+0.236 in)
other dimensions on request		
Mechanical and physical properties ⁽⁷⁾		
Weight [kg/m ²]	6.9	
Rigidity [Nmm ² /mm] ⁽²⁾ E I/b, longitudinal / transverse	1.1 E+6 / 1.0 E+6	
Bending moment [Nmm/mm] ⁽²⁾ Limit of elasticity M_{el} , longitudinal / transverse Max. bending moment M_{max} , longitudinal / transverse	≥ 1,000 / ≥ 900 ≥ 1,250 / ≥ 1,000	
Compressive strength [N/mm ²] ⁽³⁾	≥ 12	
Temperature stability ⁽⁶⁾	-40 to 100 °C (US: -40 to 212 °F)	
Approvals / Certificates	on request	



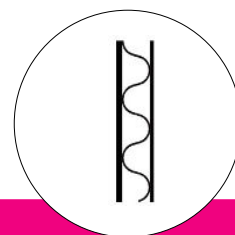


Alu hl 10-03-10 hl / H6

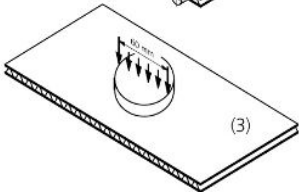
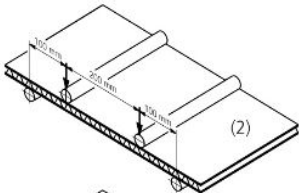
- (1) High Durable Polyester (HDP) coilcoated
Other colours and paint-systems on request
- (2) Bending test at room temperature following DIN 53293
Since the panel core is a corrugated sheet,
two different load cases have to be considered:
longitudinal: bending axis perpendicular to the corrugation
transverse: bending axis parallel to the corrugation
- (3) Pressure test at room temperature following DIN 53291
- (4) Border margin max. 5 mm (US: max. 0.197 in)
- (5) Cut by hammer shears
- (6) Others on request
- (7) Further characteristics can be supplied on demand

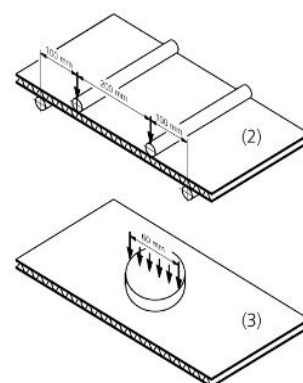
Data sheet

White top sheet
coilcoated



Panel type		Alu cc 08-02-05 hl / H6	
Top cover sheet			
Thickness of sheet		0.8 mm	(US: 0.032 in)
Surface		HDP RAL 9010 (white) ⁽¹⁾	
Alloy / Condition		EN AW-5754 H42	
Proof stress R _{p0,2} [N/mm ²]		≥ 140	
Tensile stress R _m [N/mm ²]		≥ 220	
Back cover sheet			
Thickness of sheet		0.5 mm	(US: 0.020 in)
Surface		primed	
Alloy / Condition		EN AW-5182 H48	
Proof stress R _{p0,2} [N/mm ²]		≥ 300	
Tensile stress R _m [N/mm ²]		≥ 330	
Dimensions			
Overall thickness [mm]		6.0 ± 0.15	(US: 0.217 in ± 0.006 in)
Standard width [mm]		1,500 -0/+6 ⁽⁴⁾	(US: 4.92 ft -0/+0.236 in) ⁽⁴⁾
Standard length [mm]		3,000 -0/+6	(US: 9.84 ft -0/+0.236 in)
other dimensions on request			
Mechanical and physical properties ⁽⁷⁾			
Weight [kg/m ²]		4.6	
Rigidity [Nmm ² /mm] ⁽²⁾ E I/b, longitudinal / transverse		700,000 / 625,000	
Bending moment [Nmm/mm] ⁽²⁾ Limit of elasticity M _{el} , longitudinal / transverse Max. bending moment M _{max} , longitudinal / transverse		≥ 550 / ≥ 500 ≥ 900 / ≥ 600	
Compressive strength [N/mm ²] ⁽³⁾		≥ 3.0	
Temperature stability ⁽⁶⁾		-40 to 100 °C (US: -40 to 212 °F)	
Approvals / Certificates		on request	





- (1) High Durable Polyester (HDP) coilcoated
Other colours and paint-systems on request
- (2) Bending test at room temperature following DIN 53293
Since the panel core is a corrugated sheet,
two different load cases have to be considered:
longitudinal: bending axis perpendicular to the corrugation
transverse: bending axis parallel to the corrugation
- (3) Pressure test at room temperature following DIN 53291
- (4) Border margin max. 5 mm (US: max. 0.197 in)
- (5) Cut by hammer shears
- (6) Others on request
- (7) Further characteristics can be supplied on demand

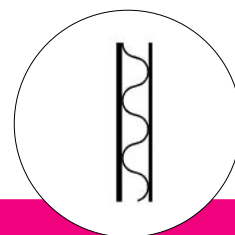
Protective film

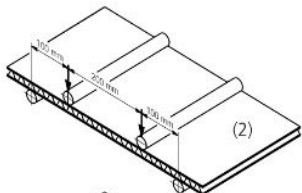
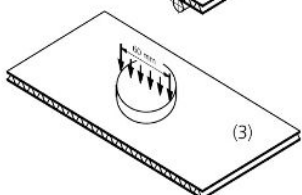
If panels are supplied with a protective film, it must be taken off not later than 6 months after delivery. Bigger temperature changes and exposure to direct sunlight should be avoided since this may reduce the duration. Partial removal of the film, e.g. during processing, may lead to dirt marks along the borders.

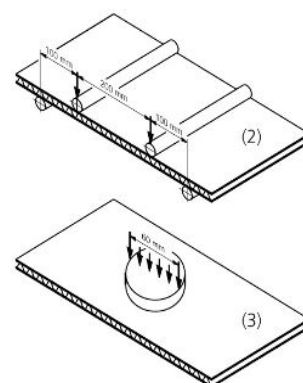
Alu cc 08-02-05 hl / H6

Data sheet

All-round-panel
primered



Panel type		Alu hl 08-02-05 hl / H6	
Top cover sheet			
Thickness of sheet		0.8 mm	(US: 0.032 in)
Surface		primered	
Alloy / Condition		EN AW-5754 H42	
Proof stress $R_{p0,2}$ [N/mm ²]		≥ 140	
Tensile stress R_m [N/mm ²]		≥ 220	
Back cover sheet			
Thickness of sheet		0.5 mm	(US: 0.020 in)
Surface		primered	
Alloy / Condition		EN AW-5182 H48	
Proof stress $R_{p0,2}$ [N/mm ²]		≥ 300	
Tensile stress R_m [N/mm ²]		≥ 330	
Dimensions			
Overall thickness [mm]		6.0 ± 0.15	(US: 0.217 in ± 0.006 in)
Standard width [mm]		1,500 -0/+6 ⁽⁴⁾	(US: 4.92 ft -0/+0.236 in) ⁽⁴⁾
Standard length [mm]		3,000 -0/+6	(US: 9.84 ft -0/+0.236 in)
other dimensions on request			
Mechanical and physical properties ⁽⁷⁾			
Weight [kg/m ²]		4.6	
Rigidity [Nmm ² /mm] ⁽²⁾ E I/b, longitudinal / transverse		700,000 / 625,000	
Bending moment [Nmm/mm] ⁽²⁾ Limit of elasticity M_{el} , longitudinal / transverse Max. bending moment M_{max} , longitudinal / transverse		≥ 550 / ≥ 500 ≥ 900 / ≥ 600	
Compressive strength [N/mm ²] ⁽³⁾		≥ 3.0	
Temperature stability ⁽⁶⁾		-40 to 100 °C (US: -40 to 212 °F)	
Approvals / Certificates		on request	

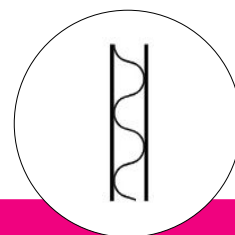


Alu hl 08-02-05 hl / H6

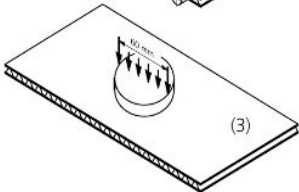
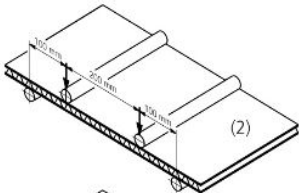
- (1) High Durable Polyester (HDP) coilcoated
Other colours and paint-systems on request
- (2) Bending test at room temperature following DIN 53293
Since the panel core is a corrugated sheet,
two different load cases have to be considered:
longitudinal: bending axis perpendicular to the corrugation
transverse: bending axis parallel to the corrugation
- (3) Pressure test at room temperature following DIN 53291
- (4) Border margin max. 5 mm (US: max. 0.197 in)
- (5) Cut by hammer shears
- (6) Others on request
- (7) Further characteristics can be supplied on demand

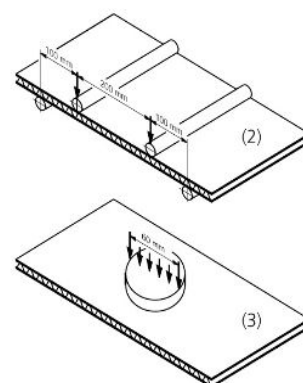
Data sheet

Light panel
primered



Panel type		Alu hl 05-02-05 hl / H6	
Top cover sheet			
Thickness of sheet		0.5 mm	(US: 0.020 in)
Surface		primered	
Alloy / Condition		EN AW-5182 H48	
Proof stress $R_{p0,2}$ [N/mm ²]		≥ 300	
Tensile stress R_m [N/mm ²]		≥ 330	
Back cover sheet			
Thickness of sheet		0.5 mm	(US: 0.020 in)
Surface		primered	
Alloy / Condition		EN AW-5182 H48	
Proof stress $R_{p0,2}$ [N/mm ²]		≥ 300	
Tensile stress R_m [N/mm ²]		≥ 330	
Dimensions			
Overall thickness[mm]		6 ± 0.15	(US: 0.236 in ± 0.006 in)
Standard width [mm]		1,500 -0/+6 ⁽⁴⁾	(US: 4.92 ft -0/+0.236 in) ⁽⁴⁾
Standard length [mm]		3,000 -0/+6	(US: 9.84 ft -0/+0.236 in)
other dimensions on request			
Mechanical and physical properties ⁽⁷⁾			
Weight [kg/m ²]		3.8	
Rigidity [Nmm ² /mm] ⁽²⁾		740,000 / 600,000	
E I/b, longitudinal / transverse			
Bending moment [Nmm/mm] ⁽²⁾			
Limit of elasticity M_{el} , longitudinal / transverse		≥ 700 / ≥ 480	
Max. bending moment M_{max} , longitudinal / transverse		≥ 950 / ≥ 500	
Compressive strength [N/mm ²] ⁽³⁾		≥ 2.4	
Temperature stability ⁽⁶⁾		-40 to 100 °C	
		(US: -40 to 212 °F)	
Approvals / Certificates		on request	



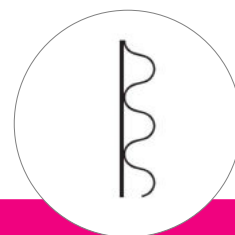


Alu hl 05-02-05 hl / H6

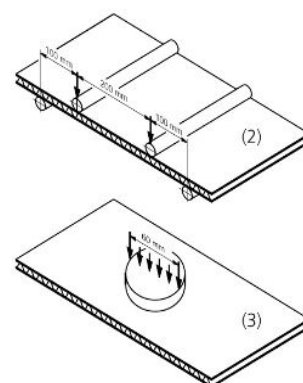
- (1) High Durable Polyester (HDP) coilcoated
Other colours and paint-systems on request
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Since the panel core is a corrugated sheet,
two different load cases have to be considered:
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transverse: bending axis parallel to the corrugation
- (3) Pressure test at room temperature following DIN 53291
- (4) Border margin max. 5 mm (US: max. 0.197 in)
- (5) Cut by hammer shears
- (6) Others on request
- (7) Further characteristics can be supplied on demand

Data sheet

One cover sheet
easy shaping



Panel type	Aluflex hl 05-02 hl / H4.7
Top cover sheet	
Thickness of sheet	0.5 mm
Surface	primered
Alloy / Condition	EN AW-5182 H48
Proof stress $R_{p0.2}$ [N/mm ²]	≥ 300
Tensile stress R_m [N/mm ²]	≥ 330
Corrugation	
Thickness of sheet	0.2 mm
Surface	primered
Dimensions	
Overall thickness [mm]	4.7 ± 0.15
Standard width [mm]	1,500 -0/+6 ⁽⁴⁾
Standard length [mm]	Roll 20,000 ⁽⁵⁾
other dimensions on request	
Mechanical and physical properties ⁽⁷⁾	
Weight [kg/m ²]	2.2
Rigidity [Nmm ² /mm] ⁽²⁾ E I/b, longitudinal / transverse	110,000 / -
Bending moment [Nmm/mm] ⁽²⁾ Limit of elasticity M_{el} , longitudinal / transverse Max. bending moment M_{max} , longitudinal / transverse	≥ 60 / - ≥ 110 / -
10%-Compressive strength [N/mm ²] ⁽³⁾	≥ 1.4
Temperature stability ⁽⁶⁾	-40 to 100 °C
Approvals / Certificates	on request



Aluflex hl 05-02 hl / H4.7

- (1) High Durable Polyester (HDP) coilcoated.
Other colours and paint-systems on request.
- (2) Bending test at room temperature following DIN 53293
Since the panel core is a corrugated sheet,
two different load cases have to be considered:
longitudinal: bending axis perpendicular to the corrugation
transverse: bending axis parallel to the corrugation
- (3) Pressure test at room temperature following DIN 53291
- (4) Border margin max. 5 mm
- (5) Cut by hammer shears
- (6) Others on request
- (7) Further characteristics can be supplied on demand