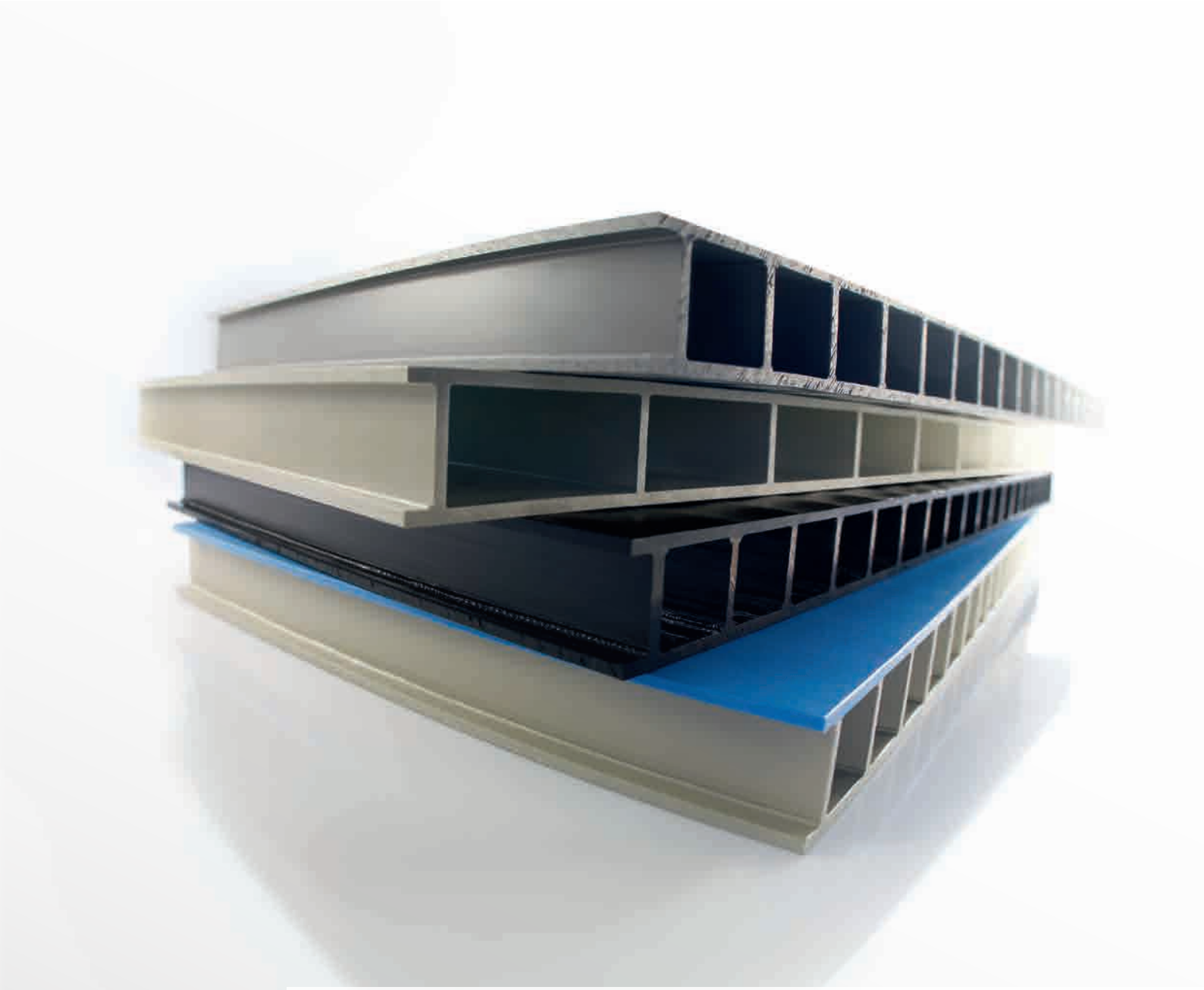
SIMONA



SIMONA® Twin-Wall Sheets

The efficient solution for strong, lightweight construction

GLOBAL THERMOPLASTIC SOLUTIONS

SIMONA® Twin-Wall Sheets
Light, quiet, strong and versatile

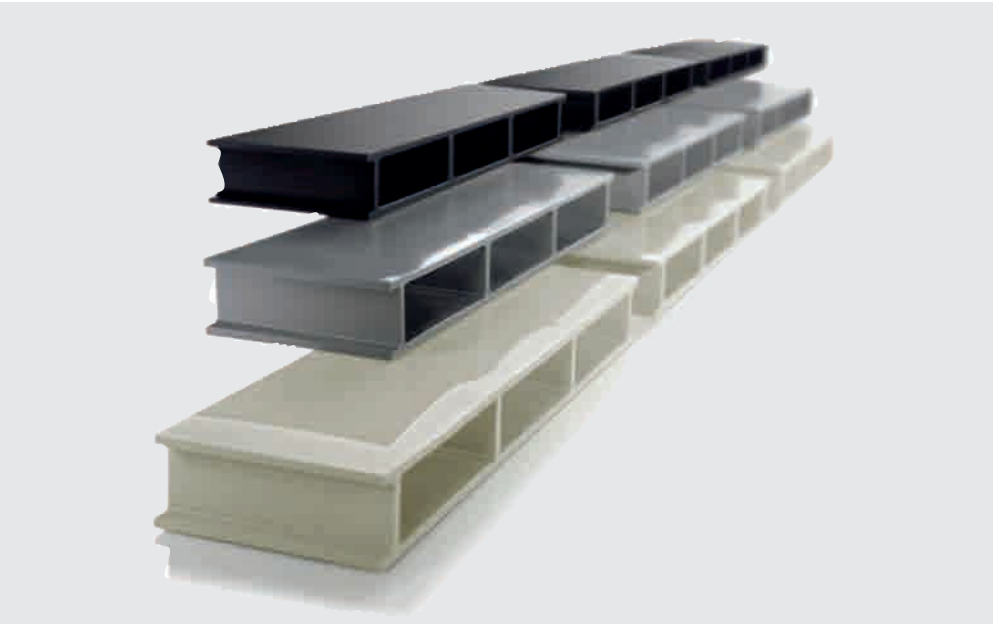
SIMONA® Twin-Wall Sheets are highly innovative and versatile. Twin-Wall Sheets are made of PE 100, PP AlphaPlus® (PP-H), PPs or PP-C-UV with state-of-the-art machine technology. They combine high rigidity, low specific weight and good thermal insulation with the benefits of efficient fabrication and machining. Twin-Wall Sheets can be processed by the same methods as those used for solid materials.

Design-specific advantages

- High rigidity and strength
- High break resistance
- Rectangular tanks possible without steel reinforcement
- Lighter weight than solid material due to cavities
- Excellent sound insulation (DIN EN ISO 140-3 certificates available on request)
- Low heat transfer coefficients (k-value/U-value) based on ISO 8301, EN 1946-3
- Many different fields of application

Plastic-specific advantages

- High thermal insulation
- Good electrical insulation
- Good slip properties
- High wear resistance
- High chemical resistance
- Low water absorption
- Resistant to microorganisms
- Excellent fabrication capability



Advantages of PE 100

- Impact strength down to – 50 °C
- Insensitive to weather
- High chemical resistance

Advantages of PP AlphaPlus®

- Service temperature range up to +100 °C
- High chemical resistance

Advantages of PPs

- Low flammability in accordance with DIN 4102 B1
- High chemical resistance

Advantages of PP-C-UV

- UV-stabilised
- Maximum chemical resistance

At a glance

- Variable number of webs (54 and 108 mm)
- Ranging sheet thickness
- Excellent fabrication properties
- High rigidity despite light weight
- Wide range of potential applications
- Support with structural analysis from TÜV Rheinland LGA Bautechnik GmbH, Nürnberg

Certificates

- DIN EN ISO 140-3: Sound insulation of PE-HKP (on request)
- DIN 4102 B1: PPs-HKP low flammability
- DIN 4102 B2: PE-HKP and PP-HKP normal flammability (self assessment)

SIMONA® Twin-Wall Sheets
An unlimited number of potential applications

From left to right: biological scrubber, banner at an ice rink in the outdoor area

Below: spray booth

Apparatus, equipment, machines

- Rectangular tanks
- Covers for electroplating baths, structurally strong and thermally insulating
- Boat construction
- Floating pontoons for pipelines and supply lines at sea
- Storm-water retention basins
- Cooling water tanks
- Sound booths
- Spray booths
- Weather booths
- Safety tanks
- Water supply tanks
- Covers for circular tanks with large diameters (wrapped tube tanks)

Construction industry

- Slide and anti-wear sheets in conjunction with thermal insulation
- Walk-over swimming pool floors
- Lightweight shaft bottoms or concrete-lined for floats
- Shafts
- Protective ducts for pipelines and supply lines
- Stone impact protection in road construction
- Sound barriers
- Ventilation ducts
- Banner elements for leisure and sports facilities

From left to right: outdoor whirlpool, storage tank for acid solutions

Below: flow distributor for ventilation ducts

Agriculture

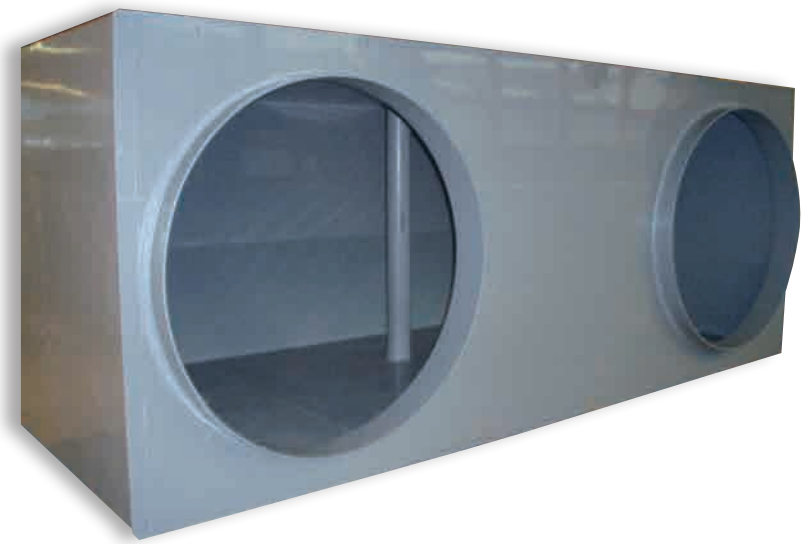
- Linings for transport stalls
- Linings for silos
- Medicinal baths for horses
- Partitions

Environment

- Biofilters
- Wastewater engineering
- Sewage sludge treatment
- Flood protection structures
- Safety drip pans

Miscellaneous

- Alternative product to aluminium twin-wall profiles



SIMONA® Twin-Wall Sheets
Product range

SIMONA® PE-HKP
PE 100 is a high-heat resistant, UV-stabilised polyethylene.

SIMONA® PP-HKP
PP AlphaPlus® (PP-H) is a homo-polymer, alpha-nucleated, permanent-heat-resistant polypropylene.

SIMONA® PPs-HKP
PPs is a low-flammability, homo-polymer, permanent-heat-resistant polypropylene.

SIMONA® PP-C-UV-HKP
PP-C-UV is a copolymer, UV-stabilised polypropylene.

Product range Twin-Wall Sheets

Twin-Wall Sheets

Total thickness	Thickness of outer skin	Web spacing	Weight	Order number
mm	mm	mm	kg/piece	3,000 x 1,000 mm
PE-HKP, black				
54	**6**	**108**	**42.4**	**010011108**
54	**6**	**54**	**49.6**	**010011109**
58	**8**	**54**	**61.0**	**010011110**
PP-HKP, grey				
54	**6**	**108**	**40.7**	**010011104**
54	**6**	**54**	**47.6**	**010011106**
58	**8**	**54**	**58.6**	**010011107**
PPs-HKP, grey				
54	6	108	41.7	010013859
54	6	54	51.0	010019358
58	8	54	61.0	010019359

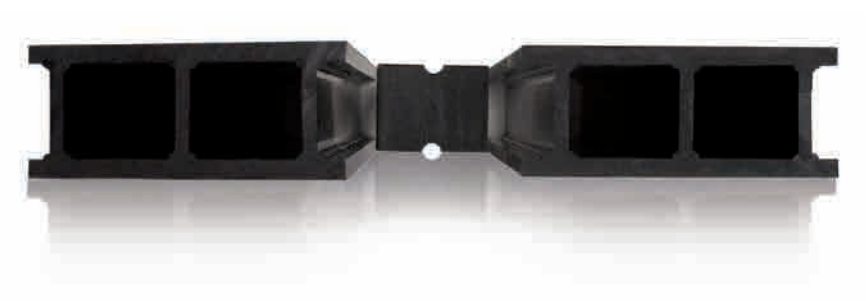
Stock availability of products: **bold type** = available immediately; light-faced type = available on request
PP-C-UV-HKP, blue (top)/grey (bottom) available on request.

Product range Flat Connection

In order to simplify the extrusion welding of Twin-Wall Sheets we offer connection profiles (flat connections).

PE-HKP Flat Connection, black

Length	Width	Thickness	Order number
mm	mm	mm	
2,000	50	39	010015428



Product range Corner Elements

PE-HKP Corner Elements, 45°, black

Total length	Leg length	Total thickness	Thickness of outer skin	Web spacing	Order number
mm	mm	mm	mm	mm	
1,500	318	54	6	108	010014259
1,500	318	54	6	54	010014263
1,500	318	58	8	54	010014267
3,000	318	54	6	108	010014261
3,000	318	54	6	54	010014265
3,000	318	58	8	54	010014269

PE-HKP Corner Elements, 90°, black

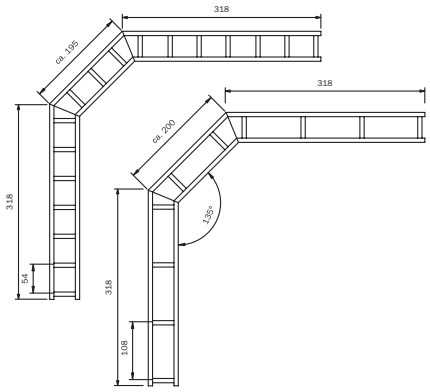
Total length	Leg length	Total thickness	Thickness of outer skin	Web spacing	Order number
mm	mm	mm	mm	mm	
1,500	490	54	6	108	010014271
1,500	490	54	6	54	010014275
1,500	490	58	8	54	010014279
3,000	490	54	6	108	010014273
3,000	490	54	6	54	010014277
3,000	490	58	8	54	010014287

PP-HKP Corner Elements, 45°, grey

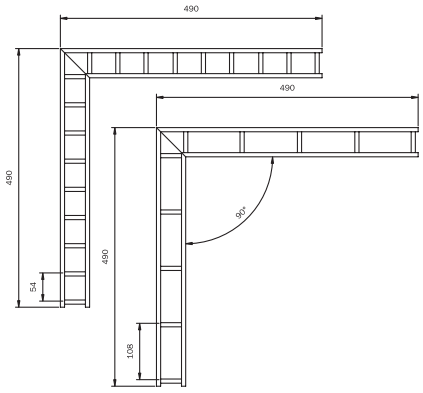
Total length	Leg length	Total thickness	Thickness of outer skin	Web spacing	Order number
mm	mm	mm	mm	mm	
1,500	318	54	6	108	010014283
1,500	318	54	6	54	010014287
1,500	318	58	8	54	010014291
3,000	318	54	6	108	010014285
3,000	318	54	6	54	010014289
3,000	318	58	8	54	010014293

PP-HKP Corner Elements, 90°, grey

Total length	Leg length	Total thickness	Thickness of outer skin	Web spacing	Order number
mm	mm	mm	mm	mm	
1,500	490	54	6	108	010014295
1,500	490	54	6	54	010014299
1,500	490	58	8	54	010014303
3,000	490	54	6	108	010014297
3,000	490	54	6	54	010014301
3,000	490	58	8	54	010014305



Standard Corner Element, 45°



Standard Corner Element, 90°

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Fax +49 (0) 67 52 14-302
tsc@simona.de

SIMONA® Twin-Wall Sheets
Various processing capabilities

Welding

General

Pipe parts and sheets with an MFR (= Melt Flow Rate) of 0.3 to 1.7 and 0.2 to 0.7 can be welded to one another. This means that the fusion properties when warmed are very similar. This statement is contained in DVS 2207 Part 1 and has also been confirmed by DVGW (German Gas and Water Association). For PP-H (Type 1), PP-B (Type 2) and PP-R (Type 3) the weldability is within melt index group 006/012 (MFR 190/5: 0.4 to 1.0 g/10 min.). This statement can be found in DVS 2207 Part 11.

Welding preparation

Directly before welding the surfaces to be connected, the adjacent areas and any damaged surfaces (especially if there are weather or chemical influences) must be machined down to intact zones.

Hot gas draw welding

For Twin-Wall Sheets which can only be welded from one side it is advisable to use a single V. Cleaning of surfaces to be welded to sheet and welding rod by machining is essential. Welding with the tacking nozzle serves to keep the parts in position. Fusion is performed with hot air but without any additional wire.

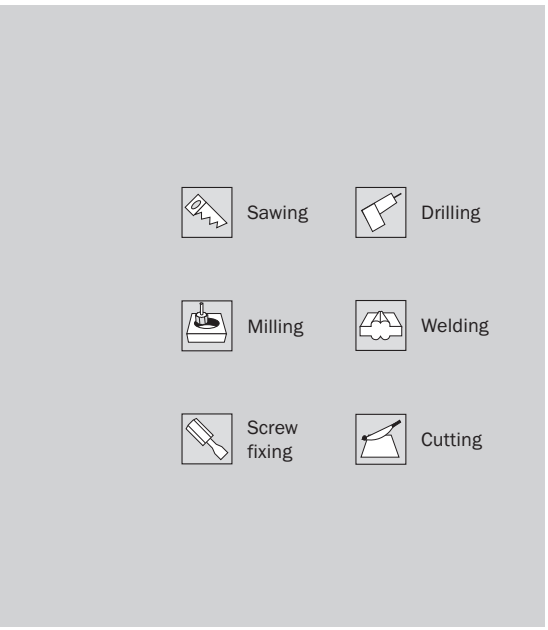
Weld structure

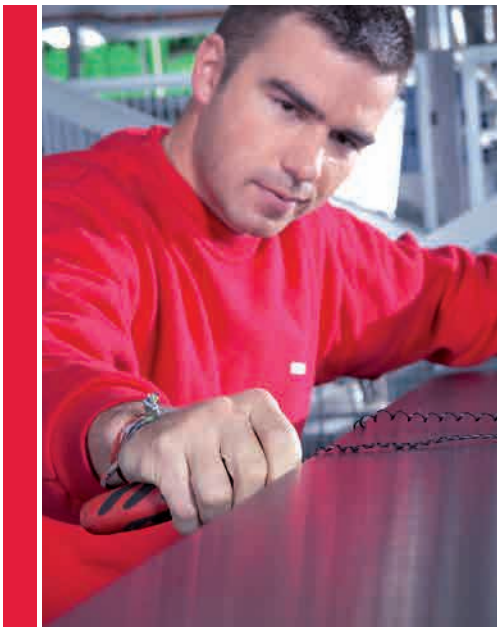
Thickness	Number x diameter
mm	mm
5	6 x 3
6	6 x 4

For a sheet thickness of 8 mm we recommend extrusion welding.

Extrusion welding

Suitable fillings (e.g. a PE 100 connection profile) must be introduced to the cavity in the seam area of the Twin-Wall Sheets in order to ensure a build-up of pressure in the seam zone. An airtight seam 4 mm thick is to be recommended.





Material	Temperature of extrudate measured at the nozzle outlet	Air temperature measured in the hot air nozzle	Air flow (cold air intake)
	°C	°C	l/min
PE-HKP	210 to 230	250 to 300	≥ 300
PP-HKP	210 to 240	250 to 300	≥ 300

Heated element butt welding

Welding seam preparation

The cleanliness of the parts to be joined by welding and of the heated element itself is of paramount importance in heated element butt welding. Teflon films or coatings facilitate the cleaning of heating surfaces and prevent plastics from clinging to the heated element when warming up.

Heated element temperature

Semi-finished products with a large wall thickness usually call for relatively low temperatures – within tolerances – and a suitably longer exposure time. A heated tool height of at least 70 mm and a clamping distance of 60 mm are to be recommended for Twin-Wall Sheets 54 mm to 60 mm thick because a relatively uniform temperature distribution can be guaranteed.

A heated element temperature of 210 °C to 220 °C for PE and PP and the pressures and times commensurate with the aggregate wall thicknesses are to be recommended.

Machining

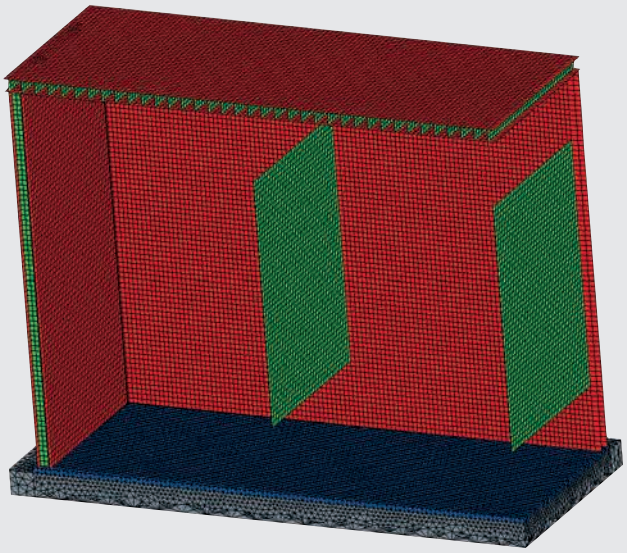
SIMONA® Twin-Wall Sheets can be processed by many different methods. These include drilling, milling and sawing; in this case, a distinction must be made between circular sawing and band-sawing.

For further information, please refer to our tech.info „SIMONA® Twin-Wall Sheets“.

Structural analyses using FEM (Finite Element Method) – An example

Storage tank made of PE Twin-Wall Sheets (PE-HKP) with an 8 mm outer skin, 19 webs and a format of 4,000 x 1,500 x 1,500 mm for a liquid level of 1,400 mm (structurally tested by TÜV Rheinland LGA Bautechnik GmbH, Nuremberg)

TÜVRheinland®
LGA
Statisch geprüft
BBIS 69602593
Behälter aus Hohlkammerplatten



Positioned vertically, the webs provide the structure with the necessary strength. The partitions welded into the tank serve as ties and bring about a reduction in the deformation which would result when filled with water at a temperature of 25 °C. Consequently, the tank can be built without any steel reinforcement whatsoever. The base is made of a 20 mm PE sheet and easily withstands the pressure exerted by the water. Like the tank wall, the cover is made of PE-HKP.

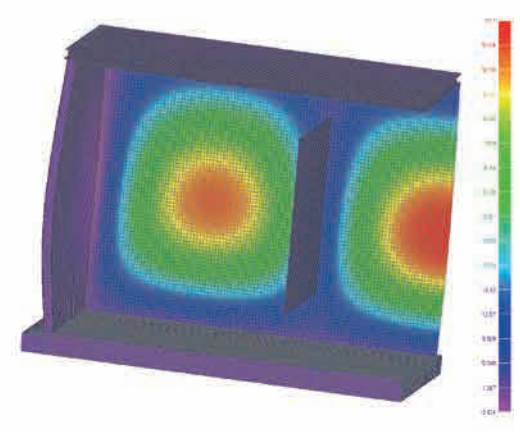
The coloured plots show the averaged stresses and the deformation occurring, thereby illustrating the overall load capacity of the tank. It is evident that the stresses are all within the acceptable range and do not exceed a maximum figure of 6 MPa. In addition, the stresses at the corner points and within the Twin-Wall Sheet are mainly within the non-critical pressure range.

Deformation also remains at a maximum of 57 mm, so it is well below the maximum deformation of 5 % in relation to the free length of the span, which in this case is 75 mm. For deformation and stress results, please refer to page 11.

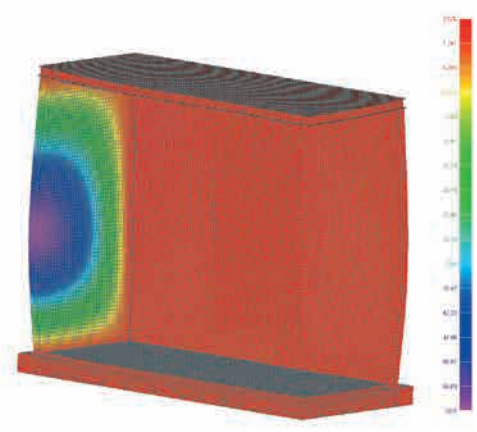
TÜV Rheinland LGA Bautechnik GmbH, Nuremberg, supports SIMONA AG with FEM analyses (Finite Element Method).

Deformation results

Deformation of long side
(maximum bowing f = 3.8 %)

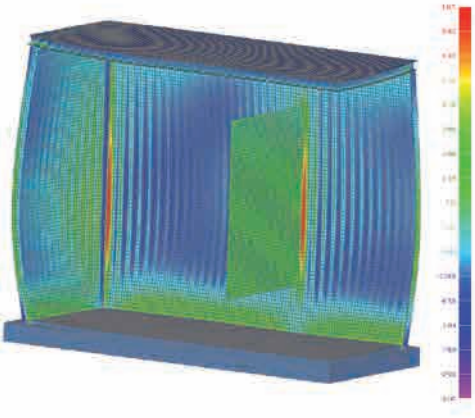


Deformation of end
(maximum bowing f = 3.8 %)

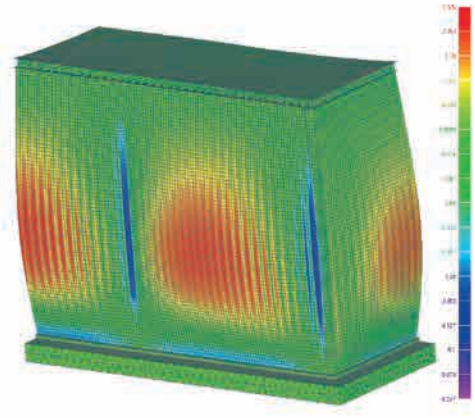


Stress results (assuming double the useful load)

Maximum tensile stress
(maximum stress = 6.6 MPa)



Maximum compressive stress
(maximum stress = 2.9 MPa)



Our R&D team is committed to the continuous development of our product range. Thanks to highly innovative technical adjustments, the efficiency and stability of our twin-wall sheets have been further optimised while keeping the overall thickness of the walls to a minimum. For further information and a preview of the third generation of SIMONA® Twin-Wall Sheets, please visit: **www.simona.de/HKP**

SIMONA® Twin-Wall Sheets
Material specifications

Printed on Hello Fat matt by Deutsche Papier.

Material specifications

		PE-HKP	PP-HKP	PPs-HKP
Density, g/cm³, DIN EN ISO 1183		0.960	0.915	0.950
Impact strength, kJ/m², DIN EN ISO 179		No break	No break	No break
Temperature range, °C		–50 to +80	0 to +100	0 to +100
Fire behaviour, DIN 4102		Normal flammability	Normal flammability	Low flammability B1
Chemical resistance		excellent in contact with many acids, alkalis and solvents		
Physiologically safe	BfR	✔	✔	
	EU	✔	✔	
	FDA		✔	

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