



# Certification Document

<b>Manufacturer:</b>	Metecno Bausysteme GmbH Am Amselberg 1 99444 Blankenhain Germany
<b>Production plant:</b>	Metecno Bausysteme GmbH Am Amselberg 1 99444 Blankenhain Germany
<b>Panel Types:</b>	Monowall, Thermowall-Kombi, H-Wall 8P, Superwall ML, G4 and Topanel with steel faces and polyurethane core material
<b>Date of issue:</b>	14-10-2019
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<b>Certification Number:</b>	09-05-01-01-0052

The Quality Label EPAQ shall be used only in combination with this certification number.

This Certification Document consists of 12 pages.

This Certification Document is only valid in combination with the valid accompanying Quality Certificate. The Quality Certificate is awarded only after the first External Quality Control (EQC), if the requirements of this Certification Document are fulfilled.

**European Association for Panels and Profiles**

## 1 GENERAL

This Certification Document (CD) specifies all characteristics of panel types Monowall, Thermowall-Kombi, H-Wall 8P, Superwall ML, G4 and Topanel, which must be declared according to EN 14509. Additionally to the requirements of EN 14509, ZA2 for the mechanical resistance and thermal performance, the EPAQ system A applies. All reports of the initial inspection and continuous surveillance have to be sent also to the association.

## 2 SANDWICH PANEL TYPES AND DEFINITION OF USED MATERIALS

### 2.1 Panel types

The sandwich panel types Monowall, Thermowall-Kombi, H-Wall 8P, Superwall ML, G4 and Topanel consist of polyurethane core material in between steel faces, with a panel width of 1000 mm. The panel thickness is stated in table 3. The geometry of the panels is displayed in figures 1 to 6. The dimensions of the panels shall be within the tolerances given in EN 14509, annex D and in the Quality Regulations for Panels and Profiles of PPA-Europe, table 2.3. The outer and inner faces are made of steel sheets with nominal thicknesses  $0,45 \text{ mm} \leq t_N \leq 0,75 \text{ mm}$  for the inner face and  $0,50 \text{ mm} \leq t_N \leq 0,75 \text{ mm}$  for the outer face.

The sandwich panels are intended to be used as self-supporting panels in external or internal walls. The sandwich panels G4 and Topanel with profiled faces are also intended to be used in roofs.

### 2.2 Characteristics and composition

#### 2.2.1 Faces

For the faces, organic coated galvanised steel S 320 GD or S 350 GD according to EN 10346 has to be used. The protective coating systems shall be selected according to their durability in the application environment. The agreed characteristics in EN 10169 for the organic coating and in EN 10346 for the metallic coating shall be fulfilled. The faces shall have backside coating according to EN 14509. The thickness of the steel sheets for the faces has to be within the normal tolerances given in EN 10143.

#### 2.2.2 Core material

The polyurethane core type meTecno System 15 has to fulfil the requirements of EN 13165. The blowing agent is pentane. The values given in this CD are only valid for the foam formulation on which the Type Testing was performed. The declared value of the thermal conductivity is  $\lambda_{\text{declared}} = 0,023 \text{ W/(mK)}$  for core type meTecno System 15.

The density is  $40^{+5}_{-0} \text{ kg/m}^3$ . The core shall fulfil the reaction to fire requirements of class A to E (not F) according EN 13501-1.

#### 2.2.3 Sandwich panels

The sandwich panels consist of a core according to chapter 2.2.2 and faces according to chapter 2.2.1. The core material has to fulfil the requirements of the production control according to table 4. The sandwich panels have to be produced on a continuous line.

The mass of the panels can be calculated by the help of the nominal density of the core according to table 4 and of the steel faces by using a weight of  $80 \text{ kN/m}^3$ .

The thermal transmittance  $U_{d,s}$ -values shown in table 3 are based on the design value of the thermal conductivity  $\lambda_{\text{design}} = 1,0 * \lambda_{\text{declared}}$ .

## 3 MATERIAL SAFETY FACTORS AND WRINKLING STRESSES

For design procedure of EN 14509, annex E, the material safety factors for the ultimate limit state and for the serviceability limit state shall be used according to table 5 and the wrinkling stresses according to tables 7 and 8. The long term shear values are given in table 6.

## 4 BENDING MOMENT CAPACITY

The bending moment capacity shall be calculated by the help of EN 14509, annex E, tables E.10.1 and E.10.2.

For bending moment capacities, no values are given, because these values are not needed in any case for the design according to the normative Annex E of EN 14509. Bending moment capacities on the basis of full scale tests are dependent on the span and the static systems without any effects due to temperature and creeping. A design with these values is therefore not possible on the stage of the valid EN 14509.

## 5 REACTION TO FIRE AND EXTERNAL FIRE PERFORMANCE

**Table 1: Reaction to fire and B<sub>Roof</sub> classification of the sandwich panels with core material meTecno System 15**

Product	Thickness [mm]	Steel thickness [mm]		Classification		Remarks
		inner face	outer face	inside	outside	
"Metecno Monowall", "SISCO Monowall"	40-120	0,45-0,75	0,50-0,75	B-s2, d0	B-s2, d0	-
"Superwall ML"	50-150	0,45-0,75	0,50-0,75	B-s2, d0	E	-
"Metecno Thermowall Kombi", "SISCO Thermowall Kombi"	60-150	0,45-0,75	0,50-0,75	B-s2, d0	B-s2, d0	-
"Metecno H-Wall 8 P", "SISCO H-Wall 8 P"	50-100	0,45-0,75	0,50-0,75	B-s2, d0	E	-
"Sandwichelement G4" and "Topanel"	30-150	0,45-0,75	0,50-0,75	B-s2, d0	B <sub>ROOF</sub> (t1)	-

**Table 2: Valid field of application for the classification given in table 1**

Parameter	Valid field of application
<b>Metal facings</b>	
Grade of metal	Zinc coated steel S 320 and S 350 GD+Z275
Profile geometry of inside facing flat or light profiling up to 5 mm	F, S, P, SU1, L
Profile geometry of outside facing profiles greater than 5 mm	W, T
Surface coating – tested face –PCS	Valid for all coatings with PCS-value in the range 0 to 0,43 MJ/m <sup>2</sup>
Colour of coating	Valid for all colours
<b>Joint design</b>	
Joint Types I, IV, V, VI, VII	Valid for: "Metecno Monowall", "Metecno Superwall ML", "Metecno Thermowall Kombi", "Metecno H-Wall 8 P", "SISCO Monowall", "SISCO Superwall ML", "SISCO Thermowall Kombi", "SISCO H-Wall 8 P", "Metecno G4", "SISCO G4", "SISCOROOF 4 G 1000", "Klößner TOPANEL" and "Sandwichelement G4"
Seals and gaskets (integral with panel)	Valid only for the types of joint seals and gaskets tested and for those with a PCS value of $\leq 5,67$ MJ/m <sup>2</sup>
<b>PU foam insulating core</b>	
PU foam type	meTecno System 15
Density	$40 \text{ kg/m}^3 \leq \rho \leq 45 \text{ kg/m}^3$
<b>Application</b>	
Orientation of panels vertical or horizontal application of sandwich panels	Valid for vertical and horizontal application of sandwich panels as self-supporting wall and roof panels for use in walls and roofs
Metal corner flashings	Coated steel corner flashing with thickness of 0,6 mm and width of at least 50 mm with PCS value in the range 0 to 0,43 MJ/m <sup>2</sup>
Plastic corner flashings	Not valid for plastic corner flashings
Fixings for metal flashings	Valid for fixing spacing of 400 mm or less
Seals which are applied in end use but not part of the manufactured panel	Not valid for seals which are applied in end use but not part of the manufactured panel



## 6 FIRE RESISTANCE

NPD

## 7 WATER PERMEABILITY

NPD

## 8 AIR PERMEABILITY

NPD

## 9 WATER VAPOUR PERMEABILITY

The sandwich panel types Monowall, Thermowall-Kombi, H-Wall 8P, Superwall ML, G4 and Topanel are considered to be impermeable to water vapour.

## 10 AIRBORNE SOUND PERMEABILITY

NPD

## 11 SOUND ABSORPTION

NPD

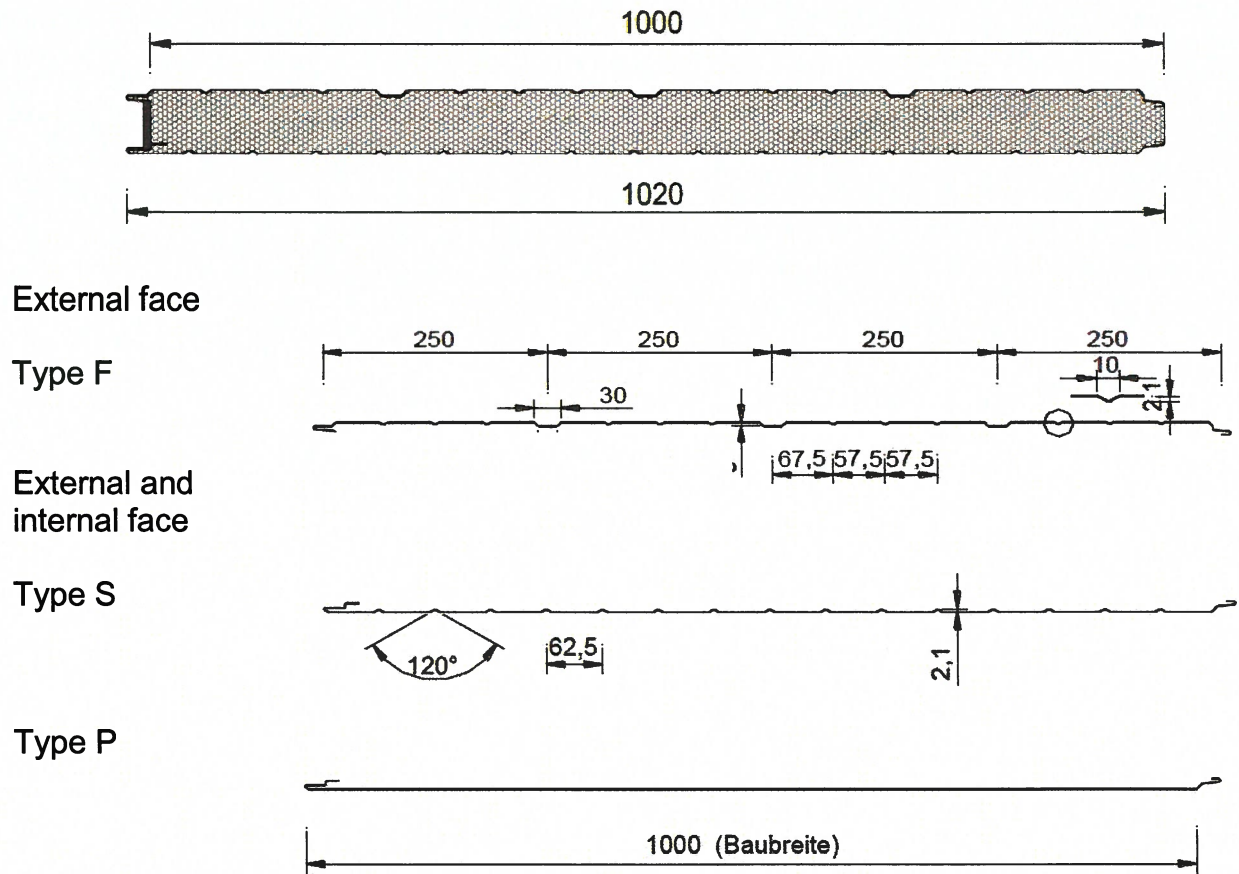
## 12 WALKABILITY

NPD

## 13 THERMAL INSULATION PERFORMANCE

**Table 3: Thermal transmittance  $U_{d,s}$  (W/m<sup>2</sup>K)**

Panel type	G4	To panel	Superwall ML		H-Wall 8P	Mono wall	Thermowall-Kombi		
Type of faces	T / S	T / L	ML / S	P / S	W / S	F / S	S / S	ML / S	P / S
Panel thickness class D [mm]	U-value [W/m <sup>2</sup> K]								
30	0,766	0,769	-	-	-	-	-	-	-
40	0,574	0,575	-	-	-	0,618	-	-	-
50	0,469	0,463	-	-	0,421	0,531	-	-	-
60	0,383	0,383	0,425	0,422	-	0,398	0,396	0,398	0,395
80	0,287	0,287	0,304	0,303	0,269	0,296	0,294	0,295	0,293
100	0,230	0,231	0,240	0,239	0,218	0,235	0,234	0,235	0,234
120	0,191	0,192	0,198	0,198	-	0,195	0,195	0,195	0,194
150	0,153	0,154	0,158	0,157	-	-	0,155	0,155	0,155



**Figure 1: Cross-section of panel type Monowall®**

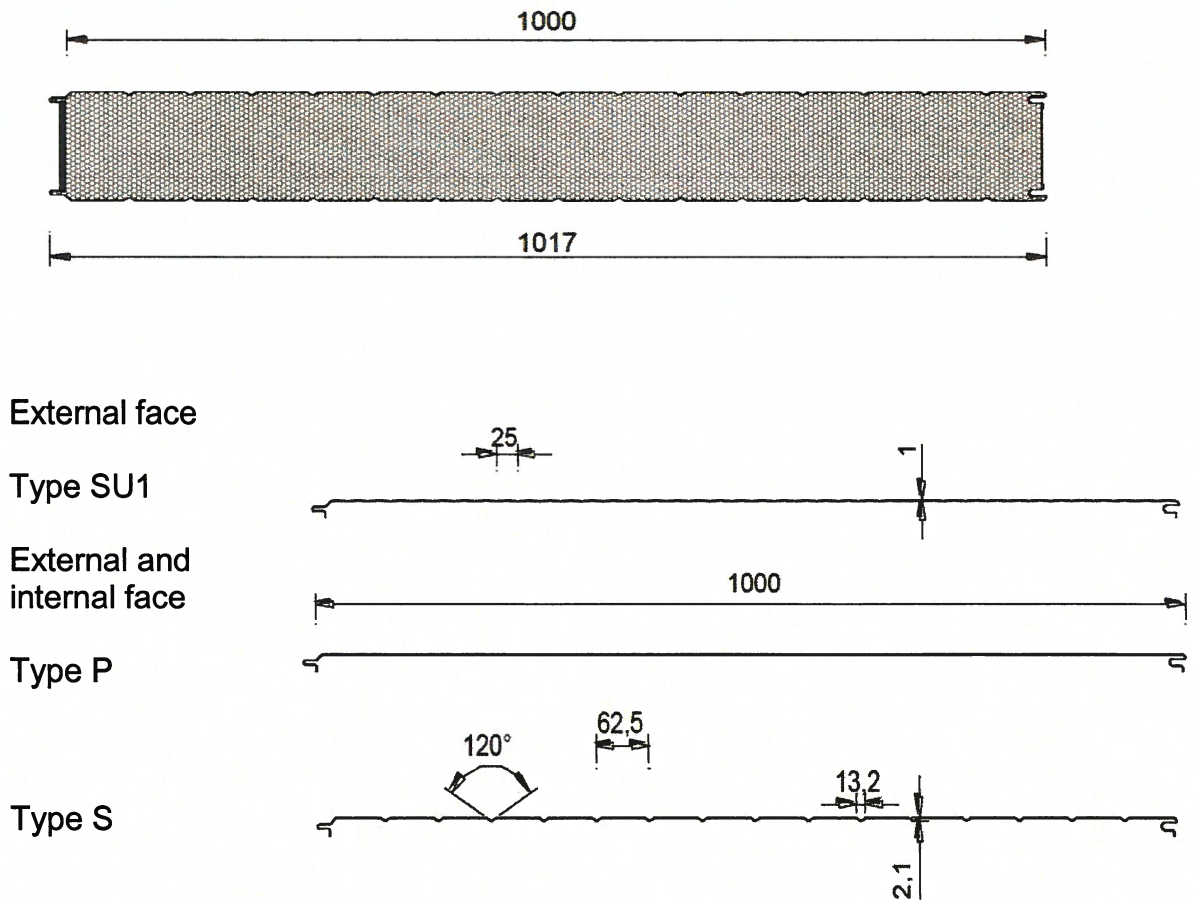


Figure 2: Cross-section of panel type Thermowall-Kombi®

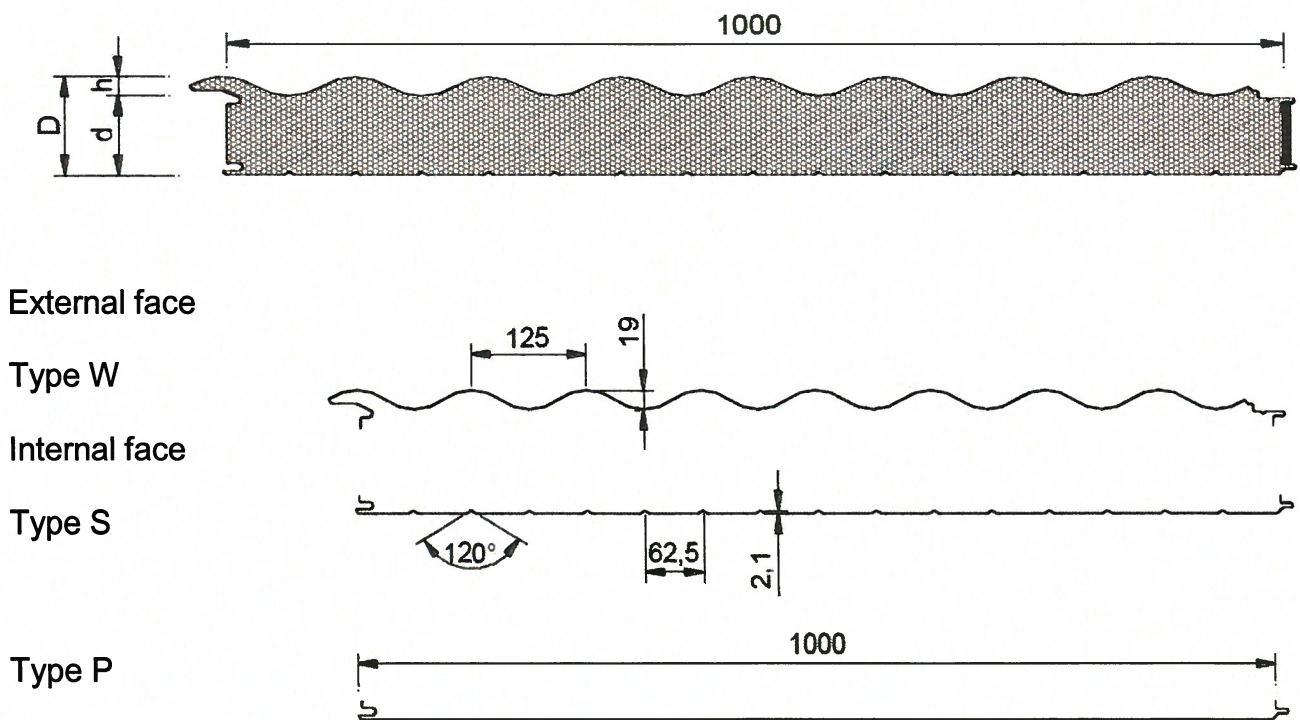


Figure 3: Cross-section of panel type H-Wall® 8P



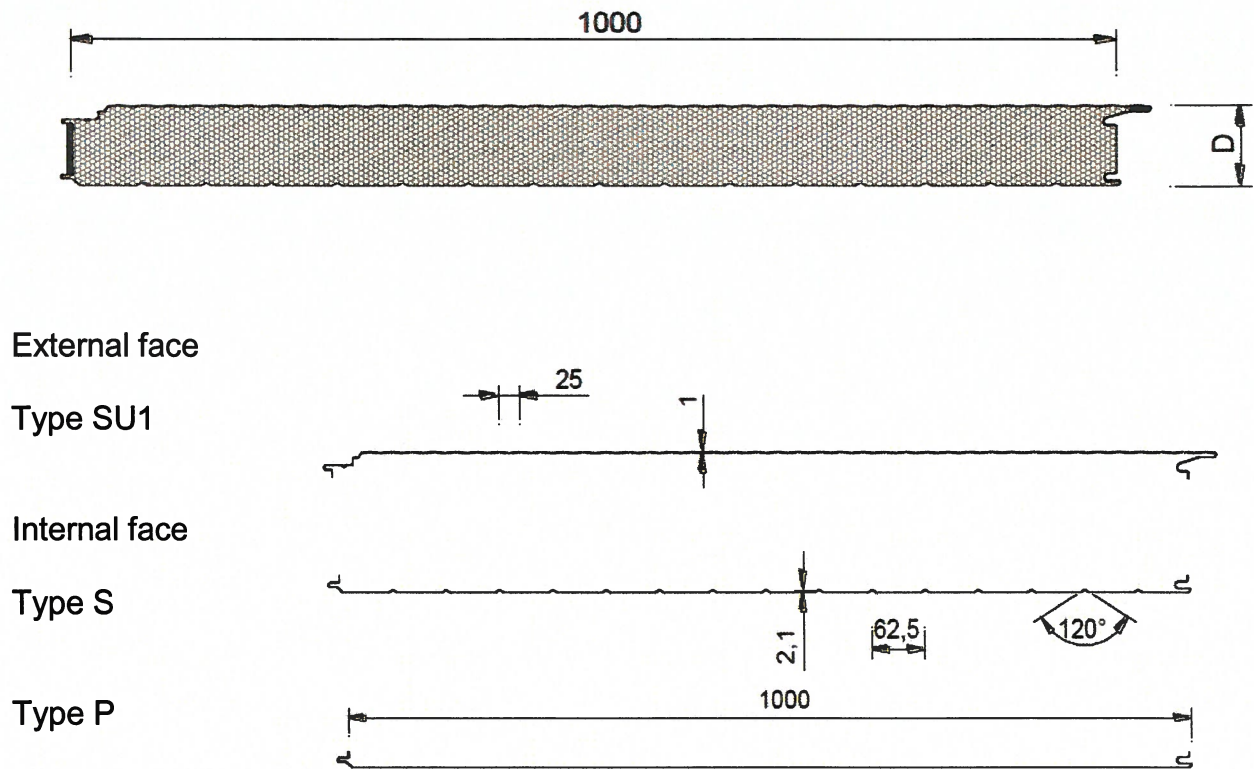


Figure 4: Cross-section of panel type Superwall® ML

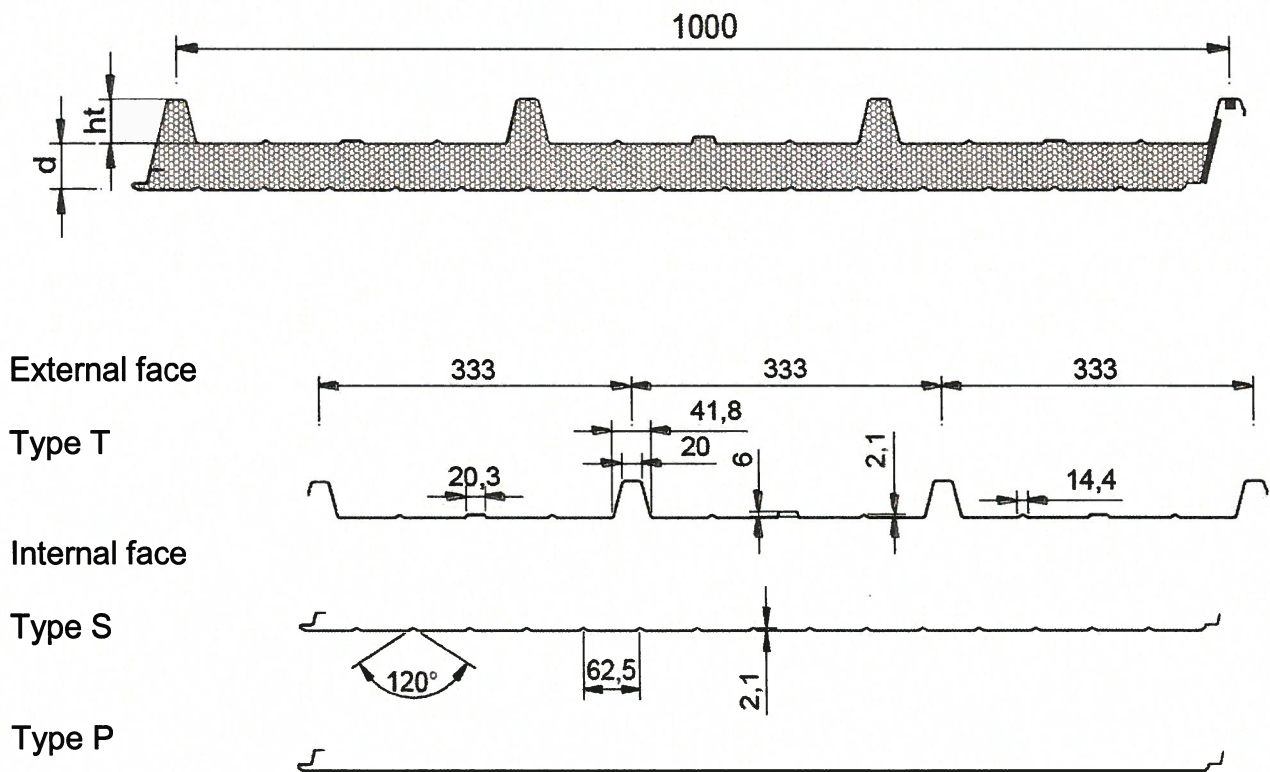
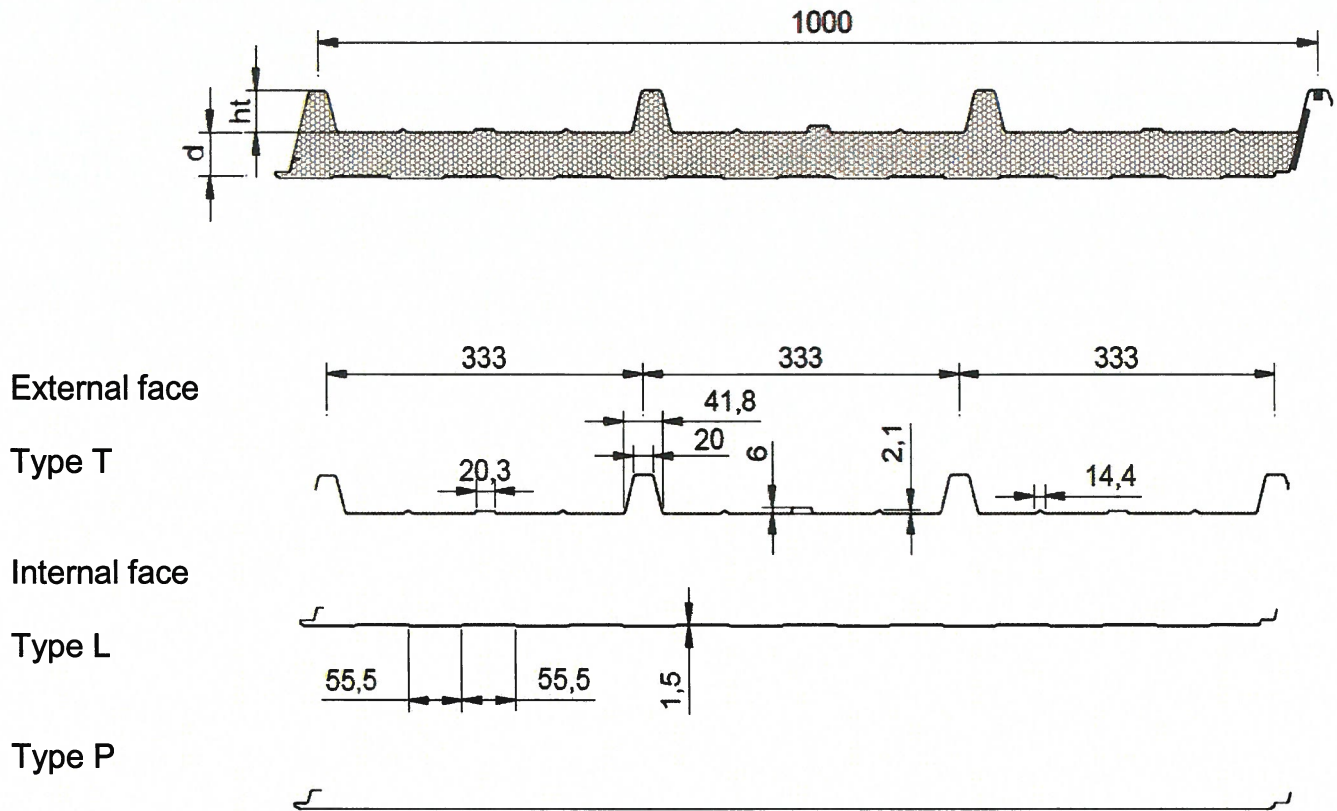


Figure 5: Cross-section of panel type G4® (or SISCO ROOF 4G®)



**Figure 6: Cross-section of panel type TOPANEL®**



**Table 4: Requirements for the production control of the core material meTecno System 15 with faces (mechanical values)<sup>1</sup>**

Characteristic	Unit	Requirements for panels of thickness class D [mm]:						
		30	40	60	80	100	120	150
Density of the PU core	kg/m <sup>3</sup>	40 <sup>+5</sup> <sub>-0</sub>						
Shear modulus G <sub>C</sub> mean value	MPa	3,0	3,1	3,1	2,8	2,8	3,3	3,3
5%-fractile value	MPa	2,1	2,4	2,0	2,3	2,3	3,2	3,2
Shear strength f <sub>c</sub>	MPa	0,11	0,11	0,11	0,11	0,11	0,10	0,12
E-modulus E <sub>C</sub> <sup>2</sup> mean value	MPa	3,2	3,1	2,8	3,1	3,1	4,5	5,8
5%-fractile value	MPa	1,7	2,5	2,0	2,3	2,3	3,2	3,2
Compressive strength f <sub>Cc</sub>	MPa	0,10	0,10	0,10	0,10	0,10	0,10	0,15
Cross panel tensile strength f <sub>Ct</sub>	MPa	0,08	0,08	0,08	0,08	0,08	0,08	0,08

<sup>1</sup> Values for intermediate panel thicknesses can be interpolated.

<sup>2</sup> The stated values are mean values of the mean compressive and cross panel tensile moduli:

$$E_C = \frac{E_{Cc} + E_{Ct}}{2}$$

**Table 5: Material safety factors γ<sub>M</sub> for sandwich panels with core material meTecno System 15**

Property to which γ <sub>M</sub> applies	Limit state	
	Ultimate limit state	Serviceability state
Yielding of a face	1,10	1,00
Wrinkling of a face in the span and at an intermediate support	1,12	1,02
Shear of the core	1,18	1,04
Shear failure of a profiled face	1,10	1,00
Crushing of the core	1,16	1,04
Support reaction capacity of a profiled face	1,10	1,00

**Table 6: Long term shear values for core material meTecno System 15**

Panel thickness [mm]	Long term shear strength: $f_c$ [MPa]	Creep coefficient $\varphi_t$ t = 2000 h	Creep coefficient $\varphi_t$ t = 100000 h
30 to 100	0,05	2,4	7,0
120	0,06	2,4	7,0
150	0,07	2,4	7,0

**Table 7: Wrinkling stresses for external faces,  $t_N = 0,50$  mm and  $0,60$  mm<sup>1</sup>, for core material meTecno System 15**

Geometry of the face	Panel thickness [mm]	Wrinkling stress [MPa]							
		in span		in span, elevated temperature		at central support		at central support, elevated temperature	
		S320	S350	S320	S350	S320	S350	S320	S350
Type P (flat)	30	56	56	48	48	46	46	40	40
	40-100	61	61	52	52	50	50	43	43
	120	73	73	63	63	58	58	50	50
	150	79	79	68	68	63	63	54	54
Type SU1 (micro profiled)	60-150	143	143	123	123	114	114	98	98
Types F and S (lightly profiled)	30	113	118	97	101	92	96	79	83
	40-100	123	129	106	111	100	105	86	90
	120	129	135	111	116	103	108	89	93
	150	139	146	120	126	111	117	95	101
Type W (corrugated)	50, 80	297	325	297	325	297	325	297	325
	100	320	337	320	337	320	337	320	337
Type T (profiled)	30-100	320	350	320	350	320	350	320	350
	120	320	340	320	340	320	340	320	340
	150	310	327	310	327	310	327	310	327

<sup>1</sup> Reduction factors for the wrinkling stresses for face thicknesses  $t_N > 0,60$  mm:

Geometry of the face	0,75 mm
Type P	1,00
Type S	0,88
Types F, SU1	0,87

**Table 8: Wrinkling stresses for internal faces,  $t_N = 0,45$  mm,  $0,50$  mm and  $0,60$  mm<sup>1</sup>, for core material meTecno System 15**

Geometry of the face	Panel thickness [mm]	Wrinkling stress [MPa]			
		in span		at central support	
		S320	S350	S320	S350
Type P and L	30	56	56	51	51
	40-100	61	61	55	55
	120	73	73	66	66
	150	79	79	71	71
Type S	30	113	118	102	107
	40-100	123	129	111	116
	120	129	135	117	122
	150	139	146	125	131

<sup>1</sup> Reduction factors for the wrinkling stresses for face thicknesses  $t_N > 0,60$  mm:

Geometry of the face	0,75 mm
Type P and L	1,00
Type S	0,88



## Liability

The “European Association for Panels and Profiles” (PPA-Europe) located in Krefeld/Germany certifies and monitors at the wish of the manufacturers the sandwich panels and profiled sheets produced by them and awards the “EPAQ Quality Label” after successful certification.

In doing this, PPA-Europe and its representatives take the statutory regulations and the trust of end users in the certified products very seriously and make use of external experts for the substantive and technical examination of the construction products whose test results are checked once more by PPA-Europe. The same applies for the subsequent monitoring by PPA-Europe.

Nevertheless, it is possible that individual products unintentionally do not fully comply with the high level of quality and may lead to damage to the construction. If, in such a case, a claim is made on the manufacturer due to faulty quality or faulty delivery of the construction products, claims of recourse for this reason on PPA-Europe or its representatives may only be invoked in cases of intentional or grossly negligent behaviour during the certification or monitoring.

The certification and subsequent monitoring executed by PPA-Europe and its representatives does not affect the obligation of the manufacturer for a proper and constant level of quality and standard of the products.

With the exemption of intentional or grossly negligent action on the part of PPA-Europe and its representatives, we are only liable for the direct damage to the construction caused by the faulty product; all further subsequent damages are excluded.



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Chairman of the Quality Committee for Panels