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Lid van EOTA  
Member of EOTA

### European Technical Approval (original version is in the English language)

**ETA 13/0411**

**Trade name**

**PhoneStar**

**Holder of the approval**

**Wolf Bavaria GmbH  
Gutenbergstrasse 8  
D-91560 Heilsbronn, Germany  
[www.wolf-bavaria.com](http://www.wolf-bavaria.com)**

**Generic type and use  
of construction product**

**Self-supporting composite lightweight  
panels for use in internal walls**

**Validity from to**

**2013-06-17  
2018-06-17**

**Manufacturing plant**

**Plant 1, Plant 2, Plant 3**

**Kiwa K76014/01**

**This European Technical Approval  
contains**

**34 pages**



Europese Organisatie voor Technische Goedkeuringen  
European Organisation for Technical Approvals  
Europäische Organisation für Technische Zulassungen  
Organisation pour l'Agrément Technique Européen

## I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European Technical Approval is issued by Kiwa Nederland B.V., further mentioned as Kiwa, in accordance with:
  - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, modified by the Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N<sup>o</sup> 1882/2003 of the European Parliament of the Council<sup>3</sup>;
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex of Commission Decision 94/23/EC<sup>4</sup>.
  - Guideline for European technical approval of internal partition kits for use as non-load bearing walls, ETAG no 003.
- 2 Kiwa is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
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<sup>1</sup> Official Journal of the European Communities N<sup>o</sup> L 40, 11.02.1989, p. 12

<sup>2</sup> Official Journal of the European Communities N<sup>o</sup> L 220, 30.08.1993, p. 1

<sup>3</sup> Official Journal of the European Union N<sup>o</sup> L 284, 31 October 2003, p. 25

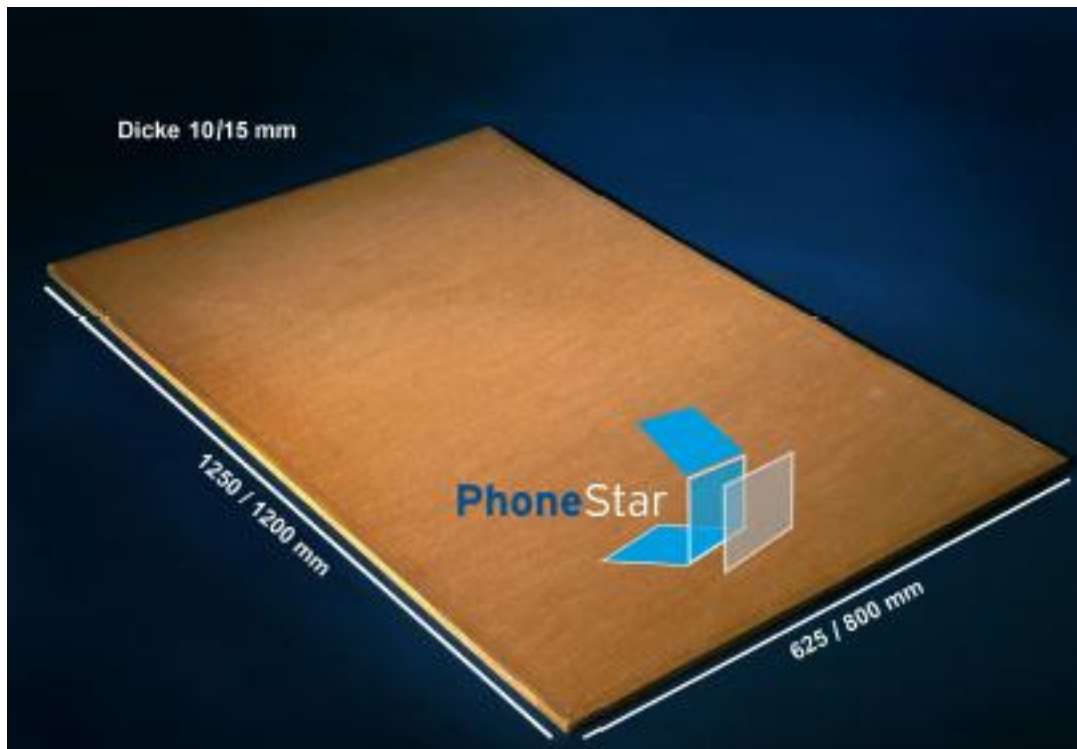
<sup>4</sup> Official Journal of the European Communities N<sup>o</sup> L17, 20 Jan 1994, p 34.

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 DEFINITION OF PRODUCTS AND INTENDED USE

#### 1.1 Definition of products

PhoneStar are boards made of water resistance corrugated cardboard. Hollow spaces are filled with a mixture of dry sand; the cutting edges were closed by an adhesive paper tape. PhoneStar are self-supporting composite lightweight boards for use in internal walls.



The PhoneStar boards are produced in two thicknesses 10 and 15 mm. PhoneStar boards have a length of 1000 mm up to 1250 mm and a width of 500 mm up to 800 mm.

In general there are three different types of PhoneStar:

PhoneStar Twin



Thickness 10 mm  
Two Waves in one direction

PhoneStar Tri



Thickness 15 mm  
Three wave in one direction

PhoneStar Professional



Thickness 15 mm  
Three wave crossed

## 1.2 Geometry PhoneStar boards

The dimensions of the PhoneStar boards are:

Length : 1000 to 1250 mm;  
Width : 500 to 800 mm;  
Thickness : 10 or 15 mm.

With the following tolerances determined to EN 822:

Length :  $\pm 3$  mm;  
Width :  $\pm 3$  mm;  
Thickness :  $\pm 1$  mm;  
Squareness :  $\pm 1$  mm/m.

## 1.3 Density PhoneStar boards

The density of the PhoneStar boards is  $1300 \text{ kg/m}^3 \pm 100 \text{ kg/m}^3$ .

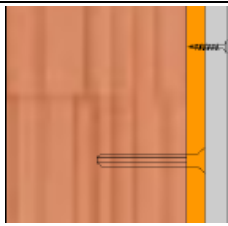
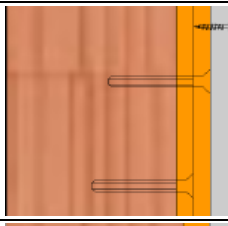

## 1.4 Surface hardness PhoneStar boards

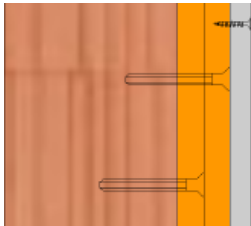
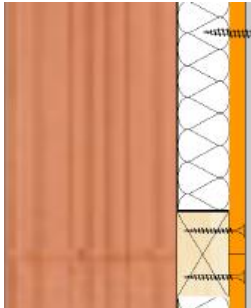
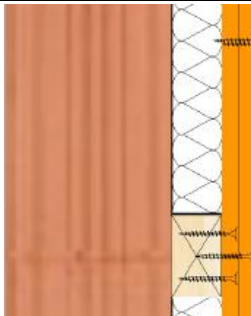
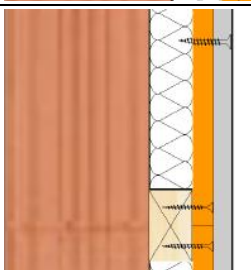
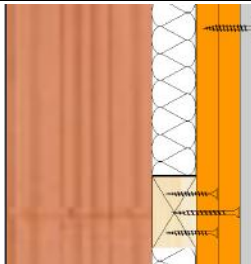
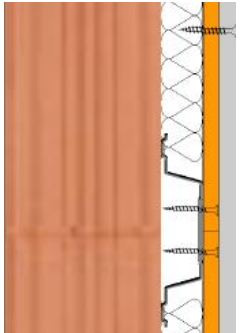
The surface hardness of the PhoneStar boards is  $\leq 15$  mm determined in accordance with EN 520.

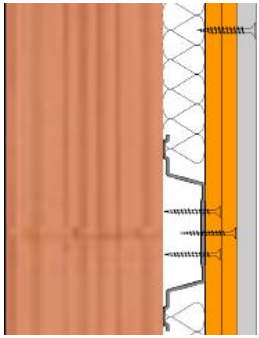
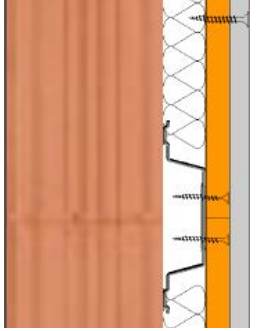
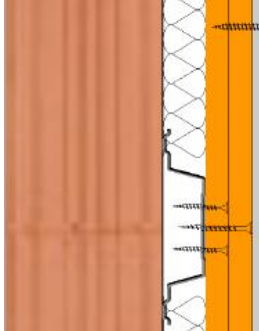
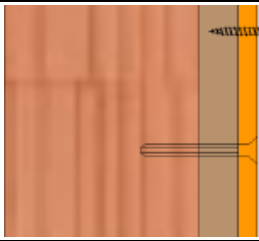
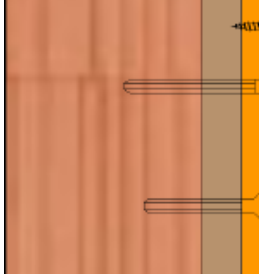
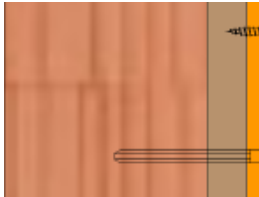
## 1.5 Intended use

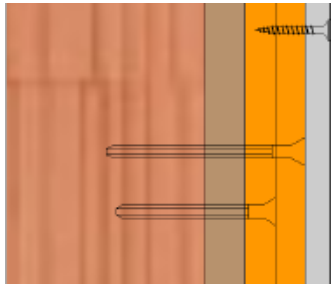
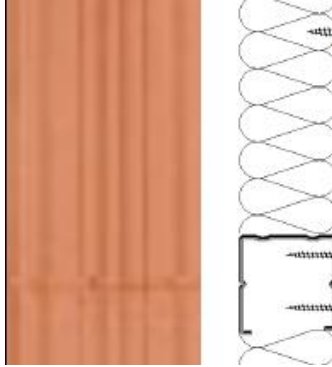
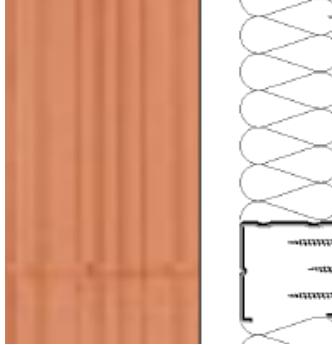
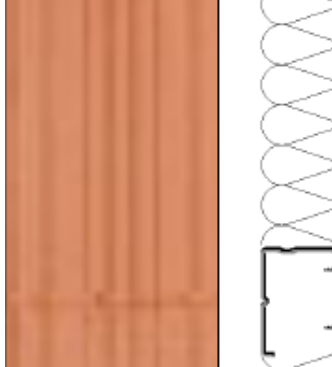
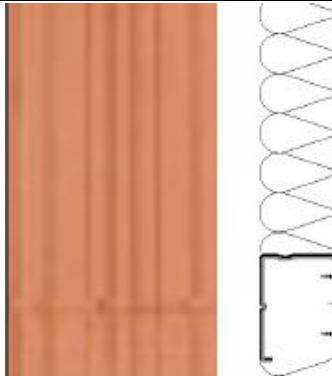
PhoneStar boards for planking and lining of building components. PhoneStar boards are only to be used as additional panel(s) behind the surface panel of internal walls and ceilings in order to improve acoustic performance. PhoneStar boards can not be the final layer. It is necessary to screw and or glue a plaster board on top of PhoneStar. Examples of applications are given in the following tables.

### 1.5.1 Application area: Masonry walls

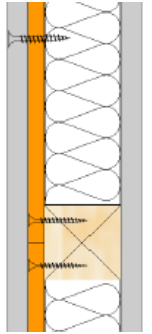
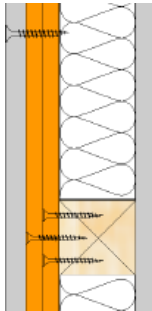
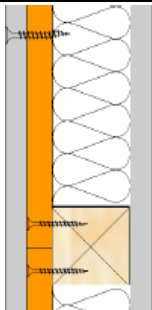
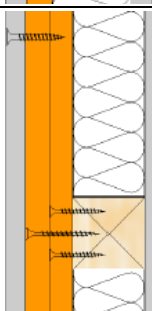
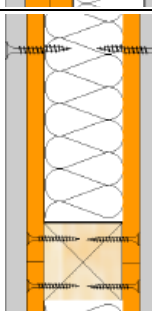
Type	Ref. No	Constructions on <b>masonry</b> walls	Thickness [mm]	System drawing
1	WMZ D 1.1	Masonry wall 115 mm Twin 10 mm Plasterboard 12,5 mm	22,5	
2	WMZ D 1.1 2 x 10 mm	Masonry wall 2 x Twin 10 mm Plasterboard 12,5 mm	32,5	
3	WMZ D 1.2	Masonry wall PhoneStar 15 mm Plasterboard 12,5 mm	17,5	

Type	Ref. No	Constructions on <b>masonry</b> walls	Thickness [mm]	System drawing
4	WMZ D 1.2 2 x 15 mm	Masonry wall 2 x PhoneStar 15 mm Plasterboard 12,5 mm	42,5	
5	WMZ L 1.2	Masonry wall Battens W 50 x T 30 mm Twin 10 mm Plasterboard 12,5 mm	52,5	
6	WMZ L 1.2 2 x 10 mm	Masonry wall Battens W 50 x T 30 mm 2 x Twin 10 mm Plasterboard 12,5 mm	62,5	
7	WMZ L 1.2	Masonry wall Battens W 50 x T 30 mm PhoneStar 15 mm Plasterboard 12,5 mm	57,5	
8	WMZ L 1.2 2 x 15 mm	Masonry wall Battens W 50 x T 30 mm 2 x PhoneStar 15 mm Plasterboard 12,5 mm	72,5	
9	WMZ H 1.1	Masonry wall Resilient bars T 27 mm Twin 10 mm Plasterboard 12,5 mm	49,5	

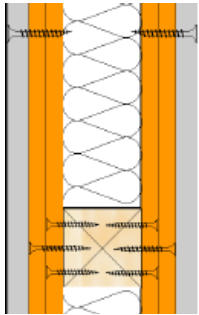
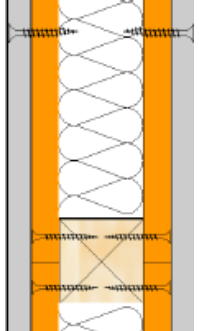
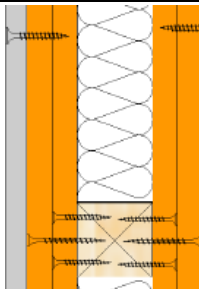
Type	Ref. No	Constructions on <b>masonry</b> walls	Thickness [mm]	System drawing
10	WMZ H 1.1 2 x 10 mm	Masonry wall Resilient bars T 27 mm 2 x Twin 10 mm Plasterboard 12,5 mm	59,5	
11	WMZ H 1.2	Masonry wall Resilient bars T 27 mm PhoneStar 15 mm Plasterboard 12,5 mm	54,5	
12	WMZ H 1.2 2 x 15 mm	Masonry wall Resilient bars T 27 mm PhoneStar 15 mm Plasterboard 12,5 mm	69,5	
13	WMZ W 1.1	Masonry wall Wood fiber 20 mm Twin 10 mm Plasterboard 12,5	42,5	
14	WMZ W 1.1 2 x 10 mm	Masonry wall Wood fiber 20 mm 2 x Twin 10 mm Plasterboard 12,5	52,5	
15	WMZ W 1.2	Wood fiber 20 mm PhoneStar 15 mm Plasterboard 12,5	47,5	

Type	Ref. No	Constructions on <b>masonry</b> walls	Thickness [mm]	System drawing
16	WMZ W 1.2 2 x 15 mm	Wood fiber 20 mm 2 x Twin 15 mm Plasterboard 12,5	62,5	
17	WMZ V 1.1	Air gab 10 mm Steel stud T 50 mm (Cavity) Twin 10 mm Plasterboard 12,5 mm	82,5	
18	WMZ V 1.1 2 x 10 mm	Air gab 10 mm Steel stud T 50 mm (Cavity) 2 x Twin 10 mm Plasterboard 12,5 mm	92,5	
19	WMZ V 1.2	Air gab 10 mm Steel stud T 50 mm (Cavity) PhoneStar 15 mm Plasterboard 12,5 mm	87,5	
20	WMZ V 1.2 2 x 15 mm	Air gab 10 mm Steel stud T 50 mm (Cavity) 2 x PhoneStar 15 mm Plasterboard 12,5 mm	112,5	

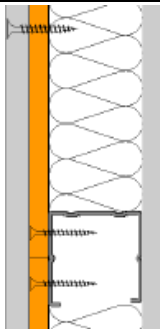
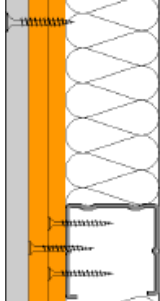
**1.5.2 Application area: Timber stud walls**

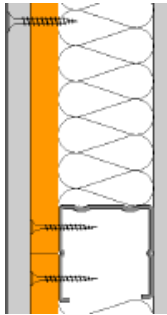
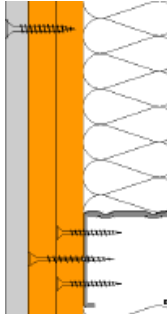
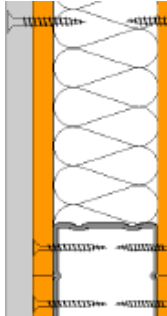
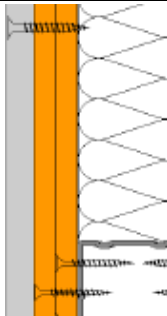
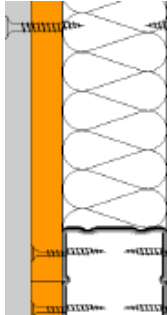
Type	Ref. No	Constructions on <b>timber stud walls</b>	Thickness [mm]	System drawing
1	WSH 1.1	Plasterboard 12,5 mm Twin 10 mm Timber stud T 45 mm (Cavity) Plasterboard 12,5 mm	80,0	
2	WSH 1.1 2 x 10 mm	Plasterboard 12,5 mm 2 x Twin 10 mm Timber stud T 45 mm (Cavity) Plasterboard 12,5 mm	90,0	
3	WSH 1.2	Plasterboard 12,5 mm PhoneStar 15 mm Timber stud T 45 mm (Cavity) Plasterboard 12,5 mm	85,0	
4	WSH 1.2 2 x 15 mm	Plasterboard 12,5 mm 2 x PhoneStar 15 mm Timber stud T 45 mm (Cavity) Plasterboard 12,5 mm	100	
5	WSH 2.1	Plasterboard 12,5 mm Twin 10 mm Timber stud T 45 mm (Cavity) Twin 10 mm Plasterboard 12,5 mm	90,0	

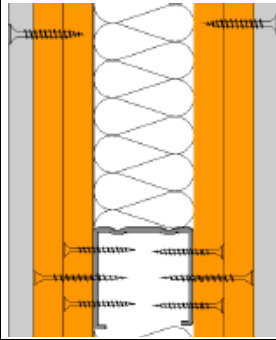


Type	Ref. No	Constructions on <b>timber stud</b> walls	Thickness [mm]	System drawing
6	WSH 2.1 2 x 10 mm	Plasterboard 12,5 mm 2 x Twin 10 mm Timber stud T 45 mm (Cavity) 2 x Twin 10 mm Plasterboard 12,5 mm	110,0	
7	WSH 2.2	Plasterboard 12,5 mm Twin 15 mm Timber stud T 45 mm (Cavity) Twin 15 mm Plasterboard 12,5 mm	90,0	
8	WSH 2.2 2 x 15 mm	Plasterboard 12,5 mm 2 x Twin 15 mm Timber stud T 45 mm (Cavity) 2 x Twin 15 mm Plasterboard 12,5 mm	120,0	

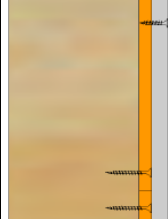
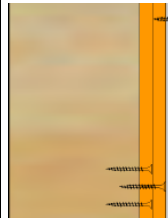
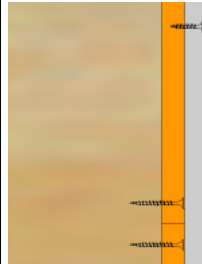
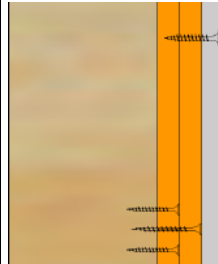
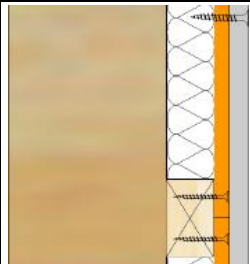
### 1.5.3 Application area: Steel stud walls

Type	Ref. No	Constructions on <b>steel stud</b> walls	Thickness [mm]	System drawing
1	WSM 1.1	Plasterboard 12,5 mm Twin 10 mm Steel stud T 50 mm (Cavity) Plasterboard 12,5 mm	85,0	
2	WSM 1.1 2 x 10 mm	Plasterboard 12,5 mm 2 x Twin 10 mm Steel stud T 50 mm (Cavity) Plasterboard 12,5 mm	95,0	

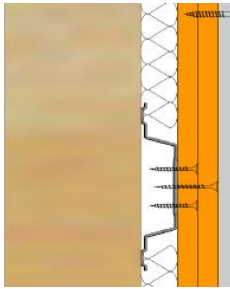
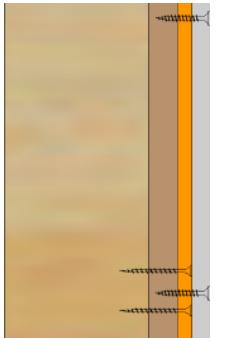
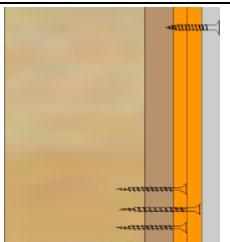
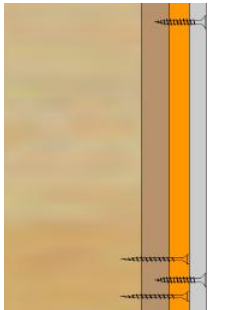
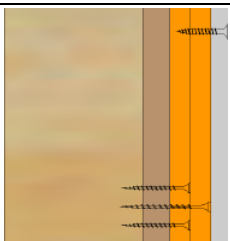
Type	Ref. No	Constructions on <b>steel stud</b> walls	Thickness [mm]	System drawing
3	WSM 1.2	Plasterboard 12,5 mm PhoneStar 15 mm Steel stud T 50 mm (Cavity) Plasterboard 12,5 mm	90,0	
4	WSM 1.2 2 x 15 mm	Plasterboard 12,5 mm 2 x PhoneStar 15 mm Steel stud T 45 mm (Cavity) Plasterboard 12,5 mm	105	
5	WSM 2.1	Plasterboard 12,5 mm Twin 10 mm Steel stud T 50 mm (Cavity) Twin 10 mm Plasterboard 12,5 mm	95,0	
6	WSM 2.1 2 x 10 mm	Plasterboard 12,5 mm 2 x Twin 10 mm Steel stud T 50 mm (Cavity) 2 x Twin 10 mm Plasterboard 12,5 mm	115,0	
7	WSM 2.2	Plasterboard 12,5 mm Twin 15 mm Steel stud T 50 mm (Cavity) Twin 15 mm Plasterboard 12,5 mm	105,0	

Type	Ref. No	Constructions on <b>steel stud</b> walls	Thickness [mm]	System drawing
8	WSM 2.2 2 x 15 mm	Plasterboard 12,5 mm 2 x Twin 15 mm Steel stud T 50 mm (Cavity) 2 x Twin 15 mm Plasterboard 12,5 mm	130,0	

#### 1.5.4 Application area: Solid timber walls

Type	Ref. No	Constructions on <b>solid timber</b> walls	Thickness [mm]	System drawing
1	WMH D 1.1	Solid timber wall Twin 10 mm Plasterboard 12,5 mm	22,5	
2	WMH D 1.1 2 x 10 mm	Solid timber wall 2 x Twin 10 mm Plasterboard 12,5 mm	32,5	
3	WMH D 1.2	Solid timber wall PhoneStar 15 mm Plasterboard 12,5 mm	17,5	
4	WMH D 1.2 2 x 15 mm	Solid timber wall 2 x PhoneStar 15 mm Plasterboard 12,5 mm	42,5	
5	WMH L 1.2	Solid timber wall Battens W 50 x T 30 mm Twin 10 mm Plasterboard 12,5 mm	52,5	

Type	Ref. No	Constructions on <b>solid timber</b> walls	Thickness [mm]	System drawing
6	WMH L 1.2 2 x 10 mm	Solid timber wall Battens W 50 x T 30 mm 2 x Twin 10 mm Plasterboard 12,5 mm	62,5	
7	WMH L 1.2	Solid timber wall Battens W 50 x T 30 mm PhoneStar 15 mm Plasterboard 12,5 mm	57,5	
8	WMH L 1.2 2 x 15 mm	Solid timber wall Battens W 50 x T 30 mm 2 x PhoneStar 15 mm Plasterboard 12,5 mm	72,5	
9	WMH H 1.1	Solid timber wall Resilient bars T 27 mm Twin 10 mm Plasterboard 12,5 mm	49,5	
10	WMH H 1.1 2 x 10 mm	Solid timber wall Resilient bars T 27 mm 2 x Twin 10 mm Plasterboard 12,5 mm	59,5	
11	WMH H 1.2	Solid timber wall Resilient bars T 27 mm PhoneStar 15 mm Plasterboard 12,5 mm	54,5	








Type	Ref. No	Constructions on <b>solid timber</b> walls	Thickness [mm]	System drawing
12	WMH H 1.2 2 x 15 mm	Solid timber wall Resilient bars T 27 mm PhoneStar 15 mm Plasterboard 12,5 mm	69,5	
13	WMH W 1.1	Solid timber wall Wood fiber 20 mm Twin 10 mm Plasterboard 12,5	42,5	
14	WMH W 1.1 2 x 10 mm	Solid timber wall Wood fiber 20 mm 2 x Twin 10 mm Plasterboard 12,5	52,5	
15	WMH W 1.2	Solid timber wall Wood fiber 20 mm PhoneStar 15 mm Plasterboard 12,5	47,5	
16	WMH W 1.2 2 x 15 mm	Solid timber wall Wood fiber 20 mm 2 x Twin 15 mm Plasterboard 12,5	62,5	

### 1.5.5 Intended use

The intended working life of the PhoneStar plates is assumed to be at least 10 years.

The indication of the working life of a system cannot be interpreted as a guarantee given by the producer (or the approval body) but is regarded only as a mean of choosing the right products in relation to the expected economically reasonable working life.

## 1.6 Other components

Product	Picture	Description
<b>Wolf Tape</b> Roll / 50 m		Taping cutting edges of PhoneStar
<b>Wolf System Glue</b> Bottle 1,1 kg Approx. 10 m <sup>2</sup> a bottle		Gluing plasterboards on PhoneStar at different systems solutions. Or gluing PhoneStar together.
<b>Wolf System Dowel</b> Box: 50 / 250 pcs. Dimensions: 6 x 60, 6 x 80, 8 x 100 mm Consumption: 12 pcs. / plate		Direct installing PhoneStar on masonry walls
<b>Gypsum screw</b> Dimension: 5,5 x 38 mm Box: 500 pcs.		Fixing a plasterboard in PhoneStar
<b>Timber Screw</b> Dimension: 3,9 x 35 mm Box: 1000 pcs.		Fixing PhoneStar plates in timber constructions
<b>Metal Screw</b> Dimension: 3,9 x 35 mm Box: 1000 pcs.		Fixing PhoneStar plates in metal constructions.
<b>Gypsum fibre Screw</b> Dimension: 3,9 x 22 mm Box: 1000 pcs		Fixing Plasterboard in PhoneStar in connection with Wolf System Glue.

## 2 Characteristics of the product and methods of verification

### 2.1 ER 1 – Mechanical resistance

#### 2.1.1 Reaction to fire

PhoneStar panels are non-load bearing panels, therefore the mechanical resistance is considered under chapter 2.4 Safety in use (ER4).

## 2.2 ER 2 – Safety in case of fire

### 2.2.1 Reaction to fire

The PhoneStar panels, in relation to its reaction of fire behaviour are tested in accordance with EN 13501-1 and classified E.

### 2.2.2 Resistance to fire

Resistance to fire has not been determined and will be classified as NPD.

### 2.2.3 External fire performance

External fire performance is not considered in ETAG 016 part 4.

## 2.3 ER 3 – Hygiene, health and environment

### 2.3.1 Water permeability

Water permeability has not been determined and will be classified as NPD.

### 2.3.2 Vapour permeability

The water vapour resistance factor  $\mu$  according to EN 12572:

- PhoneStar 10 mm = 17;
- PhoneStar 15 mm = 14.

### 2.3.3 Release of dangerous substances

PhoneStar boards do not contain dangerous substances.

In addition there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

### 2.3.4 Dimensional variations related to water penetration

Dimensional variations related to water penetration have not been determined and will be classified as NPD.

## 2.4 ER 4 – Safety in use

### 2.4.1 Mechanical resistance

PhoneStar panels are tested to determine the mechanical strength of a simply supported panel subject to positive load and the mechanical strength of a fixed panel subject to negative load. The results shown in the following table.

Product	Span in mm	Load	Max. Load (N) (avg)	Distance in mm (avg)
PhoneStar Twin	312,5	Positive	1654,00	49,67
		Negative	1575,00	24,07
	625,0	Positive	327,33	53,67
		Negative	1062,67	43,20

Product	Span in mm	Load	Max. Load (N) (avg)	Distance in mm (avg)
PhoneStar Tri	312,5	Positive	4273,67	47,33
		Negative	3458,67	21,63
	625,0	Positive	1113,33	82,20
		Negative	2398,33	53,10
PhoneStar Professional	312,5	Positive	3512,67	43,07
		Negative	2783,67	23,37
	625,0	Positive	962,00	73,23
		Negative	2053,67	47,30

### 2.4.2 Impact resistance

Impact resistance has not been determined and will be classified as NPD.

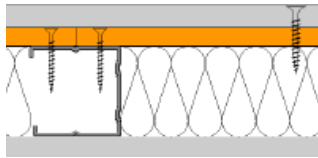
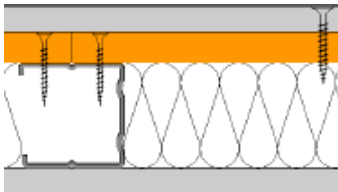
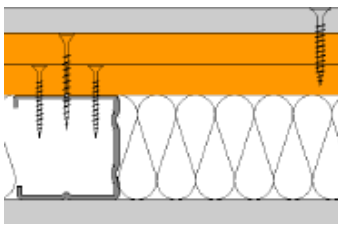
### 2.4.3 Resistance to fixings

Resistance to fixings has not been determined and will be classified as NPD.

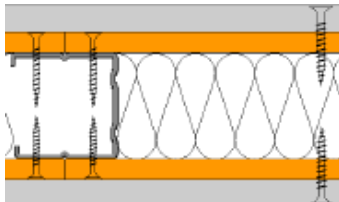
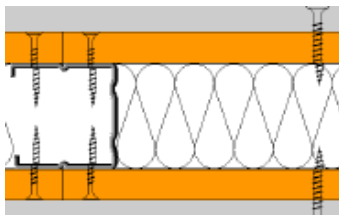
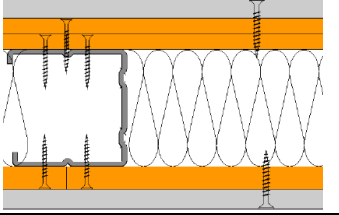
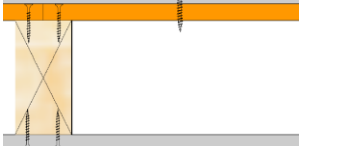
## 2.5 ER 5 – Protection against noise

### 2.5.1 Direct airborne insulation

The laboratory airborne sound insulation has been determined according to EN 140 – 3 for the constructions are given in following table:

Type	Ref. No	Construction	Thickness [mm]	Airborne sound insulation, $R_w$ [dB]	System drawing
1	WSM 1.1	Plasterboard 12,5 mm PhoneStar 10 mm Steel stud T 50 mm (Cavity) Plasterboard 12,5 mm	85,0	49	
2	WSM 1.2	Plasterboard 12,5 mm PhoneStar 15 mm Steel stud T 50 mm (Cavity) Plasterboard 12,5 mm	90,0	51	
3	WSM 1.2 2 x 15 mm	Plasterboard 12,5 mm PhoneStar 15 mm PhoneStar 15 mm Steel stud T 45 mm (Cavity) Plasterboard 12,5 mm	105	54	



Type	Ref. No	Construction	Thickness [mm]	Airborne sound insulation, $R_w$ [dB]	System drawing
4	WSM 2.1	Plasterboard 12,5 mm Twin 10 mm Steel stud T 50 mm (Cavity) Twin 10 mm Plasterboard 12,5 mm	95,0	55	
5	WSM 2.2	Plasterboard 12,5 mm PhoneStar 15 mm Steel stud T 50 mm (Cavity) PhoneStar 15 mm Plasterboard 12,5 mm	105,0	59	
6	WSM	Plasterboard 12,5 mm PhoneStar 10 mm PhoneStar 10 mm Steel stud T 75 mm (Cavity) PhoneStar 15 mm Plasterboard 12,5 mm	90,0	60 dB	
7	WSH 1.2	Plasterboard 15,0 mm PhoneStar 15 mm Timber stud T 101,6 x 50,8 mm (no Cavity) Plasterboard 15,0 mm	146,6	50 dB	

## 2.5.2 Sound absorption

The sound absorption has not been and will be classified NPD.

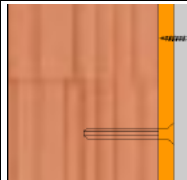
## 2.6 ER 6 – Energy economy and heat retention

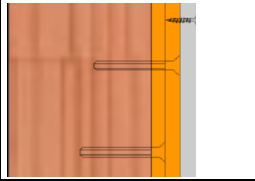
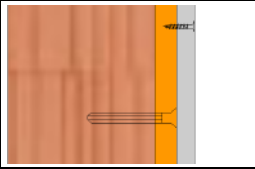
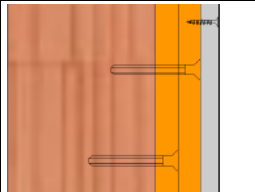
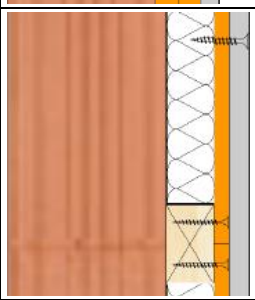
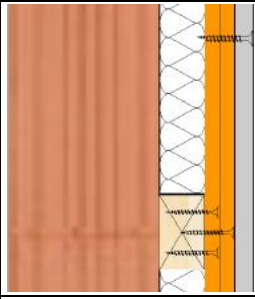
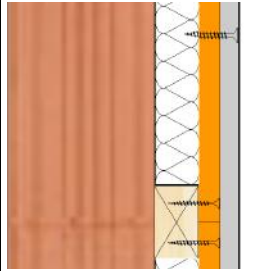
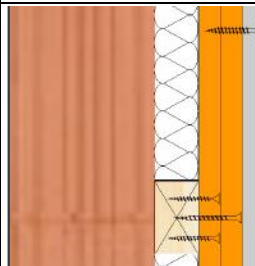
### 2.6.1 Thermal insulation properties

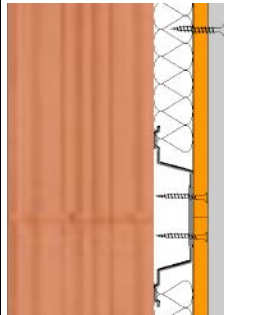
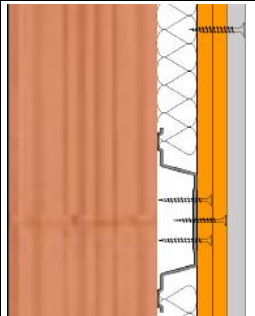
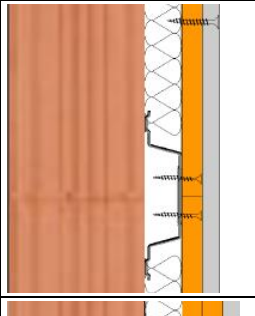
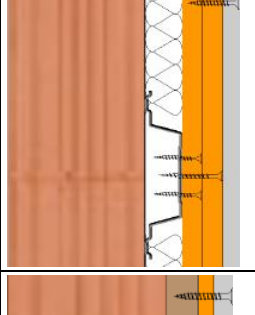
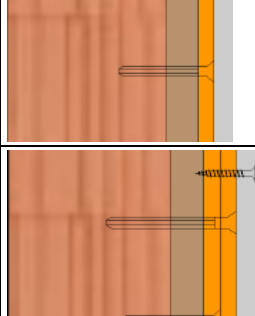
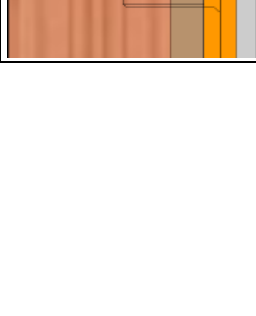
The thermal conductivity ( $\lambda$ ) of PhoneStar panels is  $\leq 0.17$  W/(m·K) according to EN 12664.

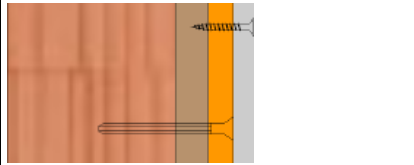
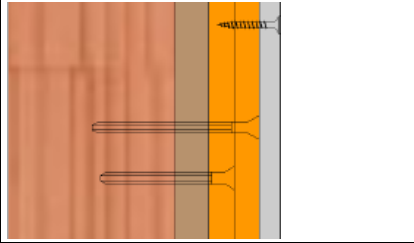
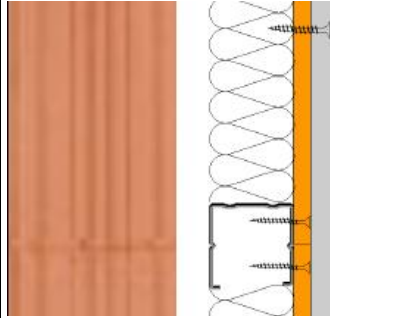
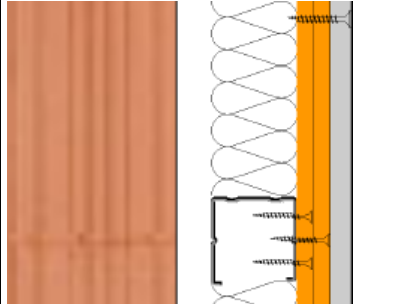
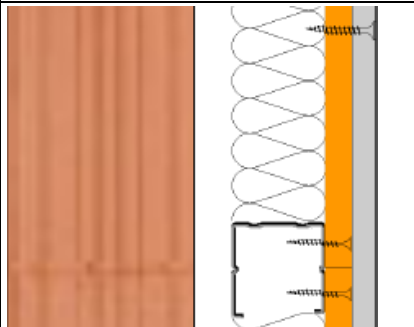
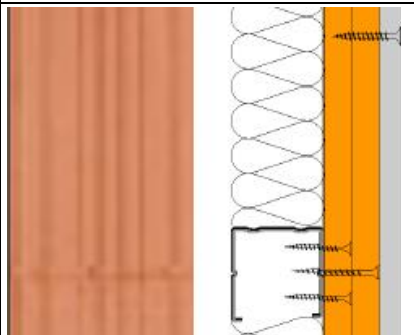
The calculated U-values for thermal conductivity of exemplary constructions have been determined according to EN 6946 for the constructions are given in the following tables.

#### 2.6.2.1 Masonry walls

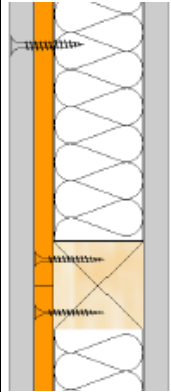
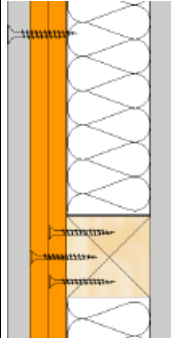
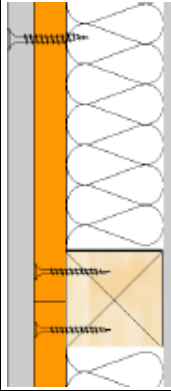
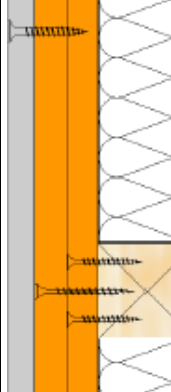
Type	Ref. No	Constructions on <b>masonry walls</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
1	WMZ D 1.1	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	152,5	1,30	

Type	Ref. No	Constructions on <b>masonry walls</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
2	WMZ D 1.1 2 x 10 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	162,5	1,21	
3	WMZ D 1.2	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	157,5	1,26	
4	WMZ D 1.2 2 x 15 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	172,5	1,13	
5	WMZ L 1.2	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Battens W 50 x T 30 mm Mineral wool 30 mm / 0,041 PhoneStar 10 mm Plasterboard 12,5 mm	182,5	0,72	
6	WMZ L 1.2 2 x 10 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Battens W 50 x T 30 mm Mineral wool 30 mm / 0,041 PhoneStar 10 mm PhoneStar 10 mm Plasterboard 12,5 mm	192,5	0,69	
7	WMZ L 1.2	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Battens W 50 x T 30 mm Mineral wool 30 mm / 0,041 PhoneStar 15 mm Plasterboard 12,5 mm	187,5	0,70	
8	WMZ L 1.2 2 x 15 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Battens W 50 x T 30 mm Mineral wool 30 mm / 0,041 PhoneStar 15 mm PhoneStar 15 mm Plasterboard 12,5 mm	202,5	0,66	

Type	Ref. No	Constructions on <b>masonry walls</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
9	WMZ H 1.1	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Resilient bars T 27 mm Mineral wool / 0,40 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	179,5	0,69	
10	WMZ H 1.1 2 x 10 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Resilient bars T 27 mm Mineral wool / 0,40 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	189,5	0,67	
11	WMZ H 1.2	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Resilient bars T 27 mm Mineral wool / 0,40 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	184,5	0,68	
12	WMZ H 1.2 2 x 15 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Resilient bars T 27 mm Mineral wool / 0,40 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	199,5	0,64	
13	WMZ W 1.1	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Wood fiber / 0,45 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	172,5	0,83	
14	WMZ W 1.1 2 x 10 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Wood fiber / 0,45 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	182,5	0,79	

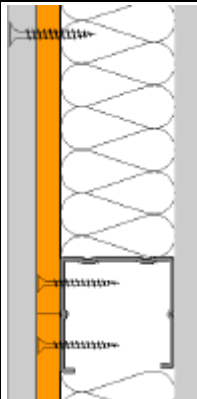
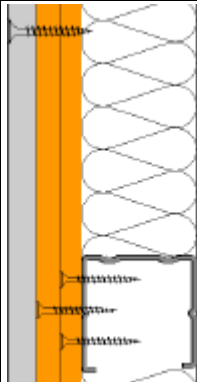
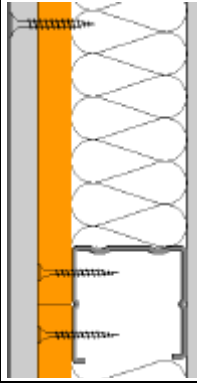
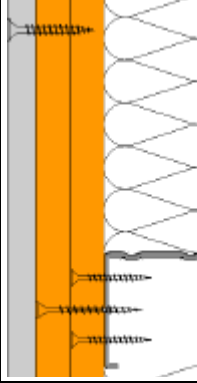
Type	Ref. No	Constructions on <b>masonry walls</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
15	WMZ W 1.2	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Wood fiber / 0,45 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	177,5	0,81	
16	WMZ W 1.2 2 x 15 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Wood fiber / 0,45 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	192,5	0,75	
17	WMZ V 1.1	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Metal Stud T 50 mm Mineral wool 50 mm / 0,40 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	212,5	0,41	
18	WMZ V 1.1 2 x 10 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Metal Stud T 50 mm Mineral wool 50 mm / 0,40 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	222,5	0,40	
19	WMZ V 1.2	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Metal Stud T 50 mm Mineral wool 50 mm / 0,40 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	217,5	0,41	
20	WMZ V 1.2 2 x 15 mm	Gypsum render 10 mm / 0,40 W/mK Brick 120 mm / 0,33 W/mK Metal Stud T 50 mm Mineral wool 50 mm / 0,40 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	222,5	0,39	

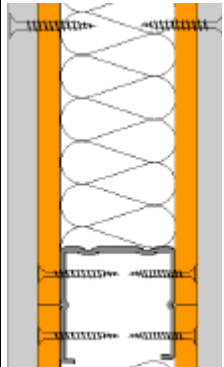
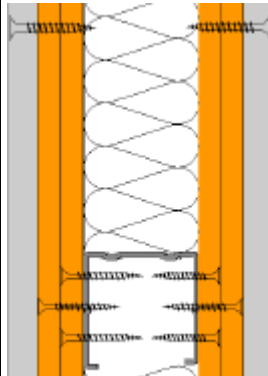
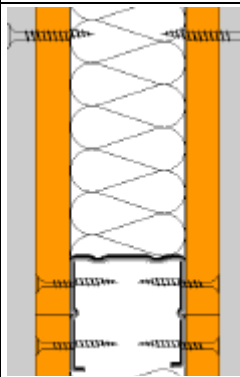
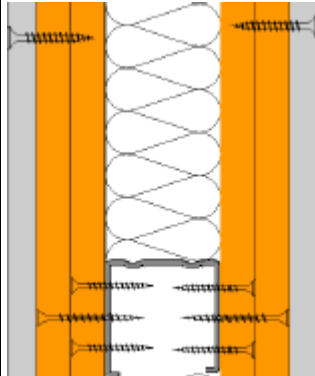
**2.6.2.2 Timber stud walls**

Type	Ref. No	Constructions on <b>timber studs</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
1	WSH 1.1	Plasterboard 12,5 / 0,21 W/mK PhoneStar 10 mm / 0,17 W/mK Timber stud T 45 mm Mineral wool 40 mm / 0,037 W/mK Plasterboard 12,5 / 0,21 W/mK	80,0	0,69	
2	WSH 1.1 2 x 10 mm	Plasterboard 12,5 / 0,21 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Timber stud T 45 mm Mineral wool 40 mm / 0,037 W/mK Plasterboard 12,5 / 0,21 W/mK	90,0	0,66	
3	WSH 1.2	Plasterboard 12,5 / 0,21 W/mK PhoneStar 15 mm / 0,17 W/mK Timber stud T 45 mm Mineral wool 40 mm / 0,037 W/mK Plasterboard 12,5 / 0,21 W/mK	85,0	0,68	
4	WSH 1.2 2 x 15 mm	Plasterboard 12,5 / 0,21 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Timber stud T 45 mm Mineral wool 40 mm / 0,037 W/mK Plasterboard 12,5 / 0,21 W/mK	100,0	0,64	

Type	Ref. No	Constructions on <b>timber studs</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
5	WSH 2.1	Plasterboard 12,5 / 0,21 W/mK PhoneStar 10 mm / 0,17 W/mK Timber stud T 45 mm Mineral wool 40 mm / 0,037 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	90,0	0,66	
6	WSH 2.1 2 x 10 mm	Plasterboard 12,5 / 0,21 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Timber stud T 45 mm Mineral wool 40 mm / 0,037 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	110,0	0,61	
7	WSH 2.2	Plasterboard 12,5 / 0,21 W/mK PhoneStar 15 mm / 0,17 W/mK Timber stud T 45 mm Mineral wool 40 mm / 0,037 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	100,0	0,64	
8	WSH 2.2 2 x 15 mm	Plasterboard 12,5 / 0,21 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Timber stud T 45 mm Mineral wool 40 mm / 0,037 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	130,0	0,50	

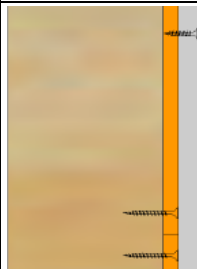
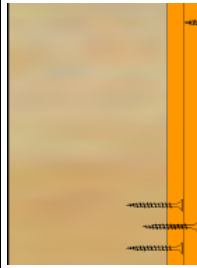
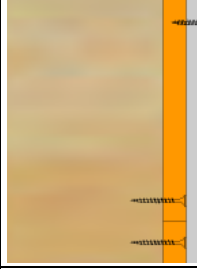
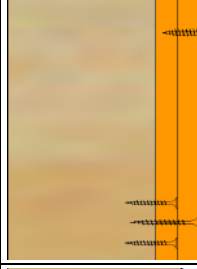


**2.6.2.3 Metal stud walls**

Type	Ref. No	Constructions on <b>steel studs</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
1	WSM 1.1	Plasterboard 12,5 / 0,21 W/mK PhoneStar 10 mm / 0,17 W/mK Metal stud T 50 mm Mineral wool 40 mm / 0,037 W/mK Plasterboard 12,5 / 0,21 W/mK	85,0	0,59	
2	WSM 1.1 2 x 10 mm	Plasterboard 12,5 / 0,21 W/mK PhoneStar 10 mm / 0,17 W/mK Metal stud T 50 mm Mineral wool 40 mm / 0,037 W/mK Plasterboard 12,5 / 0,21 W/mK	95,0	0,57	
3	WSM 1.2	Plasterboard 12,5 / 0,21 W/mK PhoneStar 15 mm / 0,17 W/mK Metal stud T 50 mm Mineral wool 40 mm / 0,037 W/mK Plasterboard 12,5 / 0,21 W/mK	90,0	0,58	
4	WSM 1.2 2 x 15 mm	Plasterboard 12,5 / 0,21 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Metal stud T 50 mm Mineral wool 40 mm / 0,037 W/mK Plasterboard 12,5 / 0,21 W/mK	105,0	0,55	

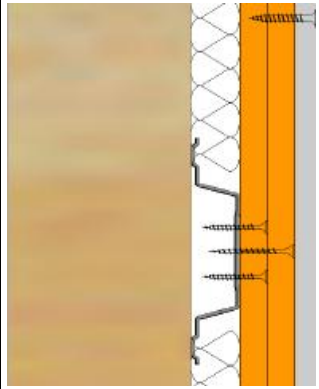
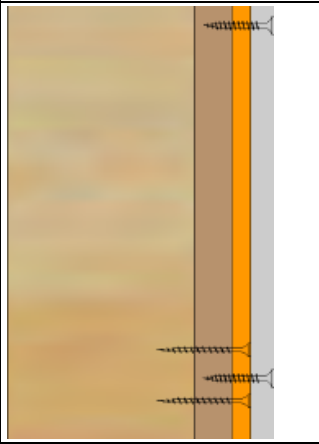
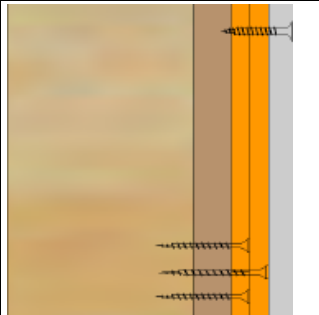
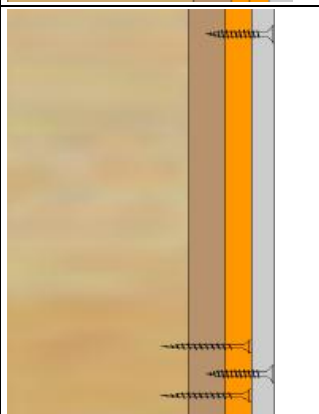
Type	Ref. No	Constructions on <b>steel studs</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
5	WSM 2.1	Plasterboard 12,5 / 0,21 W/mK PhoneStar 10 mm / 0,17 W/mK Metal stud T 50 mm Mineral wool 40 mm / 0,037 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	95,0	0,57	
6	WSM 2.1 2 x 10 mm	Plasterboard 12,5 / 0,21 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Metal stud T 50 mm Mineral wool 40 mm / 0,037 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	115,0	0,54	
7	WSM 2.2	Plasterboard 12,5 / 0,21 W/mK PhoneStar 15 mm / 0,17 W/mK Metal stud T 50 mm Mineral wool 40 mm / 0,037 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	105,0	0,55	
8	WSM 2.2 2 x 15 mm	Plasterboard 12,5 / 0,21 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Metal stud T 50 mm Mineral wool 40 mm / 0,037 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	135,0	0,55	

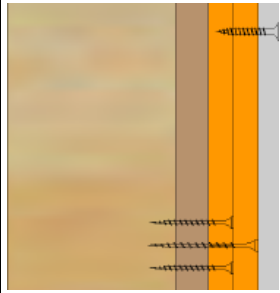


**2.6.2.4 Solid timber walls**

Type	Ref. No	Constructions on <b>solid timber walls</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
1	WMH D 1.1	Solid Wood 150 mm / 0,12 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	172,5	0,61	
2	WMH D 1.1 2 x 10 mm	Solid Wood 150 mm / 0,12 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	182,5	0,59	
3	WMH D 1.2	Solid Wood 150 mm / 0,12 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	177,5	0,60	
4	WMH D 1.2 2 x 15 mm	Solid Wood 150 mm / 0,12 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	192,5	0,57	
5	WMH L 1.2	Solid Wood 150 mm / 0,12 W/mK Battens W 50 x T 30 mm Mineral wool 30 mm / 0,037 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	222,5	0,43	
6	WMH L 1.2 2 x 10 mm	Solid Wood 150 mm / 0,12 W/mK Battens W 50 x T 30 mm Mineral wool 30 mm / 0,037 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	212,5	0,42	

Type	Ref. No	Constructions on <b>solid timber walls</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
7	WMH L 1.2	Solid Wood 150 mm / 0,12 W/mK Battens W 50 x T 30 mm Mineral wool 30 mm / 0,037 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	207,5	0,43	
8	WMH L 1.2 2 x 15 mm	Solid Wood 150 mm / 0,12 W/mK Battens W 50 x T 30 mm Mineral wool 30 mm / 0,037 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	222,5	0,41	
9	WMH H 1.1	Solid Wood 150 mm / 0,12 W/mK Resilient bar T 27 mm Mineral wool 27 mm / 0,037 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	199,5	0,43	
10	WMH H 1.1 2 x 10 mm	Solid Wood 150 mm / 0,12 W/mK Resilient bar T 27 mm Mineral wool 27 mm / 0,037 W/mK PhoneStar 10 mm / 0,17 W/mK PhoneStar 10 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	209,5	0,42	
11	WMH H 1.2	Solid Wood 150 mm / 0,12 W/mK Resilient bar T 27 mm Mineral wool 27 mm / 0,037 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	204,5	0,43	

Type	Ref. No	Constructions on <b>solid timber walls</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
12	WMH H 1.2 2 x 15 mm	Solid Wood 150 mm / 0,12 W/mK Resilient bar T 27 mm Mineral wool 27 mm / 0,037 W/mK PhoneStar 15 mm / 0,17 W/mK PhoneStar 15 mm / 0,17 W/mK Plasterboard 12,5 / 0,21 W/mK	219,5	0,41	
13	WMH W 1.1	Solid Wood 150 mm / 0,12 W/mK Wood fiber 20 mm / 0,04 W/mK Twin 10 mm / 0,17 W/mK Plasterboard 12,5 mm	192,5	0,48	
14	WMH W 1.1 2 x 10 mm	Solid Wood 150 mm / 0,12 W/mK Wood fiber 20 mm / 0,04 W/mK Twin 10 mm / 0,17 W/mK Twin 10 mm / 0,17 W/mK Plasterboard 12,5 mm	202,5	0,47	
15	WMH W 1.2	Solid Wood 150 mm / 0,12 W/mK Wood fiber 20 mm / 0,04 W/mK Twin 15 mm / 0,17 W/mK Plasterboard 12,5 mm	197,5	0,48	

Type	Ref. No	Constructions on <b>solid timber walls</b>	Thickness [mm]	U-Value [W/m <sup>2</sup> K]	System drawing
16	WMH W 1.2 2 x 15 mm	Solid Wood 150 mm / 0,12 W/mK Wood fiber 20 mm / 0,04 W/mK Twin 15 mm / 0,17 W/mK Twin 15 mm / 0,17 W/mK Plasterboard 12,5 mm	212,5	0,46	

### 2.6.2 Air permeability

The air permeability has not been determined and will be classified NPD.

## 2.7 ER 7 – Aspects of durability, serviceability and identification of the product

### 2.7.1 Aspects of durability

Creep has not been determined and will be classified as NPD.

### 2.7.2 Serviceability

Serviceability has not been determined and will be classified as NPD.

### 2.7.3 Aspects identification of materials and products

The ETA is issued for the products on the basis of the information deposited to Kiwa Nederland B.V. which identifies the panels that have been assessed and judged. Identification tests have been carried out on components, which confirm that the product under assessment conforms to its declared characteristics.

### **3 EVALUATION OF CONFORMITY AND CE-MARKING**

#### **3.1 Attestation of conformity system**

The attestation of conformity applied to this product specified by the European Commission in Mandate Construct 97/243 REV.1, Annex 3 (and specified in EC decision 98/213/EG, revised by EC decision 2001/596/EG) is System 3.

System 3 is described in Council Directive (89/106/EEC) Annex III, 2 (ii), second possibility and is detailed as follows:

1. factory production control;
2. initial type testing of the product by an approved body.

#### **3.2 Responsibilities**

##### **3.2.1 Tasks of the manufacturer**

###### **3.2.1.1 *Factory production control***

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European Technical Approval.

The manufacturer may only use raw materials stated in the technical documentation of this European Technical Approval.

The factory production control shall be in accordance with the control plan which is laid down in the context of the factory production control system operated by the manufacturer and deposited at Kiwa N.V.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan<sup>3</sup>.

###### **3.2.1.2 *Other tasks of the manufacturer***

The manufacturer shall make a Declaration of Conformity, stating that the construction product is in conformity with the provisions of this European Technical Approval.

##### **3.2.2 Tasks of the approved body**

Due to the level of attestation of conformity system 3 there is task for the notified body.

##### **3.2.3 EC Declaration of conformity**

The manufacturer shall draw up a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical Approval.

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<sup>3</sup> The control plan is a confidential part of the documentation of the European Technical Approval and will not be published together with the ETA and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.


### 3.2.4 CE marking

The CE marking shall be affixed on the packaging and/or accompanying documents of the product.

The CE marking shall be accompanied by the following information:

- identity of the product (commercial name);
- name or identifying mark of the producer and plant;
- ETA number;
- relevant product characteristics/performances and levels/classes thereof (all products under the same designation, regardless of the manufacturing plant, must meet the relevant product characteristics and performance values);
- last two digits of the year in which marking was affixed.

Below an example of the CE-marking.

	“CE” symbol
<b>Wolf Bavaria GmbH</b> <b>Gutenbergstraße 8</b> <b>91560 Heilsbron</b> <b>Germany</b> <b>Werk Amberg</b>  <b>13</b>	Name and address of the manufacturer or his representative established in the EEA and of the plant where the product was manufactured  xx Two last digits of year of affixing CE Marking
ETA N° 13/0411	ETA number
ETAG 016 Parts 1 and 4 Self-supporting lightweight composite panel for use in internal walls 2003	ETA-Guideline reference
<b>Wolf Bavaria GmbH</b>	Product characteristics regarding the product marked in relation to the different product types mentioned in this ETA.
Reaction to Fire	
Mechanical resistance	

## **4 ASSUMPTIONS UNDER WHICH THE FITNESS FOR THE INTENDED USE IS ASSESSED**

### **4.1 Manufacturing**

The manufacturing process of the products is in accordance with the process that is agreed between Wolf Bavaria GmbH and Kiwa.

Changes to the product/production process, which could result in this deposited data / information being incorrect, should be notified to the approval body before the changes are introduced. The approval body will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and so whether further assessment / alterations to the ETA, is necessary.

### **4.2 Installation**

Before installing PhoneStar boards the house or building must be protected by floor, walls, roofs, windows and front doors which prevent infiltration and penetration of rain, snow etc. and of groundwater.

Check temperature and humidity and make sure they are in range of manufactures guidelines and this document.

The PhoneStar boards must be acclimatised before use. At least 24 hours or even more!

Protect PhoneStar from direct sunlight in the long run.

When doweling or screwing the PhoneStar boards on the construction, make sure that the label is facing inside the room (label shall be on the visible side).

Cut PhoneStar boards on a stable working table with a circle saw or a jigsaw and take care of general working protection. After cutting PhoneStar, the cutting edges must be sealed. In order to maintain the Wolf Bavaria guarantee, only Wolf Tape may be used. For further clarification see Annex 1, PhoneStar – Cutting and Taping.

Start installing PhoneStar in a bottom corner and dowel or screw and or glue the PhoneStar board on the construction. Avoid cross joints!

Make sure that the plasterboard does not touch any flanking elements. Leave there a joint between 2 – 3 mm and seal the joints with silicon or acryl. This improves the airborne sound insulation. See Annex 2 Cutting & Taping

PhoneStar can not be used as final layer. It is necessary to screw and or glue a plaster board on top of PhoneStar.

After installing the Plaster board on PhoneStar, the Plaster boards shall be finished in accordance with the processing instructions by the manufacturer of the Plaster boards used.

For further information: please see the latest instruction manual of Wolf Bavaria GmbH under [www.wolf-bavaria.com](http://www.wolf-bavaria.com).

## **5 RECOMMENDATIONS**

### **5.1 Recommendations on packaging, transport and storage**

The PhoneStar boards are strapped on pallets encased in a thick corrugated cardboard box structure, which is placed over the product. PhoneStar shall be handled and stored with care and be protected from accidental damage. The PhoneStar boards must be protected from moisture during transport, storage and installation. The product should be stored flat, under cover, in dry well ventilated conditions inside. Protect PhoneStar from direct sunlight when stored over a long period of time.

### **5.2 Recommendations on use, maintenance and repair**

The rooms must be closed and heatable before installing the PhoneStar boards. PhoneStar boards must be acclimatised at least 24 h on the building site. PhoneStar boards that are damaged from transport can not be used any more.

Small damages on surfaces or edges can be sealed with Wolf Tape only. Before small damages on PhoneStar boards are sealed, make sure the channels are still filled with sand. In order to maintain the properties of PhoneStar boards, the channels shall be refilled with silicon sand when necessary.



## ANNEX 1

### PhoneStar – Cutting & Taping



#### 1 Dimensioning

Measure and mark the cutting line.



#### 2 Cutting boards

Use a jig saw with metal-ceramic blade or buzz saw with a Widia blade and extraction. When necessary refill cutting edges with sand.



#### 3 Taping boards

Tape the cutting edges with Wolf tape only. The tape shall be applied at least 20 mm around the corners.



#### 4 Folding corners

Fold the protruding part of the tape on the edges first and then fold the tape onto the board surface.



#### 5 Folding longitudinal side

After folding the corners, fold the tape on the longitudinal side and press onto the board surface.



#### 6 Done

**ANNEX 2**

The plasterboard needs a 3 mm joints to all flanking components. Seal the flanking joints with acryl or silicon (see red line in the picture below).

