





## Safety from the floor onwards

Alongside the visual effect and functionality, one important aspect is increasingly becoming the focus of attention in planning activities: safety. A requirement that **Union floor** flooring systems perfectly implements in many respects.

**Union Floor** is a tongue and groove hollow floor system, made up of the innovative plaster material calcium sulphate, the only building material of its kind that is classified throughout Europe with building materials class A1, noncombustible (acc. to DIN EN 13501-1). Whether used in panelled access floors or sheet-panelled access floors, all **Union floor** systems comply at least with the fire protection requirement F30.

We take our work seriously,  
and open to your ideas.

This is probably the best way to describe the character of **Union Floor**. You can rely on the durability and high load-carrying capacity of these floors. The foundation for the high stability is already laid during the production of the plaster boards. The unique winding process by Knauf Integral determines the homogenous material structure before the extremely high compressing to  $1500 \text{ kg/m}^3$  and more takes place in the subsequent pressing process.

You can obtain **Union Floor** as panelled access floor green ware or sheet-panelled access floor with tongue and groove edging in various material thicknesses, and with standard or individual grid dimensions. All components are optimally coordinated to one another. The panels are supplied to the construction site ready-to-lay, a surface primer applied at the factory protects the boards during transportation and laying, ensuring the full hardwearing capabilities of the floor right from the start.





## Comfort for all!

The dry laying of **Union Floor** offers numerous advantages compared with wet flooring systems. No additional moisture is added to the construction during installation. That is the important thing: **Union Floor** requires no drying time at all.

So, depending on the project, you can save several weeks of construction time. Moreover, we like to walk quietly and here is a further plus point of **Union Floor**: the good insulation against transmitted impact sound. And, when it comes to floor covering options, surface finishing and handling **Union Floor** always turns out to be the right choice.

With appropriate accessories like supports, system adhesive, transition profiles or inspection frames, laying is as simple as never before. Flexibility, increased laying efficiency, more advantages. We think you'll like that.





## Union Floor panelled access floor panels – All advantages at a glance

Optimum access to underground installations, as every element can be removed separately.

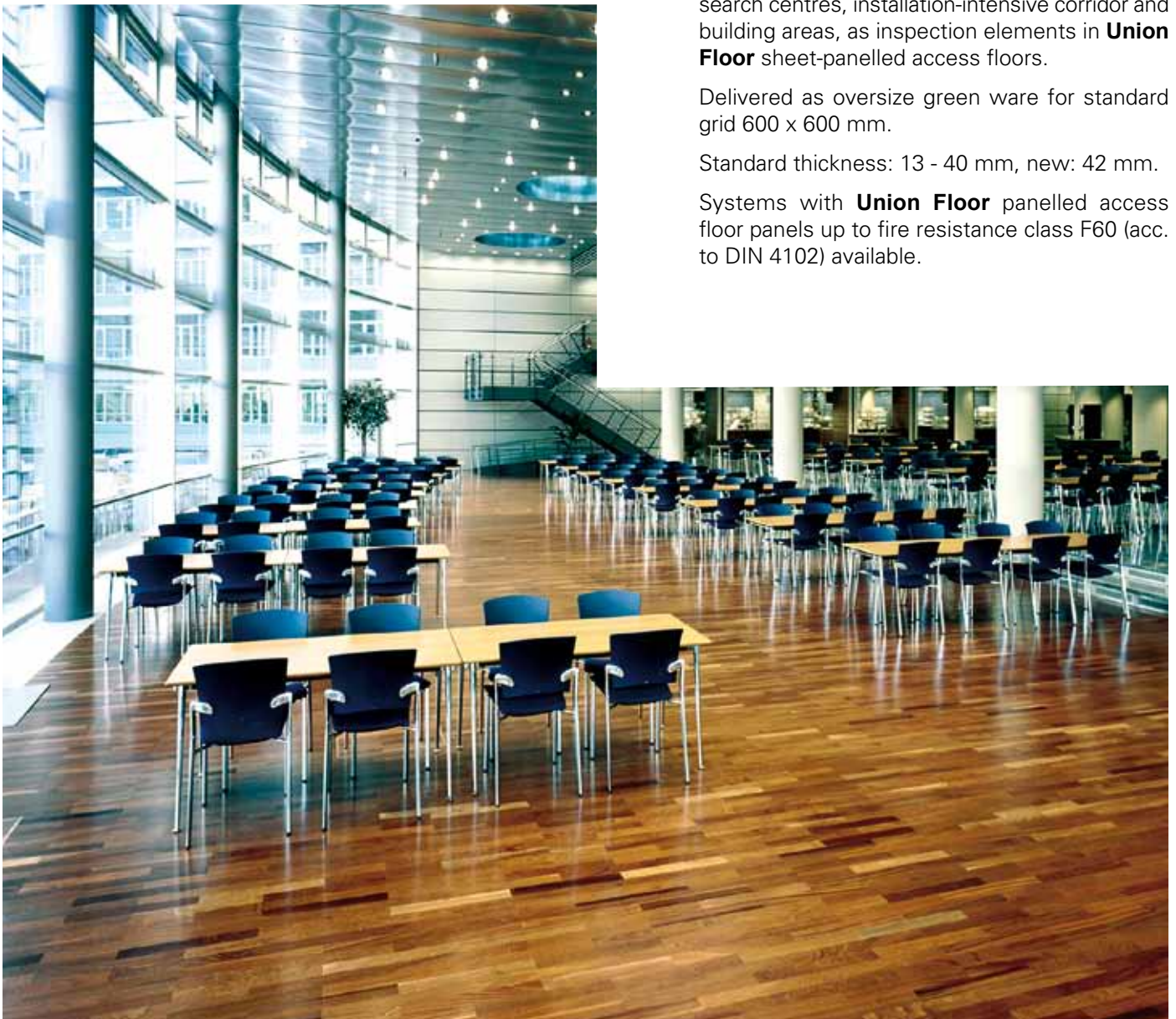
Can be combined with **Union Floor** tongue and groove raised floor, e.g. upon request, the appropriate transition profiles can be supplied for installation runs.

Application areas: switch rooms, media and research centres, installation-intensive corridor and building areas, as inspection elements in **Union Floor** sheet-panelled access floors.

Delivered as oversize green ware for standard grid 600 x 600 mm.

Standard thickness: 13 - 40 mm, new: 42 mm.

Systems with **Union Floor** panelled access floor panels up to fire resistance class F60 (acc. to DIN 4102) available.





**FHB**

## Union Floor FHB, F181 All advantages at a glance

Increased laying efficiency on account of board dimensions 1200 x 600 mm.

High laying security due to bracing.

Greater loading capacity also with comparatively less board thickness (stabilizing effect on account of glued tongue and groove fixing).

Level evenness thanks to the calibrated board thickness and tongue and groove structure.

High security on account of system components that are coordinated to one another and inspected.

Fire resistance class at least F30 (acc. to DIN 4102).

Possible to erect dry walls (stud partition systems) directly on the **Union Floor** sheet-panelled access floor.

Ramps, slopes and terracing possible.

Can be combined with **Union Floor** panelled access floors, and the appropriate transition profiles can be supplied upon request.

Possible position inspection openings, electrants and other outlets at any point in the floor, appropriate inspection frames can be supplied upon request.

Application areas: installation-intensive buildings, throughout surfaces for individual floor coverings.

Board dimensions: 1200 x 600 mm and 600 x 600 mm with tongue and groove.

Standard board thickness: 25 mm, 28 mm, 32 mm.





BAT

## Union Floor panelled access floor panels – All advantages at a glance

High-performance installation on account of the dimension 600x1200mm of the panels.

Load bearing area non-combustible.

Installation of floor coverings could be prefabricated in a workshop.

High level of prefabrication.

Short term for installation.

Easy to uninstall.

Noticeable reduction of weight.

Surface areas and risers made of the same material.

Straight and curved forms are feasible.

Direct fixing of the chairs to the **Union Floor** panels.

High resistance thanks to the toughness of the material.



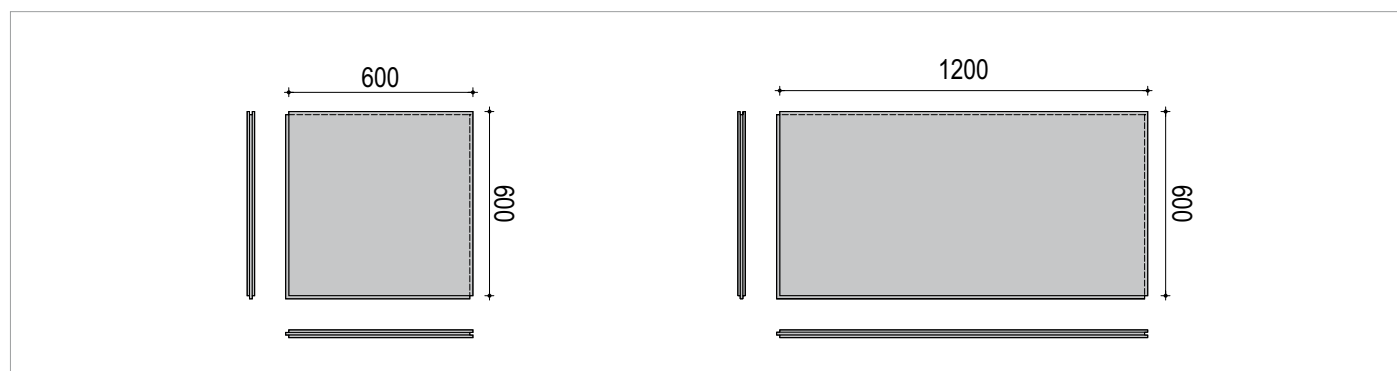
**Union Floor standardized panels** (Other thicknesses of the FHB panels on request, observe special delivery time)

## TECHNICAL DATA

Name	Sizes Panel net size mm	Panel thickness mm	Weights (Density $\geq 1500 \text{ kg/m}^3$ ) Panel		Unit pcs./palett
			c. kg/pc.	c. kg/m <sup>2</sup>	
<b>FHB 25</b>	1200x600	25	27.0	37.5	35 pcs./pal.
GF-W1DIR1/1200/600/25-C1/NF					
	600x600	25	13.5	37.5	70 pcs./pal.
GF-W1DIR1/600/600/25-C1/NF					
<b>FHB 28</b>	1200x600	28	30.2	42.0	30 pcs./pal.
GF-W1DIR1/1200/600/28-C1/NF					
	600x600	28	15.1	42.0	60 pcs./pal.
GF-W1DIR1/600/600/28-C1/NF					
<b>FHB 32</b>	1200x600	32	34.6	48.0	25 pcs./pal.
GF-W1DIR1/1200/600/32-C1/NF					
	600x600	32	17.3	48.0	50 pcs./pal.
GF-W1DIR1/600/600/32-C1/NF					
<b>FHB 38</b>	1200x600	38	41.2	57.0	20 pcs./pal.
GF-W1DIR1/1200/600/38-C1/NF					
	600x600	38	20.6	57.0	40 pcs./pal.
GF-W1DIR1/600/600/38-C1/NF					

To increase the working load and in case of damageable floor coverings to be put onto the Union Floor FHB panels					
<b>LEP 13</b>	1200x600	13	14.1	19.5	70 pcs./pal.
GF-W1DIR1/1200/600/13-C1/SF					
<b>LEP 18</b>	1200x600	18	19.5	27.0	50 pcs./pal.
GF-W1DIR1/1200/600/18-C1/SF					

DLH panels not to be combined with the above mentioned Union Floor panels with density $1500 \text{ kg/m}^3$					
<b>DLH 25</b>	1200x600	25	21.6	30.0	35 pcs./pal.
GF-W1/1200/600/25-C1/NF			(density $\geq 1100 \text{ kg/m}^3$ )		
<b>DLH 13</b>	1200x600	13	11.2	15.6	70 pcs./pal.
GF-W1/1200/600/13-C1/SF			(density $\geq 1100 \text{ kg/m}^3$ )		





## Raw material and production / Building biological data

### Raw material and production

**Union Floor** is produced from natural gypsum and a portion of FGD-gypsum mixed with cellulose fibres made of sorted recycled paper and cardboard. The natural gypsum is extracted in an area c. 30 km around the factory in open-cast minings. The natural-chemical identical clean FGD gypsum is calcined with the natural gypsum to stucco. The papers are soaked in big tanks. After processing time they are mixed with processing water and the stucco to a mush. This mush is put on a transport belt, reaching a thickness of c. 2mm by absorbing the surplus water. On the

forming cylinder it is wound up to the needed thickness, roughly cut and after a setting period dried in a 12-layer dryer. The **Union Floor** large-sized panels are being sanded and then shaped in a format station to become **Union Floor** panels. After priming the top and back side of the panels they are packed on pallets. This kind of production of gypsum fibre material ensures the unique homogeneous density through the whole thickness of the **Union Floor** panel.

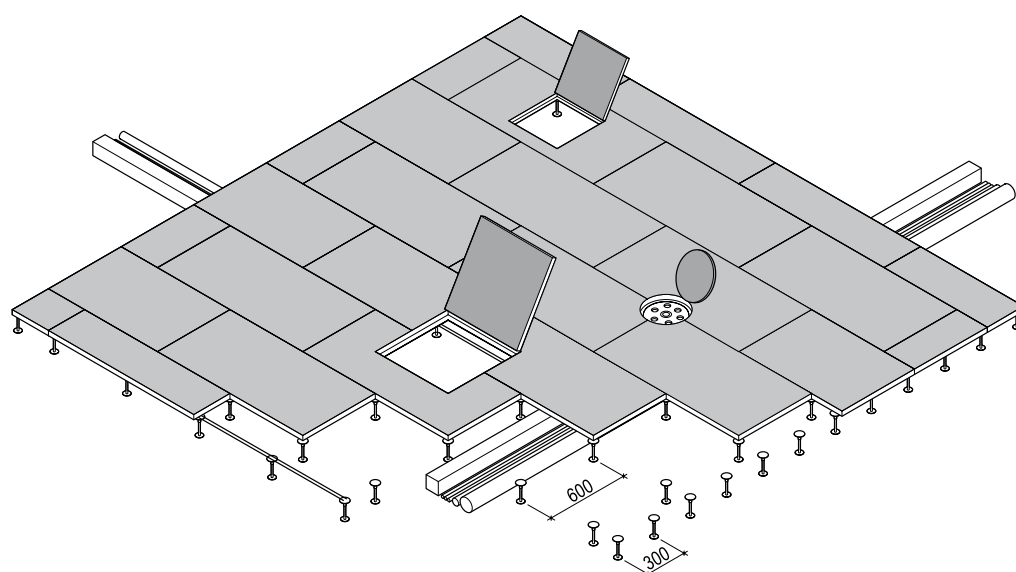
### Valuation of the eurofins emission test results

Cancerogene	after 3 and 28 days	not detectable
TVOC**	after 3 and 28 days	below the limit
SVOC***	after 28 days	below the limit
VOC*-value R	after 28 days	below the limit
VOC*-value without NIK-value	after 28 days	below the limit
Formaldehyde	after 28 days	below the limit

\* VOC = volatile organic compounds    \*\* TVOC = sum of the volatile organic substances

\*\*\* SVOC = sum of the less volatile organic substances

### Application and processing



## Building physical material values

	Union Floor FHB / LEP	Union Floor DLH	
<b>FIRE PROTECTION</b>			
Building material class according to EN 13501-1	A1	A1	non-combustible
Building material class according to DIN 4102-1	A2	A2	non-combustible
<b>HYGROTHERMAL VALUES</b>			
Conductivity of heat $\lambda_P$	0.44	0.38	W/(mK)
For floor heating systems $\lambda_{10}$	0.30	-	W/(mK)
Value of vapour diffusion resistance $\mu$	30 / 50	17	-
Specific heat capacity $c$	>1000	>1000	J/(kgK)
Thermal extension coefficient $\alpha$	$12.9 \times 10^{-6}$	$12.9 \times 10^{-6}$	1/K
Expansion / shrinkage by rise / drop in temperature	$\leq 0.02$	$\leq 0.02$	mm/(mK)
Expansion / shrinkage by changing the rel. air humidity on 30% at 20°C	0.6	0.6	mm/m
Hygrothermal installation conditions (stationary)	+10° to +35°C	+10° to +35°C	c. 45-75% r.h.
Hygrothermal using conditions (stationary)	-10° to +35°C	+1° to +35°C	c. 35-75% r.h.
Surface water absorption capacity acc. to EN20535 (acc. Kopp)	<300	<300	g/m²
<b>STRENGTH VALUES</b>			
Surface hardness acc. to Brinell	$\geq 40$	$\geq 20$	N/mm²
Pull off bond strength	$\geq 1.0$	$\geq 0.6$	N/mm²
<b>OTHER</b>			
Surfaces with transport protecting primer to bond dust and for reduction of water absorption capacity	yes	yes	-
Ability of taking vertical dynamic maximum working load acc. to EN 13964 without additional treatment	$\geq 100\,000$	-	endurance
Value of vapour diffusion resistance $\mu$ of the optional factory-made lamination of aluminum foil on the base side	$9.3 \times 10^{-6}$	$9.3 \times 10^{-6}$	practically vapour-tight

## Fire protection

Class	Support height (=clear dimension)	Support thread dimension	Wall thickness sleeve outside Ø	Panel thickness
<b>F 30 AB*</b>	$\leq 1150$ mm $\leq 1000$ mm $\leq 600$ mm $\leq 218$ mm	M 20 M 20 M 20 M 12	3.0 mm 2.5 mm 1.5 mm 17.5 mm	$\geq 22$ mm e.g. FHB25
<b>F 60 AB*</b>	$\leq 598$ mm $\leq 168$ mm	M 20 M 16	2.0 mm 2.0 mm	$\geq 32$ mm e.g. FHB32

\*= The classification is also valid if drywalls (non-loadbearing internal partitions acc. to DIN 4103) are set on the Union Floor FHB.  
The Knauf Integral Union Floor FHB systems with a thickness  $\geq 22$ mm and a clear height  $\leq 400$ mm are fulfilling the German building regulations F30 according to DIN 4102.

## Sound insulation

	Union Floor FHB 22			Union Floor FHB 25			Union Floor FHB 28			Union Floor FHB 32		
	without finish	with finish (VM=28dB)	without finish with separ. joint with separation	without finish	with finish (VM=28dB)	without finish with separ. joint with separation	without finish	with finish (VM=28dB)	without finish with separ. joint with separation	without finish	with finish (VM=28dB)	without finish with separ. joint with separation
<b>Stand. flanking sound val. diff. <math>D_{n,f,w,P}</math> [dB]</b>	42	51	52	~40	~48	~52	39	45	52	46	49	55
<b>Weighted normal-ized flanking impact sound pressure level <math>L_{n,f,w,P}</math> [dB]</b>	86	50	70	~90	~51	~65	94	52	60	79	49	61
<b>Reduction in impact sound pressure level <math>\Delta L_{w,P}</math> [dB]</b>	15 (17)*	27 (27)*	—	~13	~26	—	12	25	—	16**	29**	—
	Measurement by Kurz und Fischer, (KuF) Pb No. 0247-1			Expectation values calculated by KuF No. 0247-5			Measurement by Kurz und Fischer, (KuF) Pb No. 0247-2			Measurement ita, Pb No. 0102.01-P358/00		

\*) with 6mm insulation sheets    \*\*) with PGR-insulation sheets

The measurements were taken according to ISO 140. The vertical sound insulation is set by the solid ceiling and is influenced positively by installing a Union Floor FHB.

## Load classes of hollow floors acc. to EN 13213

Load class	1	2	3	4	5	6
Breakingload	≥4	≥6	≥8	≥9	≥10	≥12
Safety factor	2	2	2	2	2	2

The EN 13213 hollow floors defines the test procedures and classifications of hollow floor systems. Area loads should not be taken as criterion, only the point load is the determining factor. Test by an intendor 25x25mm (simulation of a point load) until fail of the panel at specimens weakest position.

## Load classes of hollow floors acc. to EN 13213

### Allowable bearing capacities (working loads) for sheet-panelled access floors single-layer F181 <sup>1)</sup> (acc. to EN 13213)

Floor	FHB 19 <sup>2)</sup>	FHB 22 <sup>2)</sup>	FHB 25	FHB 25	FHB 25	FHB 28	FHB 28	FHB 28	FHB 32	FHB 32	FHB 32	FHB 38	FHB 38
requ. support	600x600	600x600	600x600	425x425	300x300	600x600	425x425	300x300	600x600	425x425	300x300	600x600	425x425
Working load [kN] <sup>3)</sup>	1.0	2.0	3.0	4.0	4.5	4.0	4.0	4.5	5.0	6.0	6.0	6.0 <sup>5)</sup>	7.0
Load class <sup>4)</sup>	none	1	2	3	4	3	3	4	5	6	6	6 <sup>5)</sup>	6
Load [kN]	Deflection while load initiating with a stamp 25x25mm for sheet-panelled access floors single-layer F181												
1	n/a	n/a	0.8	0.6	0.4	0.7 <sup>5)</sup>	0.5	0.4	0.6 <sup>6)</sup>	0.4	0.3	0.4	0.2
2		n/a	1.3	1.1	0.8	1.2	1.1	0.7	1.0 <sup>6)</sup>	0.9	0.6	0.8	0.6
3			1.8	1.5	1.2	1.5	1.3	1.1	1.4	1.2	0.9	1.1	0.8
4				2.0	1.5	1.8	1.8	1.4	1.7	1.5	1.2	1.5	1.1
4.5					1.8			1.6	1.8	1.6	1.3	1.6	1.2
5									2.0	1.8	1.4	1.8	1.4
6										2.0	1.6	2.3 <sup>5)</sup>	1.7
7													2.0

### Allowable bearing capacities (working loads) for sheet-panelled access floors single-layer F182 <sup>1)</sup> (acc. to EN 13213)

Floor	FHB plus 25+13	FHB plus 25+13	FHB plus 25+18	FHB plus 25+18	FHB plus 28+13	FHB plus 28+13	FHB plus 28+18	FHB plus 28+18	FHB plus 32+13	FHB plus 32+13	FHB plus 32+18	FHB plus 32+18	FHB plus 38+18	FHB ultra 38+38	DLH 25+13	DLH 25+13
requ. support	600x600	425x425	600x600	425x425	600x600	425x425	600x600	425x425	600x600	425x425	600x600	425x425	600x600	425x425	600x600	425x425
Working load [kN] <sup>3)</sup>	4.5	5.0	4.5	5.0	5.0	6.0	6.0	6.0	6.0	7.0	9.0	10.0	12.5	2.0	3.0	4.0
Load class <sup>4)</sup>	4	5	4	5	5	6	6	6	6	6	6	6	6	6	2	3
Load [kN]	Deflection while load initiating with a stamp 25x25mm for sheet-panelled access floors single-layer F182															
1	0.7	0.5	0.6 <sup>6)</sup>	0.4 <sup>6)</sup>	0.6 <sup>6)</sup>	0.4 <sup>6)</sup>	0.5 <sup>6)</sup>	0.4 <sup>6)</sup>	0.5	0.3	0.3	0.2	0.3	Because of the particular requirements to the floor finishing the deflection is not specified	0.7	0.5
2	1.2	1.0	1.1 <sup>6)</sup>	0.9 <sup>6)</sup>	1.1 <sup>6)</sup>	0.9 <sup>6)</sup>	1.0 <sup>6)</sup>	0.8 <sup>6)</sup>	0.9	0.8	0.5	0.3	0.5		1.2	0.9
3	1.5	1.3	1.4 <sup>6)</sup>	1.2 <sup>6)</sup>	1.4 <sup>6)</sup>	1.2 <sup>6)</sup>	1.3 <sup>6)</sup>	1.1 <sup>6)</sup>	1.3	1.1	0.7	0.5	0.7		1.4	1.4
4	1.8	1.6	1.7 <sup>6)</sup>	1.5 <sup>6)</sup>	1.7 <sup>6)</sup>	1.5 <sup>6)</sup>	1.6 <sup>6)</sup>	1.4 <sup>6)</sup>	1.6	1.4	0.9	0.6	0.9		1.8	
4.5	1.9	1.8	1.8 <sup>6)</sup>	1.7 <sup>6)</sup>	1.8 <sup>6)</sup>	1.7 <sup>6)</sup>	1.7 <sup>6)</sup>	1.6 <sup>6)</sup>	1.7	1.5	1.0	0.7	1.0			
5		1.9		1.9 <sup>6)</sup>	2.0 <sup>6)</sup>	1.9 <sup>6)</sup>	1.9 <sup>6)</sup>	1.8 <sup>6)</sup>	1.9	1.7	1.1	0.8	1.0			
6						2.0 <sup>6)</sup>	2.0 <sup>6)</sup>	2.0 <sup>6)</sup>	2.0	1.9	1.3	1.0	1.1			
7										2.0	1.5	1.2	1.2			
8											1.7	1.4	1.4			
9											1.9	1.6	1.5			
10												1.9	1.6			
11													1.8			
12													1.9			
12,5													2.0			

The load bearing capacity of the tested double-layer systems is mainly affected by the thickness of the lower bearing panel. Reducing the thickness of the lower panel reduces the load bearing capacity of the complete system, even the total thickness of the system is equal. If the upper panels are weakened by milling (e.g. for heating pipes), the load bearing capacity of the lower panel is equal to the load bearing capacity of the single-layer system F181 with adequate panel thickness.

If the lower panel is milled the thickness below the milling solely has to be estimated.

Support, fillings / self levelling full area mastic compound coatings and floor finishings have to be designed for the specific loads.

Special kind of supports for fire protection from bottom side are required.

Further heavy load floors on request

<sup>1)</sup> The grid system 425x425mm is generated by additional supports put in the middle of the standardized grid 600x600mm

<sup>2)</sup> Special thickness available on request

<sup>3)</sup> (= Ultimate load / safety factor 2)

<sup>4)</sup> acc. EN 13213

<sup>5)</sup> only according breaking load criterion

<sup>6)</sup> Values interpolated



## Integrated hot water heating systems



When it comes to sensitive top surfaces further to the advantages of **Union**.

**Union Klima** warming and cooling system creates a comfortable environment saving space and resources due to the low temperature warm water and low running costs. This system can offer both aesthetic benefits -such as the disappearance of intrusive radiators thanks to the out of sight heating pipes - and the maximum comfort on account of the radiant heat, which is the most natural type of heating.

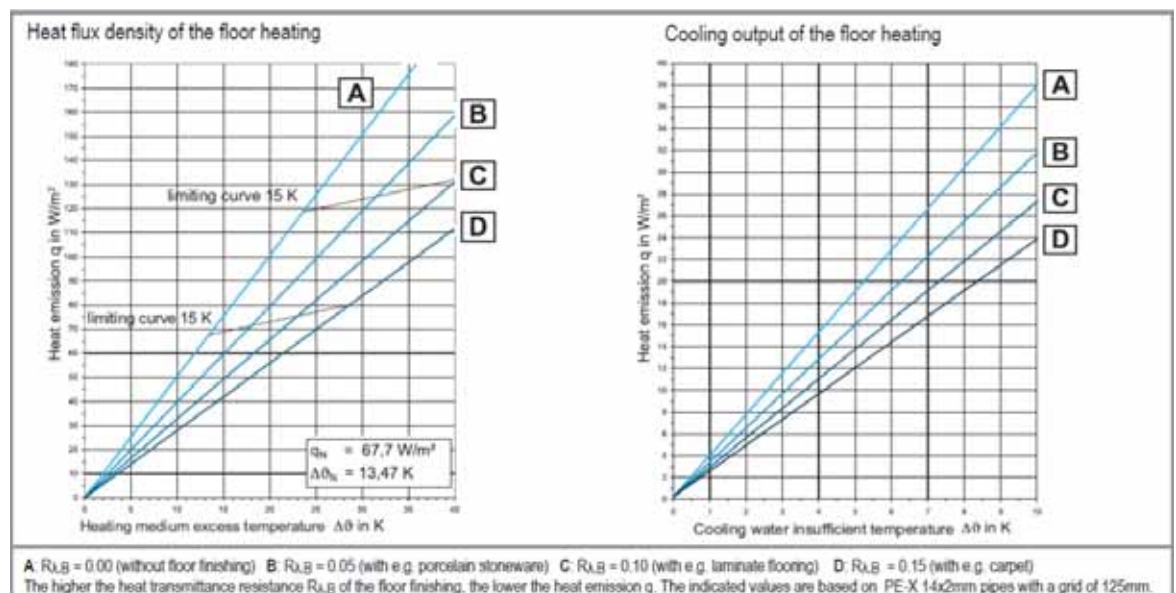
The construction of the system consists of two-layers of **Union floor** gypsum panels laid on steel pedestals in a 600 x 1200 mm grid. The adjustable pedestals are distributed in a 600 x 600 mm grid under the plenum. Bottom panels' sides are finished with a tongue and groove profile and have a minimum thickness of 25 mm. 18 mm thick panels 600x1200 mm are laid

down as the second upper layer. Both panels layers are laid down respectively out of phase.

Openings and hatches for maintenance purposes or electrical appliances have to be designed and positioned before milling the groove and laying down the heating pipes.

The milling for the heating / cooling pipelines is made on the upper layer according to the heat demand calculation and the heating pipes are laid down into the prepared grooves. After testing the heating pipes water tightness and leakage, they are covered with wet gypsum and primerised.

The system is then ready to receive the top covering.



**Union Klima** is available in standardized thicknesses of 25, 28, 32 or 38 mm



## ECSO raised floor

The raised access floor brand ECSO has been on the market for more than 20 years and it stands out in the raised floor field for its high quality and wide range of products.

By realizing more than 10 million m<sup>2</sup> of raised access floor all over the world, the company has nowadays such a fund of experience and knowledge to meet all customers' needs thanks to a technologically efficient and esthetically satisfactory system.











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