ArcelorMittal Building Solutions

ArcelorMittal

Floors guide

Composite floor solutions

Inspiring Smarter Building

Contents

Cofra® 5

Our free software, Cofra® 5 is the ideal tool to design your project using one of our composite floors. By entering the hypothesis of your specific project (spans, loads, fire resistance...), Cofra® 5 provides a full calculation note with the steel thickness of our floor system, the slab thickness and the section and position of reinforcements necessary to reach your own specifications.
The design fits with Eurocodes requirements.
Our technical assistance teams are also there to help you and to counsel you towards the best technical solution for your project.

Composite flooring solutions

Our extensive range of floor systems allows our customers to find the right fit to suit their project needs.

ArcelorMittal Building Solutions' composite flooring continues to lead the way

Our wide range of floor system is a lightweight alternative to any other concrete solution. Not only does this make them quicker and easier to install, transport and store, they're more cost effective because less substantial supporting structures are required. Plus, less equipment is needed to move and position our systems.

Meanwhile, all of the solutions within our composite flooring range can be installed with all types of structures, such as steel, concrete, wood beams and masonry walls.
They all come galvanised with our metallic coating, ZMevolution® as standard to increase durability, and can be pre-painted with our own brand of organic coatings to enhance aesthetics and protection against corrosion.

Multi-application from new building to renovation

As a result, they can be used for the widest range of projects, including commercial and office buildings, high-rise buildings, and educational, car parks, sports facilities, and more. As they are lightweight flooring solution, stackable and easy to manually install, they are naturally adapted for renovation projects.

Our flooring solutions

Composite floors:
They are multi-use solutions:
- during pouring phase, they are used as shuttering
- when the concrete is dried, thanks to the embossments and the geometry of the profile, a mechanical bond is formed between steel and concrete. In that respect, steel fully contributing to the slab resistance creating a composite slab
- in fire condition, they can reach REI120 by adding rebars in the ribs

Integrated floor systems: In that unique system, the insulation is directly included into our flooring solution providing thermal insulation.
The optimal combination of the materials used for these floor system enables them to bridge spans from 5 to 8 m providing at the same time an excellent sound absorption and fire resistance.

Additive floors: The additive floors concept takes advantages of both materials, steel and concrete, providing an optimised solution for long span as it can reach spans up to 5.50 m without props and 9 m with props.
They are also suitable for building where fire resistance up to 120 min is required.

Slim-Floor concept: With this concept, the top of the profile is at the same height that the beam which supported it or directly installed on the lower flange. It allows to reduce the total height of the structure and eliminating beam downstands under the floor.
Our additive floors and integrated floor system fit perfectly with this concept which guarantees a fast installation, an economical design and open new doors to architect's imagination.

Composite beams: Our floors can be connected to the beams using some studs creating a composite beam. This allows to optimize the design of the beam and thus the global weight and cost of the building.

Some key terms...

g': permanent loads in the final phase (excluding the self-weight of the floors).

q: live loads in the final phase.

L span: means the distance between supports (can be calculated as clear distance between supports in the case of a concrete structure).
If propping is necessary, the span differs between the pouring phase and the final composite slab.

SLS: Service Limit States - states describing the service criteria of a floor system (deflection, cracking, vibration, etc.)

Deflection: maximum deformation of the floor under a combination of SLS loads. Limited to L / 180 in the pouring phase.

REI: resistance of the floor to fire for mechanical stability (R), flame proofing and tightness (E) and thermal insulation (I).

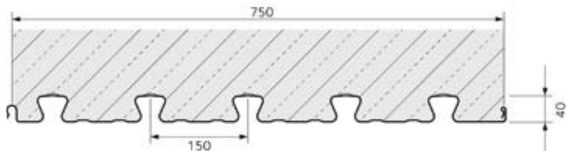
Cofrastra® 40

Composite floors decking with dovetail section

Featuring a re-entrant section, Cofrastra® 40 is suitable for slim and lightweight floor construction. With a classical pitch of 150 mm, it's the lowest composite floor decking around, yet offers optimum adhesion between profile and concrete which enables it to support heavy loads.
The Cofrafix clip system allows to suspend building equipment, ducts or false ceilings... without any dowels, pins or drilling.

Fire resistant

Thin slab



CE marking according to EN 1090-1
German technical approval: AbZ Z-26.1-22

Characteristics of the base material		Norms
Steel grade	S 350 GD	EN 10346
Corrosion protection	Galvanised steel ZM 175	P 34-310 ETPM ZMevolution® or AbZ Z-30.11-61

Characteristics	Nominal thickness of the profile sheet [mm]		
	0,75	0,88	1,00
Weight [kg / m²]	9,80	11,50	13,10
Cross section A_p: [mm² / m]	1 183	1 400	1 600
Effective inertia I_{eff} [cm⁴ / m]	17,58	22,23	25,41
Height of neutral axis [mm]	10,60	10,60	10,60
Modulus of inertia [cm³ / m]	16,57	20,95	23,95

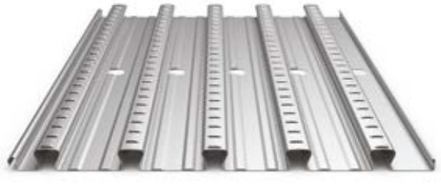
Nominal concrete consumption

	Thickness of the slab [cm]									
	9	10	11	12	13	14	15	16	17	18
Concrete volume [l / m²]	80	90	100	110	120	130	140	150	160	170
Theoretical weight* of the composite slab [kg / m²]	200	225	250	275	300	325	350	375	400	425

Concrete density 2500 kg / m³
Maximum recommended slab thickness d = 20 cm
*Additional weight du to pounding effect is not included

Cofrastra® 40P:

Pre-punched version, compatible with shear connectors, welded in advance or in shop to the composite beams.



Fire resistance

	REI [min]			
	30	60	90	120
Thickness of the slab [cm]	9	9	11	13

REI: fire protection rating of the raw composite slab
The minimum thickness is required to comply with the temperature criterion (I) on the non- fire exposed side.

According EN 1994-1-2 §4.3.2, Cofrastra® 40 composite floors are by default REI 30.
For higher fire resistance classes, reinforcement bars are required. These are positioned in the ribs of the profile.
Their section is determined by using Cofra® 5.

Sound insulation

The acoustic behaviour of a raw composite slab is determined by its mass.
Given values are calculated by modelling – study report CœSTB No. AC15-26054708

	Thickness of the slab [cm]									
	9	10	11	12	13	14	15	16	17	18
R_w [dB]	46	47	48	49	50	50	51	52	52	53
(C; Ctr) [dB]	(-1; ; -6)	(-2; -6)	(-2; -6)	(-2; -6)	(-1; -6)	(-1; -6)	(-1; -6)	(-2; -7)	(-1; -6)	(-2; -7)

Acoustic performance of the Cofrastra® 40 Décibel floor system			
Complex	R_w (C; Ctr)	$L_{n,w}$	CSTB Report
Cofrastra® Décibel: Cofrastra® 40 + slab thickness 140 mm + plénum space 70 mm + plasterboard BA13	56 (-6; -11) dB	66 dB	23268
Cofrastra® Décibel: Cofrastra® 40 + slab thickness 140 mm + plenum space 70 mm + IBR 60 mm + plasterboard BA13	65 (-4; -10) dB	61 dB	23268

Structural performance

Load / Span table

The value provided in each cell of the table loads is the maximum live load capacity Q (kN / m²). The self weight of the slab is already included.
The color of each cell give information about the required steel thickness.
A calculation using Cofra 5 optimises these values according to the project requirements.

Single span L

Thickness of the slab [cm]	Span [m]																					
	2,00	2,10	2,20	2,30	2,40	2,50	2,60	2,70	2,80	2,90	3,00	3,10	3,20	3,30	3,40	3,50	3,60	3,70	3,80	3,90	4,00
18	23,23	21,93	20,74	19,66	18,67	17,76	16,92	16,14	15,42	14,75	14,12	13,53	12,98	12,46	11,98	11,52	11,08	10,67	10,29	9,92	9,57
17	21,93	20,71	19,59	18,57	17,63	16,77	15,98	15,24	14,56	13,93	13,33	12,78	12,26	11,77	11,31	10,88	10,47	10,08	9,71	9,36	9,03
16	20,64	19,49	18,43	17,47	16,59	15,78	15,04	14,35	13,70	13,10	12,55	12,02	11,53	11,07	10,64	10,23	9,85	9,48	9,14	8,81	8,50
15	19,35	18,26	17,28	16,38	15,55	14,8	14,09	13,45	12,84	12,28	11,76	11,27	10,81	10,38	9,97	9,59	9,23	8,89	8,56	8,26	7,96
14	18,06	17,04	16,12	15,28	14,51	13,81	13,15	12,55	11,98	11,46	10,97	10,52	10,09	9,68	9,31	8,95	8,61	8,29	7,99	7,70	7,43
13	16,76	15,82	14,97	14,19	13,47	12,82	12,21	11,65	11,12	10,64	10,19	9,76	9,36	8,99	8,64	8,31	7,99	7,70	7,42	7,15	6,90
12	15,47	14,60	13,81	13,09	12,43	11,83	11,27	10,75	10,27	9,82	9,40	9,01	8,64	8,29	7,97	7,66	7,37	7,10	6,84	6,60	-
11	14,18	13,38	12,66	12,00	11,39	10,84	10,32	9,85	9,41	9,00	8,61	8,25	7,92	7,60	7,30	7,02	6,76	-	-	-	-
10	12,88	12,16	11,50	10,9	10,35	9,85	9,38	8,95	8,55	8,17	7,82	7,50	7,19	6,90	-	-	-	-	-	-	-
9	11,59	10,94	10,35	9,81	9,31	8,86	8,44	8,05	7,69	7,35	7,04	-	-	-	-	-	-	-	-	-	-

Multiple spans L1 L2 with L1 = L2 and internal width support 100mm

Thickness of the slab [cm]	Span [m]																					
	2,00	2,10	2,20	2,30	2,40	2,50	2,60	2,70	2,80	2,90	3,00	3,10	3,20	3,30	3,40	3,50	3,60	3,70	3,80	3,90	4,00
18	26,22	24,78	23,46	22,27	21,17	20,16	19,22	18,36	17,56	16,81	16,12	15,46	14,85	13,72	12,69	11,75	10,88	10,08	9,34	8,66	8,03
17	25	23,62	22,37	21,23	20,18	19,22	18,33	17,51	16,75	16,04	15,37	14,75	13,74	12,69	11,73	10,85	10,04	9,3	8,62	7,99	7,4
16	23,73	22,43	21,24	20,16	19,17	18,26	17,41	16,63	15,91	15,24	14,61	13,69	12,62	11,65	10,77	9,95	9,21	8,52	7,89	7,31	6,77
15	22,43	21,2	20,08	19,06	18,12	17,26	16,46	15,73	15,04	14,41	13,57	12,49	11,51	10,62	9,8	9,06	8,38	7,75	7,17	6,63	6,13
14	21,08	19,92	18,87	17,91	17,03	16,22	15,47	14,78	14,14	13,35	12,27	11,28	10,39	9,58	8,84	8,16	7,54	6,97	6,44	5,95	5,5
13	19,67	18,59	17,61	16,72	15,9	15,14	14,45	13,8	13,03	11,94	10,97	10,08	9,28	8,55	7,88	7,27	6,71	6,19	5,72	5,28	4,87
12	18,2	17,21	16,3	15,47	14,71	14,01	13,37	12,58	11,5	10,54	9,67	8,88	8,16	7,51	6,92	6,37	5,87	5,41	4,99	4,6	4,24
11	16,67	15,75	14,92	14,17	13,47	12,83	11,97	10,92	9,98	9,13	8,37	7,68	7,05	6,48	5,96	5,48	5,04	4,64	4,27	3,92	-
10	13,99	13,00	11,64	10,45	9,41	8,49	7,68	6,96	6,31	5,72	5,2	4,72	4,29	3,9	3,54	3,21	2,91	-	-	-	-
9	12,16	10,84	9,69	8,69	7,81	7,04	6,35	5,74	5,19	4,7	4,26	3,85	3,49	-	-	-	-	-	-	-	-

Key	Thickness [mm]
Installation without propping	0,75
	0,88
	1,00
With propping	0,75

Assumptions

- Concrete C25 / 30 (density: 25 kN / m³)
- Fire resistance REI30
- Deflection while pouring L / 180
- Deflection in service L / 350 if L < 3.5 m or (0.5 cm + L / 700) if L > 3.5 m
- Materials safety factors : γM=1.0, γC=1.5, γS=1.15
- Construction loads according to EN 1991-1-6 (Qca = 0,75 kN / m², Qcf = 0,75 kN / m²)

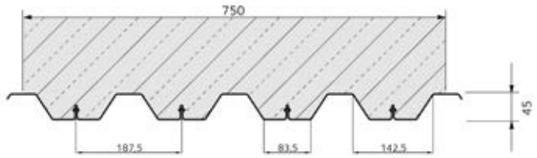
Cofraplus® 45

Composite floor decking with trapezoidal section

Used as shuttering during pouring phase and as reinforcement during service phase thanks to its specific geometry, Cofraplus® 45 is a multi-use profile suitable for all types of construction.
This slim profile optimises the height of the slab, providing great advantage for residential project. Associated with organic coating in white color, it brings some additional light and provides an attractive soffit solution. It also offers good performances in fire condition.

Fire resistant

Lightweight



CE marking according to EN 1090-1

Characteristics of the base material		Norms
Steel grade	S 350 GD	EN 10346
Corrosion protection	Galvanised steel ZM 120	P 34-310 ETPM ZMevolution® or AbZ Z-30.11-61
	Galvanised coated steel ZM 120	EN 10169+A1

Organic coating		Norms
Hairplus® 25	Category CP13	P 34-310
		EN 10169+A1
Other coatings	On demand	

Characteristics	Nominal thickness of the profile sheet [mm]
	0,80
Weight [kg / m²]	10,00
Cross section A_p : [mm² / m]	1 088

Nominal concrete consumption

	Thickness of the slab [cm]															
	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38
Concrete volume [l / m²]	62	82	102	122	142	162	182	202	222	242	262	282	302	322	342	362
Theoretical weight* of the composite slab [kg / m²]	155	205	255	305	355	405	455	505	555	605	655	705	755	805	855	905

Concrete density 2500 kg / m³
*Additional weight du to pounding effect is not included

Fire resistance

	REI [min]			
	30	60	90	120
Thickness of the slab [cm]	8	10	12	14

REI: fire protection rating of the raw composite slab
The minimum thickness is required to comply with the temperature criterion (I) on the non- fire exposed side.

According EN 1994-1-2 §4.3.2, Cofraplus® 45 composite floors are rated REI 30 even without specific reinforcement in the ribs.
For higher fire resistance classes, additional reinforcement bars are required. These are positioned in the ribs of the profile.

Structural performance

Load / Span table

The value provided in each cell of the table loads is the maximum live load capacity Q (kN / m²). The self weight of the slab is already included.
The color of each cell give information about the required steel thickness.

Single span L

Thickness of the slab [cm]	Span [m]																					
	1,50	1,60	1,70	1,80	1,90	2,00	2,10	2,20	2,30	2,40	2,50	2,60	2,70	2,80	2,90	3,00	3,10	3,20	3,30	3,40	3,50
18	16,85	15,13	13,66	12,39	11,29	10,32	9,46	8,70	8,01	7,40	6,84	6,34	5,87	5,45	5,06	4,70	4,36	4,04	3,74	3,47	3,21
17	16,18	14,52	13,10	11,87	10,81	9,87	9,05	8,31	7,65	7,06	6,53	6,04	5,60	5,20	4,82	4,48	4,15	3,84	3,56	3,30	3,05
16	15,51	13,90	12,53	11,35	10,33	9,43	8,63	7,93	7,30	6,73	6,22	5,75	5,33	4,94	4,58	4,26	3,94	3,65	3,38	3,12	2,89
15	14,84	13,29	11,97	10,83	9,85	8,98	8,22	7,54	6,94	6,39	5,90	5,46	5,05	4,68	4,35	4,03	3,73	3,45	3,19	2,95	2,73
14	14,17	12,68	11,41	10,31	9,37	8,54	7,80	7,16	6,58	6,06	5,59	5,17	4,78	4,43	4,11	3,81	3,52	3,25	3,01	2,78	2,57
13	13,51	12,07	10,84	9,79	8,88	8,09	7,39	6,77	6,22	5,72	5,28	4,87	4,51	4,17	3,87	3,58	3,31	3,06	2,83	2,61	2,41
12	12,84	11,45	10,28	9,27	8,40	7,64	6,98	6,39	5,86	5,39	4,97	4,58	4,23	3,92	3,63	3,36	3,10	2,86	2,64	2,44	2,25
11	12,17	10,84	9,72	8,75	7,92	7,20	6,56	6,00	5,50	5,05	4,65	4,29	3,96	3,66	3,39	3,14	2,89	2,67	2,46	2,27	2,09
10	11,50	10,23	9,15	8,23	7,44	6,75	6,15	5,62	5,14	4,72	4,34	4,00	3,69	3,41	3,15	2,91	2,68	2,47	2,28	-	-
9	10,83	9,62	8,59	7,71	6,96	6,31	5,73	5,23	4,78	43,8	4,03	3,71	3,42	3,15	2,91	-	-	-	-	-	-

Multiple spans L1 L2 with L1 = L2 and internal width support 100mm

Thickness of the slab [cm]	span [m]																					
	1,50	1,60	1,70	1,80	1,90	2,00	2,10	2,20	2,30	2,40	2,50	2,60	2,70	2,80	2,90	3,00	3,10	3,20	3,30	3,40	3,50
18	22,00	19,91	18,12	16,57	15,22	14,04	12,99	12,06	11,23	10,48	9,80	9,18	8,62	8,10	7,63	7,19	6,77	6,38	6,02	5,68	5,37
17	21,10	19,07	17,34	15,85	14,55	13,41	12,40	11,51	10,71	9,98	9,33	8,74	8,20	7,71	7,25	6,83	6,43	6,06	5,71	5,39	5,09
16	202,0	18,24	16,57	15,13	13,88	12,78	11,81	10,95	10,18	9,49	8,86	8,30	7,78	7,31	6,88	6,47	6,09	5,73	5,40	5,09	4,81
15	19,30	17,41	15,80	14,41	13,21	12,15	11,22	10,40	9,66	8,99	8,40	7,86	7,36	6,91	6,50	6,11	5,75	5,41	5,09	4,80	4,53
14	18,40	16,57	15,02	13,69	12,53	11,52	10,63	9,84	9,13	8,50	7,93	7,41	6,94	6,51	6,12	5,76	5,40	5,08	4,78	4,50	4,25
13	17,50	15,74	14,25	12,97	11,86	10,89	10,04	92,8	8,61	8,01	7,46	6,97	6,52	6,12	5,74	5,40	5,06	4,76	4,47	4,21	3,96
12	16,60	14,91	13,48	12,25	11,19	10,26	9,45	8,73	8,09	7,51	7,00	6,53	6,10	5,72	5,36	5,04	4,72	4,43	4,16	3,91	3,68
11	15,69	14,07	12,70	11,53	10,51	9,63	8,86	8,17	7,56	7,02	6,53	6,09	5,68	5,32	4,99	4,68	4,38	4,11	3,85	3,62	3,40
10	14,79	13,24	11,93	10,81	9,84	9,00	8,26	7,61	7,04	6,52	6,06	5,64	5,27	4,92	4,61	4,32	4,04	3,78	3,54	3,32	3,12
9	13,89	12,41	11,16	10,09	9,17	8,37	7,67	7,06	6,51	6,03	5,59	5,20	4,85	4,52	4,23	3,96	3,70	3,46	-	-	-

Key	Thickness [mm]
Installation without propping	0,80
With propping	0,80

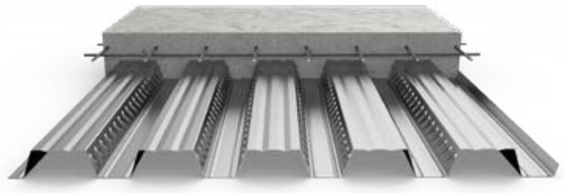
Assumptions

- Concrete C25 / 30 (density: 25 kN / m³)
- Fire resistance REI30
- Deflection while pouring L / 180
- Deflection in service L / 350 if L < 3.5 m or (0.5 cm + L / 700) if L > 3.5 m
- Materials safety factors : γM=1.0, γC=1.5, γS=1.15

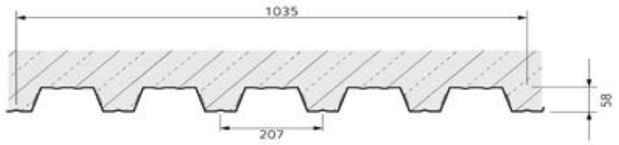
Cofraplus® 60+

Composite floor decking

Up to 30% lighter than traditional concrete slabs and easily stacked for efficient transportation and storage, Cofraplus® 60+ composite slabs are a mainstream solution designed for medium load / span floors.
It is ideal for all kinds of projects including refurbishments.
Cofraplus® 60+ is proposed with two cover widths (1035 mm and 828 mm) for an optimized installation on site.



Fire resistant | Economic | Lightweight



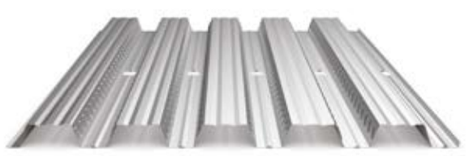
CE marking according to EN 1090-1

Characteristics of the base material		Norms
Steel grade	S 350 GD	EN 10346
Corrosion protection	Galvanised steel ZM 175	P 34-310 ETPM ZMevolution® or AbZ Z-30.11-61
	Galvanised coated steel ZM 175	P 34-301 EN 10169+A1
Organic coating		**Norms**
Hairplus® 25	Category CP13	P 34-310
		EN 10169+A1
Other coatings	On demand	

Characteristics	Nominal thickness of the profile sheet [mm]		
	0,75	0,88	1,00
Weight [kg / m²]	8,53	10,00	11,37
Cross section A_p: [mm² / m]	1 029	1 217	1 391
Effective inertia I_{eff} [cm⁴ / m]	44,37	52,64	60,08
Height of neutral axis [mm]	33,70	33,70	33,70
Modulus of inertia [cm³ / m]	13,16	15,62	17,83

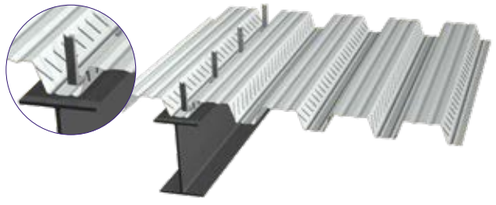
Cofraplus® 60+ P:

Pre-punched version, compatible with shear connectors welded in advance or in shop to composite beams.



Cofraplus® 60+ C:

If shear connectors are welded or nailed to the across the profile sheet to the beam, the Cofraplus® 60+ C version brings advantages. The spacing between the 2 stiffners in the lower flange permits to well position the connector.



Nominal concrete consumption

	Thickness of the slab [cm]									
	11	12	13	14	15	16	17	18	19	20
Concrete volume [l / m²]	75	85	95	105	115	125	135	145	155	165
Theoretical weight* of the composite slab [kg / m²]	188	213	238	263	288	313	338	363	388	413

Concrete density 2500 kg / m³
Maximum recommended slab thickness d = 28 cm
*Additional weight du to pounding effect is not included

Fire resistance

	REI [min]			
	30	60	90	120
Thickness of the slab [cm]	11	12	14	16

REI: fire protection rating of the raw composite slab
The minimum thickness is required to comply with the temperature criterion (I) on the non- fire exposed side.

According EN 1994-1-2 §4.3.2, Cofraplus® 60 composite floors are rated REI 30 even without specific reinforcement in the rib.
For higher fire resistance classes, reinforcement bars are required. These are positioned in the ribs of the profile.
Their section is determined by using Cofra® 5.

Sound insulation

The acoustic behaviour of a raw composite slab is determined by its mass.
Values calculated by modelling – study report CSTB No. AC15-26054708

	Thickness of the slab [cm]								
	11	12	13	14	15	16	17	18	19
R_w [dB]	46	47	48	48	49	50	51	52	53
(C; Ctr) [dB]	(-2; -6)	(-2; -6)	(-2; -6)	(-1; -6)	(-1; -6)	(-2; -6)	(-2; -7)	(-2; -7)	(-2; -7)

Structural performance

Load / Span table

The value provided in each cell of the table loads is the maximum live load capacity Q (kN / m²). The self weight of the slab is already included.
The color of each cell give information about the required steel thickness.
A calculation using Cofra 5 might optimise the given values according to the project requirements.

Single span L

Thickness of the slab [cm]	Span [m]																					
	2,00	2,10	2,20	2,30	2,40	2,50	2,60	2,70	2,80	2,90	3,00	3,10	3,20	3,30	3,40	3,50	3,60	3,70	3,80	3,90	4,00
20	9,91	9,23	8,64	8,11	8,40	7,18	6,79	6,40	6,05	5,71	5,37	5,08	4,83	4,54	4,3	4,1	3,86	3,66	3,47	3,32	3,12
19	9,47	8,84	8,25	7,76	8,06	7,62	6,49	6,10	5,76	5,47	5,18	4,88	4,64	4,39	4,15	3,91	3,71	3,52	3,37	3,17	3,03
18	9,03	8,45	7,91	7,42	6,98	7,28	6,84	5,86	5,52	5,22	4,93	4,69	4,44	4,20	3,96	3,76	3,56	3,37	3,22	3,03	2,88
17	8,54	8,01	7,52	7,03	6,64	6,93	6,54	5,57	5,27	4,98	4,69	4,44	4,20	4,00	3,81	3,61	3,42	3,22	3,08	2,93	2,78
16	8,11	7,57	7,13	6,64	6,30	5,91	6,20	5,86	4,98	4,74	4,44	4,25	4,00	3,81	3,61	3,42	3,27	3,08	2,93	2,78	2,64
15	7,62	7,13	6,69	6,30	5,91	5,57	5,86	5,57	5,27	4,44	4,25	4,00	3,81	3,61	3,42	3,27	3,08	2,93	2,78	2,64	2,54
14	7,18	6,69	6,30	5,91	5,57	5,22	4,93	5,22	4,93	4,20	4,00	3,76	3,56	3,42	3,22	3,08	2,93	2,78	2,64	2,54	2,39
13	6,69	6,25	5,86	5,52	5,22	4,88	4,64	4,39	4,64	4,39	3,71	3,56	3,37	3,22	3,03	2,88	2,73	2,64	2,49	2,39	2,25
12	6,2	5,81	5,42	5,13	4,83	4,54	4,30	4,05	3,86	4,10	3,91	3,32	3,12	2,98	2,83	2,69	2,59	2,44	2,34	2,25	2,10
11	5,66	5,32	4,98	4,69	4,44	4,20	3,96	3,76	3,56	3,37	3,61	3,42	3,27	2,73	2,64	2,49	2,39	2,29	2,15	2,05	1,95

Multiple spans L1 L2 with L1 = L2 and internal width support 100mm

Thickness of the slab [cm]	Span [m]																					
	2,00	2,10	2,20	2,30	2,40	2,50	2,60	2,70	2,80	2,90	3,00	3,10	3,20	3,30	3,40	3,50	3,60	3,70	3,80	3,90	4,00
20	16,85	15,87	14,99	14,31	12,84	11,52	10,4	9,38	8,5	7,67	6,93	5,13	4,83	4,59	4,35	4,10	3,91	3,66	3,47	3,32	3,12
19	16,02	15,09	14,21	13,43	12,01	10,79	9,77	8,79	7,96	7,18	6,45	4,88	4,64	4,39	4,15	3,96	3,71	3,52	3,37	3,17	3,03
18	15,14	14,26	13,48	12,5	11,23	10,06	9,08	8,20	7,42	6,69	6,01	4,69	4,44	4,20	4,00	3,76	3,56	3,42	3,22	3,08	2,88
17	14,31	13,48	12,70	11,57	10,40	9,33	8,4	7,57	6,84	6,20	5,57	4,44	4,25	4,00	3,81	3,61	3,42	3,27	3,08	2,93	2,78
16	13,43	12,65	11,96	10,69	9,57	8,59	7,76	6,98	6,30	5,71	5,13	4,25	4,00	3,81	3,61	3,42	3,27	3,08	2,93	2,78	2,64
15	12,6	11,87	10,94	9,77	8,79	7,86	7,08	6,35	5,76	5,22	4,69	4,00	3,81	3,61	3,42	3,27	3,08	2,93	2,78	2,69	2,54
14	11,72	11,04	9,91	8,89	7,96	7,13	6,40	5,76	5,18	4,69	4,25	3,81	3,61	3,42	3,22	3,08	2,93	2,78	2,64	2,54	2,39
13	10,84	10,01	8,94	7,96	7,13	6,40	5,76	5,18	4,64	4,20	3,76	3,56	3,37	3,22	3,03	2,88	2,78	2,64	2,49	2,39	2,25
12	9,91	8,84	7,91	7,08	6,35	5,66	5,08	4,59	4,10	3,71	3,32	3,71	3,12	2,98	2,83	2,69	2,59	2,44	2,34	2,25	2,15
11	8,69	7,71	6,88	6,15	5,52	4,93	4,44	4,00	3,56	3,22	2,88	3,42	3,27	2,78	2,64	2,49	2,39	2,29	2,20	2,05	2,00

Key	Thickness [mm]
Installation without propping	0,75
	0,88
	1,00
With propping	0,75

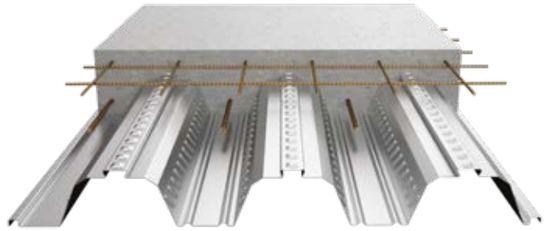
Assumptions

- Concrete C25 / 30 (density: 25 kN / m³)
- Fire resistance REI30
- Deflection while pouring L / 180
- Deflection in service L / 350 if L < 3.5 m or (0.5 cm + L / 700) if L > 3.5 m
- Materials safety factors : γM=1.0, γC=1.5, γS=1.15
- Construction loads according to EN 1991-1-6 (Qca = 0,75 kN / m², Qcf = 0,75 kN / m²)

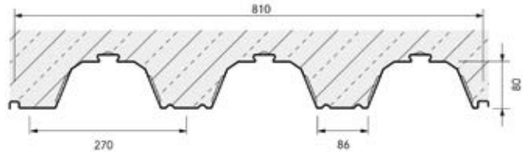
Cofraplus® 80

Composite floors decking with trapezoidal section

With its embossments and its dovetail geometry, Cofraplus® 80 is a performant composite slab solution, ideal alternative to precast slab.
Its lightness, its stackable design and its flexibility offers numerous of advantages not only from a mechanical point of view but also logistical and economical as well.
Cofraplus® 80 is compatible with all structural materials. Its specific accessories allow suspended options such as ceiling or ducts without any drillings.



Fire resistant | Long span | Economic



CE marking according to EN 1090-1

Characteristics of the base material		Norms
Steel grade	S 350 GD	EN 10346
Corrosion protection	Galvanised steel ZM 175	ETPM ZMevolution® or AbZ Z-30.11-61

Characteristics	Nominal thickness of the profile sheet [mm]			
	0,88	1,00	1,13	1,25
Weight [kg / m²]	10,66	12,11	13,69	15,14
Cross section A_p: [mm² / m]	1 296	1 481	1 682	1 867
Effective inertia I_{eff} [cm⁴ / m]	141,58	158,79	177,43	194,64
Height of neutral axis [mm]	48,02	48,02	48,02	48,02
Modulus of inertia [cm³ / m]	29, 84	33,07	36,95	40,53

Nominal concrete consumption

	Thickness of the slab [cm]												
	13	14	15	16	17	18	19	20	21	22	24	26	28
Concrete volume [l / m²]	85	95	105	115	125	135	145	155	165	175	195	215	235
Theoretical weight* of the composite slab [kg / m²]	213	238	263	288	313	338	363	388	413	438	488	538	588

Concrete density 2500 kg / m³
Maximum recommended slab thickness d = 20 cm
*Additional weight du to pounding effect is not included

Able to reach spans:
- **Up to 4,5 m without props**
- **Up to 6,5 m with props**

Reduces by 15% the CO2 emission and 30% lighter compared to a precast solution.
Flexible, sustainable and easy to install, Cofraplus® 80 is adapted to every kind of modern construction project.

Cofraplus® 80P:

Pre-punched version, compatible with shear connectors, welded in advance or in shop to the composite beams.

Fire resistance

	REI [min]			
	30	60	90	120
Thickness of the slab [cm]	13	14	15	17

REI: fire protection rating of the raw composite slab
The minimum thickness is required to comply with the temperature criterion (I) on the non- fire exposed side.

According EN 1994-1-2 §4.3.2, Cofraplus® 80 composite floors are rated REI 30 even without specific reinforcement in the ribs.
For higher fire resistance classes, additional reinforcement bars are required. These are positioned in the ribs of the profile.
Their section is determined by using Cofra®5.

Sound insulation

The acoustic behaviour of a raw composite slab is determined by its mass.
Values calculated by modelling – study report CSTB No. AC15-26054708

	Thickness of the slab [cm]									
	13	14	15	16	18	20	22	24	26	28
R_w [dB]	48	49	50	50	52	53	54	55	56	57
(C; Ctr) [dB]	(-2; -6)	(-2; -6)	(-2; -7)	(-1; -6)	(-2; -7)	(-2; -7)	(-1; -7)	(-1; -7)	(-1; -7)	(-1; -7)

Structural performance

Load / Span table

Design is made according to the Eurocodes.
The value provided in each cell of the table loads is the maximum live load capacity Q (kN / m²), with no safety factor. The self weight of the slab is already included.
The color of each cell give information about the required steel thickness.
A calculation using Cofra® 5 optimises these values according to the project requirements.

Single span L

Thickness of the slab [cm]	Span [m]																						
	3,00	3,10	3,20	3,30	3,40	3,50	3,60	3,70	3,80	3,90	4,00	4,10	4,20	4,30	4,40	4,50	4,60	4,70	4,80	4,90	5,00
22	5.82	5.49	5,19	4,90	4,63	4,37	4,13	3,90	3,68	3,48	3,28	3,10	2,92	2,75	2,59	2,44	2,29	2,15	2,01	1,88	1,76
21	5.75	5.43	5,13	4,85	4,59	4,34	4,11	3,89	3,68	3,48	3,29	3,11	2,93	2,77	2,61	2,46	2,32	2,19	2,05	1,93	1,81
20	5.68	5,37	5,08	4,81	4,55	4,31	4,09	3,87	3,67	3,47	3,29	3,11	2,95	2,79	2,64	2,49	2,35	2,22	2,09	1,97	1,85
19	5.43	5,13	4,86	4,6	4,36	4,13	3,91	3,71	3,51	3,33	3,15	2,99	2,83	2,68	2,54	2,40	2,27	2,14	2,02	1,90	1,79
18	5.17	4,89	4,63	4,39	4,16	3,94	3,74	3,54	3,36	3,19	3,02	2,86	2,71	2,57	2,43	2,30	2,18	2,06	1,95	1,84	1,73
17	4.92	4,66	4,41	4,18	3,96	3,76	3,57	3,38	3,21	3,04	2,89	2,74	2,60	2,46	2,33	2,21	2,09	1,98	1,87	1,77	1,67
16	4.67	4,42	4,19	3,97	3,77	3,57	3,39	3,22	3,06	2,9	2,75	2,61	2,48	2,35	2,23	2,12	2,01	1,90	1,80	1,70	1,61
15	4.41	4,18	3,97	3,76	3,57	3,39	3,22	3,06	2,90	2,76	2,62	2,49	2,36	2,25	2,13	2,02	1,92	1,82	1,72	1,63	1,55
14	4.16	3,94	3,74	3,55	3,37	3,20	3,05	2,89	2,75	2,62	2,49	2,36	2,25	2,14	2,03	1,93	1,83	1,74	1,65	1,57	1,48
13	3.91	3,71	3,52	3,34	3,18	3,02	2,87	2,73	2,6	2,47	2,35	2,24	2,13	2,03	1,93	1,84	1,75	1,66	1,58	1,50	1,42

Multiple spans L1 L2 with L1 = L2 and internal width support 100mm

Thickness of the slab [cm]	Span [m]																						
	3,00	3,10	3,20	3,30	3,40	3,50	3,60	3,70	3,80	3,90	4,00	4,10	4,20	4,30	4,40	4,50	4,60	4,70	4,80	4,90	5,00
22	7,89	7,51	7,16	6,83	6,52	6,23	5,95	5,69	5,45	5,21	4,99	4,78	4,57	4,38	4,20	4,02	3,85	3,69	3,54	3,39	3,25
21	7,75	7,38	7,04	6,72	6,42	6,14	5,87	5,61	5,37	5,15	4,93	4,72	4,53	4,34	4,16	3,99	3,83	3,67	3,52	3,38	3,24
20	7,60	7,25	12,50	6,61	6,31	6,04	5,78	5,53	5,30	5,08	4,87	4,67	4,48	4,30	4,12	3,96	3,80	3,65	3,5	3,36	3,23
19	7,25	6,91	12,04	11,56	6,02	5,76	5,52	5,28	5,06	4,85	4,65	4,46	4,28	4,11	3,94	3,79	3,63	3,49	3,35	3,22	3,09
18	6,89	6,57	11,56	11,11	10,68	10,28	5,25	5,03	4,82	4,62	4,43	4,25	4,08	3,92	3,76	3,61	3,47	3,34	3,20	3,08	2,96
17	6,54	6,24	11,07	10,64	10,23	9,85	9,48	4,78	4,58	4,40	4,22	4,05	3,88	3,73	3,58	3,44	3,31	3,18	3,06	2,94	2,82
16	6,18	5,90	5,64	9,82	9,44	9,09	8,65	8,03	4,34	4,17	4,00	3,84	3,69	3,54	3,40	3,27	3,14	3,02	2,91	2,80	2,69
15	5,83	5,57	5,32	5,09	4,87	8,24	7,82	7,25	6,73	3,94	3,78	3,63	3,49	3,35	3,22	3,10	2,98	2,87	2,76	2,65	2,55
14	5,48	5,23	5,00	4,78	4,58	4,39	5,16	4,75	4,37	4,02	3,57	3,40	3,12	2,86	2,62	2,39	2,18	1,98	1,80	1,62	1,46
13	5,12	4,90	4,68	4,48	4,29	4,11	3,94	3,78	3,87	3,56	3,27	3,00	2,75	2,52	2,30	2,10	1,91	1,73	1,57	1,41	1,26

Key	Thickness [mm]
Installation without propping	0,88
	1,00
	1,13
	1,25
With propping	0,88

Assumptions

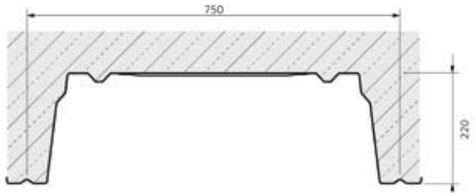
- Concrete C25 / 30 (density: 25 kN / m³)
- Fire resistance REI30
- Deflection while pouring L / 180
- Deflection in service L / 350 if L < 3.5 m or (0.5 cm + L / 700) if L > 3.5 m
- Materials safety factors : γM=1.0, γC=1.5, γS=1.15
- Construction loads according to EN 1991-1-6 (Qca = 0,75 kN / m², Qcf = 0,75 kN / m²)

Cofraplus® 220

Long span floor decking

Quick and easy to install, our additive floor Cofraplus® 220 provides an optimised solution for long span applications such as tertiary sectors or multi-storey building. As it can easily reach spans up to 5 m without props, Cofraplus® 220 is particularly adapted to car park project.
A range of support accessories makes it easy to optimise the height of the slab and beam as required and ArcelorMittal Building Solutions' organic coatings offer a large choice of colours.

Fire resistant | Long span | Slimfloor | Composite floor parking



CE marking according to EN 1090-1
French technical approval: DTA 3.1 / 17-927_V3
German technical approval: AbZ Z-26.1-55

Characteristics of the base material		Norms
Steel grade	S 350 GD	EN 10346
Corrosion protection	Galvanised steel ZM 175	P 34-310 ETPM ZMevolution® or AbZ Z-30.11-61
	Galvanised steel ZM 175 with organic coating	P 34-301 EN 10169+A1

Organic coating		Norms
Hairplus® 25	Category CP13	P 34-310
		EN 10169+A1
Other coatings	On demand	

Characteristics	Nominal thickness of the profile sheet [mm]	
	1,13	1,25
Weight [kg / m²]	15,14	16,75
Cross section A_p: [mm² / m]	1 817	2 017
Effective inertia I_{eff} [cm⁴ / m]	926	1063
Height of neutral axis [mm]	159,90	159,90
Modulus of inertia [cm³ / m]	57,91	66,48

Possibility of bridging large spans
- Up to 5,5 m without props
- Up to 8,5 m with props

Considerable flexibility in use: the profile's lightness (12,5 kg / ml) makes it easy to handle, thus reducing the costs of lifting devices for installation.

Compatibility with steel, concrete or timber frame for better adaptability.

Nominal concrete consumption

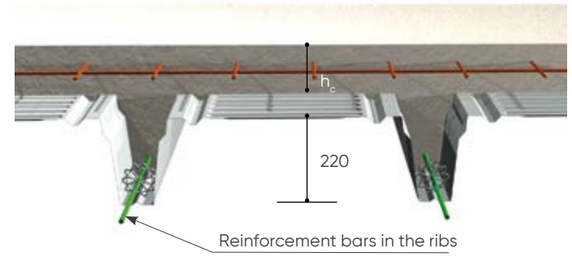
	Thickness of the slab [cm]							
	80	90	100	110	120	130	140	150
Concrete volume [l / m²]	117	127	137	147	157	167	177	187
Theoretical weight* of the composite slab [kg / m²]	308	333	358	383	408	433	458	483

Concrete density 2500 kg / m³
Maximum recommended slab thickness d = 20 cm
*Additional weight du to pounding effect is not included

Fire resistance

	REI [min]			
	30	60	90	120
h_c mini [cm]	8	8	10	12

The section of reinforcement get calculated according the project specifications.
A specific calculation note for a pre-design will be communicated by our consultant engineers.



Structural performance

Load / Span table

The value provided in each cell of the table loads is the maximum live load capacity Q (kN / m²), with no safety factor.
The self weight of the slab is already included.
The color of each cell give information about the required steel thickness.
Our engineering design office will be able to refine these indications based on the detailed specifications of your project

Single span L

Thickness of the slab [cm]	Span [m]																				
	5,00	5,10	5,20	5,30	5,40	5,50	5,60	5,70	5,80	5,90	6,00	6,20	6,40	6,60	6,80	7,00	7,20	7,40	7,60	7,80	8,00
15	7,38	6,39	6,37	6,34	6,32	7,12	7,37	6,97	6,58	6,21	5,86	8,09	7,33	6,63	5,55	5	7,72	7,45	6,84	6,27	5,75
14	7,43	6,95	6,44	6,42	6,4	7,93	6,74	6,37	6,62	6,26	5,92	8,06	7,31	6,63	6,01	5,03	7,65	7,03	6,8	6,25	5,73
13	7,47	7	6,56	6,5	6,48	7,96	7,93	6,4	6,05	5,72	5,4	8,04	7,3	6,63	6,03	5,47	7,98	6,97	6,41	5,89	5,72
12	7,52	7,06	6,62	5,84	6,56	7,99	7,97	7,94	6,09	5,76	5,45	7,48	7,29	6,64	6,04	5,49	7,91	7,29	6,37	5,87	5,4
11	7,57	7,12	6,69	5,91	5,89	8,02	8	7,98	7,95	5,81	5,5	7,45	6,78	6,17	6,06	5,52	7,84	7,24	6,68	6,17	5,38
10	7,62	7,18	6,75	5,99	5,97	7,31	8,03	8,01	7,99	7,96	5,56	7,42	6,77	6,17	5,63	5,55	7,77	7,19	6,65	6,15	5,69
9	7,67	7,23	6,82	6,07	6,05	7,34	7,32	7,29	8,02	8	7,97	7,39	6,75	6,17	5,64	5,16	7,31	7,13	6,61	6,13	5,67
8	7,72	7,29	6,89	6,15	6,14	7,37	7,35	7,33	7,31	8,03	8,01	7,96	6,74	6,18	5,67	5,19	7,25	6,71	6,57	6,1	5,66
Steel reinforcement per rib	1 HA 14					1 HA16						1 HA20						1 HA25			

Multiple spans L1 L2 with L1 = L2 and internal width support 100mm

Thickness of the slab [cm]	Span [m]																				
	5,00	5,10	5,20	5,30	5,40	5,50	5,60	5,70	5,80	5,90	6,00	6,20	6,40	6,60	6,80	7,00	7,20	7,40	7,60	7,80	8,00
15	11,54	11,46	10,83	10,23	9,66	9,49	8,98	8,52	8,08	7,66	7,27	10,48	9,57	8,74	7,99	7,3	6,66	6,06	5,52	5,02	4,56
14	11,49	10,89	10,55	9,97	9,42	8,9	8,78	8,33	7,89	7,49	7,1	10,16	9,28	8,49	7,76	7,1	6,49	5,93	5,39	4,91	4,46
13	11,44	10,84	10,25	9,71	9,18	8,68	8,2	8,11	7,71	7,32	6,95	9,85	9	8,23	7,53	6,89	6,3	5,77	5,27	4,81	4,36
12	11,15	10,55	9,98	9,43	8,94	8,46	7,99	7,55	7,52	7,15	6,79	9,55	8,72	7,98	7,31	6,69	6,12	5,6	5,14	4,69	4,28
11	10,83	10,25	9,7	9,18	8,68	8,24	7,79	7,37	7,33	6,97	6,63	9,24	8,46	7,75	7,09	6,49	5,95	5,45	4,99	4,56	4,19
10	10,51	9,95	9,42	8,92	8,45	8	7,57	7,18	7,14	6,42	6,46	8,92	8,18	7,5	6,88	6,3	5,78	5,3	4,86	4,45	4,07
9	10,19	9,65	9,15	8,67	8,21	7,78	7,37	6,97	6,95	6,27	5,93	8,61	7,9	7,25	6,66	6,11	5,62	5,14	4,72	4,33	3,97
8	9,87	9,36	8,87	8,41	7,98	7,56	7,17	6,79	6,43	6,12	5,79	7,9	7,62	7	6,43	5,92	5,44	5,01	4,6	4,22	3,88
Steel reinforcement per rib	1 HA14					1 HA16						1 HA20						1 HA25			
	503mm² / ml on support											760mm² / ml on support									

Key	Thickness [mm]
Installation without propping	1,13
	1,25
With 2 props	1,13
	1,25
With 3 props	1,13
	1,25

Assumptions

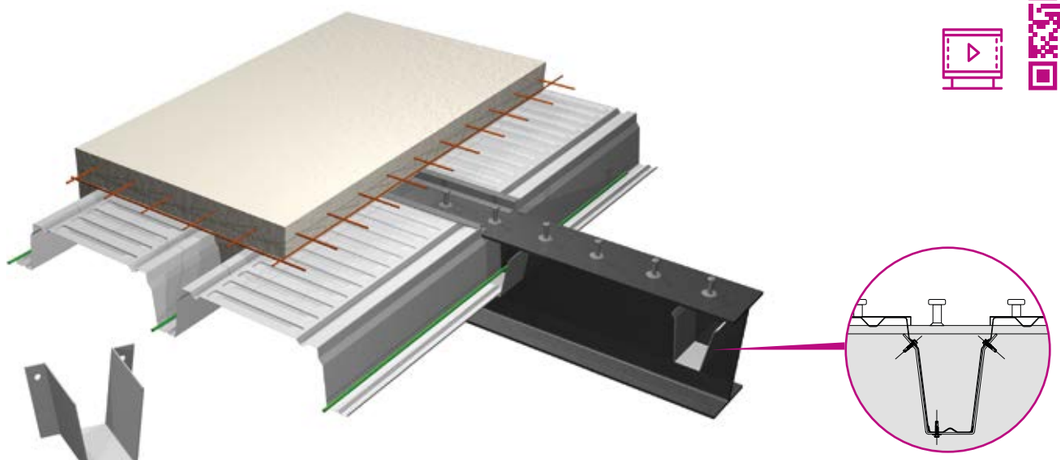
- Concrete C25 / 30 (density: 25 kN / m³)
- Fire resistance REI30
- Deflection while pouring L / 180
- Deflection in service L / 350 if L < 3.5 m or (0.5 cm + L / 700) if L > 3.5 m
- Materials safety factors : γM=1.0, γC=1.5, γS=1.15
- Construction loads according to EN 1991-1-6 (Qca = 0,75 kN / m², Qcf = 0,75 kN / m²)

Cofraplus® 220

Long span floor decking

Wing system

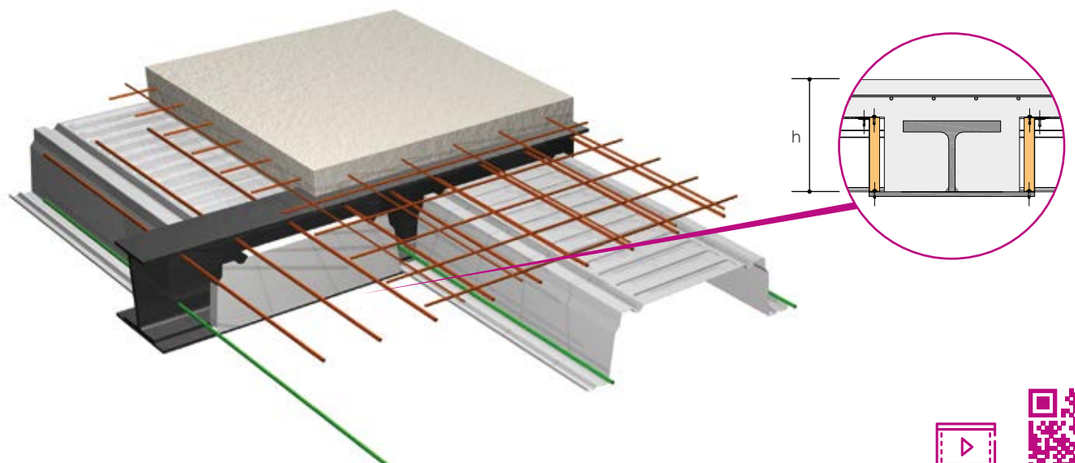
Wings are consoles which can be welded to the web of the beam in shop or bolted on site.



Bolted wing

Slim Floor system

The combination of Cofraplus® 220 with a CoSFB beam avoids the beam dropping and protects it in case of fire.



Slimfloor

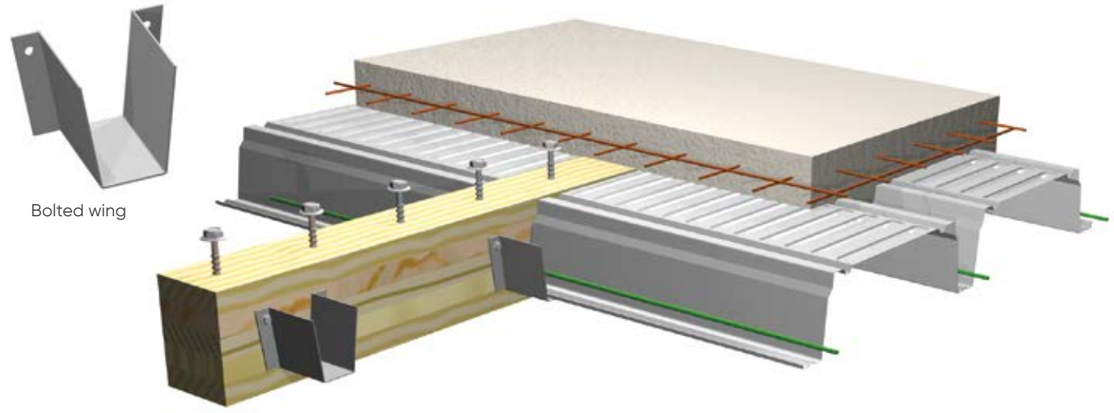
Cofraplus® 220

Installation

Supports

On timber or steel beam

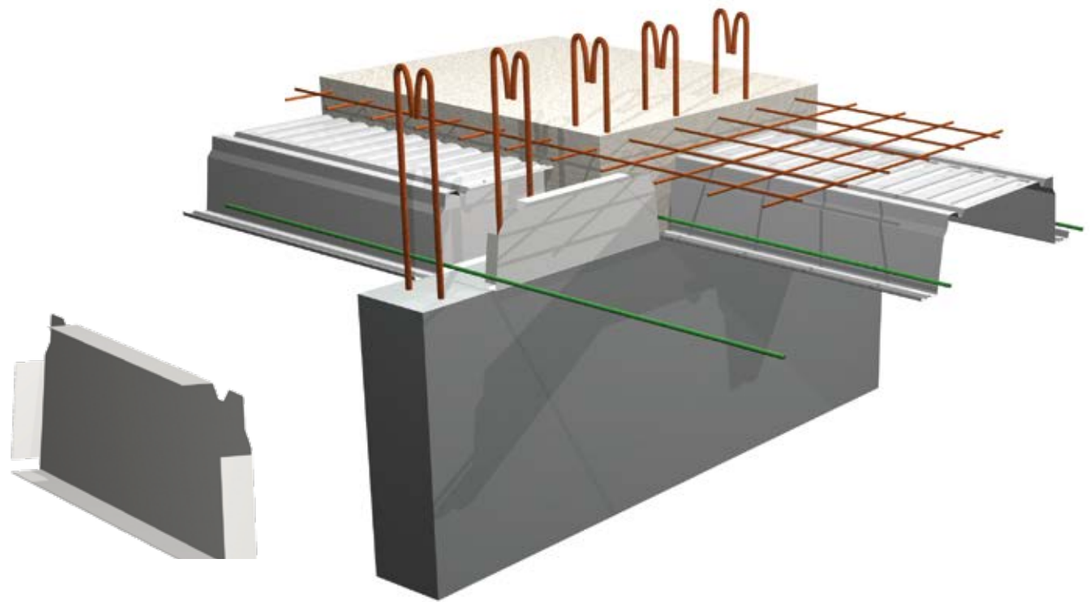
Wings can be either welded in shop to the web of the steel beam or bolted on site requiring holes in the web of the steel beam.



Bolted wing

On concrete beams

The end diaphragm can either be fixed to the profile in advance, before it is installed on the supporting structure, or it can be fixed on the support by nailing in order to house the profile.
The brochure " Cofraplus® 220 - installation guidelines" gives more details on the different installation procedures.



Cofradal® 200 & 260

Integrated composite floor systems

This truly innovative lightweight and insulated floor system is suitable for all types of construction, from commercial buildings to new build multi-story housing and renovation.
Using the Slim-Floor solution, Cofradal® allows users to optimise the height and weight of the slab and in turn the building itself. It can be specified in decibel version to provide additional acoustic absorption properties and, when finished with one of ArcelorMittal Construction's organic coatings, it provides an attractive soffit solution.

French technical approval: DTA 3.1/11-687_V2

Characteristics of the base material		Norms
Steel grade	S 320 GD	EN 10346
Type of corrosion protection	ZMevolution® galvanised steel	P 34-310 ETPM ZMevolution® or AbZ Z-30.11-61
	ZM galvanised steel coated evolution	EN 10169+A1 P 34-301
Coating		
Hairplus® 25	Category CP13	P 34-310
		EN 10169+A1
Other coatings	On demand	

Cofradal®	200	260
Thickness of the complex [mm]	200	260
Weight of the finished floor [kg / m²] Excluding support zones	240	280

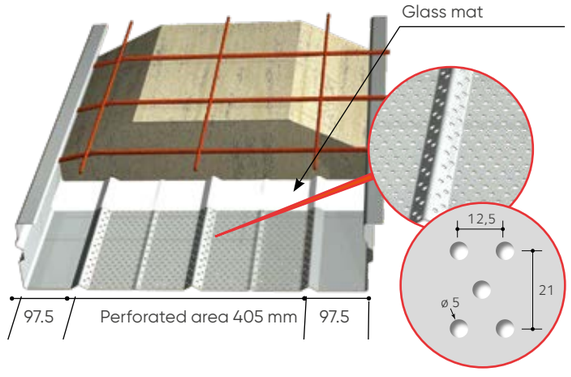
Fire resistance

Cofradal®		200			260		
Span [m]		5,00	6,00	7,00	6,00	7,50	8,00
REI [min]			120			120	
G' [kg / m²]	Q [kg / m²]						
100	250	Ø 12 mm	Ø 16 mm	Ø 16 mm	Ø 16 mm	Ø 16 mm	Ø 16 mm
70	350	Ø 12 mm	Ø 16 mm	/	Ø 16 mm	Ø 16 mm	/
100	500	Ø 12 mm	/	/ /	Ø 16 mm	/	/

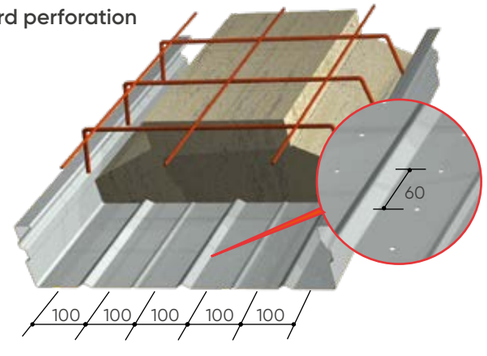
REI: fire protection rating of the net composite slab
The incorporation of a mineral wool insulation and the reinforcement bars permit to obtain a fire resistance rating of REI 120 even for the maximum span.

Two versions

Decibel perforation



Standard perforation



Acoustic performances

Despite its low self-weight, Cofradal® meets the requirements of the acoustic regulations without an additional false ceiling.
The "decibel" finish also provides remarquable sound absorption intended to improve comfort of the adjacent rooms below.

Installation	R_w (C, Ctr)	Ln, w
Cofradal® 200 alone(1)	58 (-1 ; -6) dB	78 dB
Cofradal® 200 with floating screed (2) Rocksol 501 20 mm + 50 mm screed	65 (-3 ; -10) dB	60 dB
Cofradal® 200 decibels - perforated profile (3)	α_w = 0.85	

(1) Test report CSTB No. AC 04-060 - (2) Test report CSTB No. AC 08-260 13 227 / 2
(3) Test report CSTB No. AC 05-148

Thermal performance

125 mm of mineral wool give the Cofradal® good thermal insulation. Additional insulation material, fixed to the underside, will provide the targeted Up value.

e [mm]	0	40	60	80	100
Up (W / m2K)	0,78	0,37	0,29	0,24	0,20

Structural performance

Load / Span table

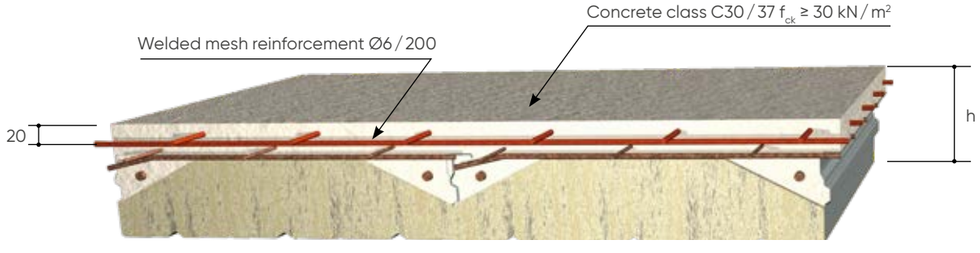
The value provided in each cell of the table loads is the maximum live load capacity Q (kN / m²), with no safety factor.
The self weight of the slab is already included.
The color of each cell give information about the required steel thickness.
Our engineering design office will be able to refine these values based on the detailed specification of your project

Cofradal®	Deflection	Span [m]										
		4,00	4,20	4,40	4,60	4,80	5,00	5,20	5,40	5,60	5,80	6,00
200 standard	1 / 350	7,99	7,64	7,29	6,97	6,82	6,66	6,47	6,29	5,88	5,39	4,90
	1 / 500	6,29	6,22	6,14	6,06	5,98	5,90	5,51	5,12	4,74	4,35	3,96
200 decibels	1 / 350	7,14	6,99	6,85	6,57	6,43	6,27	6,02	5,67	5,23	4,79	4,35
	1 / 500	5,73	5,65	5,57	5,49	5,41	5,33	4,97	4,61	4,26	3,90	3,54
260 standard	1 / 350	7,26	7,15	7,05	6,81	6,69	6,57	6,42	6,28	6,13	5,99	5,85
	1 / 500											
260 decibels	1 / 350	7,18	6,97	6,79	6,37	6,18	5,98	5,74	5,50	5,26	5,02	4,78
	1 / 500											

Cofradal®	Deflection	Span [m]										
		6,20	6,40	6,60	6,80	7,00	7,20	7,40	7,50	7,60	7,80	8,00
200 standard	1 / 350	4,56	4,22	3,88	3,54	3,20						
	1 / 500	3,69	3,43	3,16	2,90	2,63						
200 decibels	1 / 350	4,06	3,77	3,47	3,18	2,89						
	1 / 500	3,31	3,08	2,86	2,63	2,40						
260 standard	1 / 350	5,55	5,25	4,96	4,66	4,37	4,21	4,07	3,99	3,92	3,77	3,63
	1 / 500									3,86	3,44	3,24
260 decibels	1 / 350	4,55	4,32	4,08	3,85	3,62	3,52	3,43	3,37	3,32	3,23	3,13
	1 / 500										3,02	2,81

Consumption of materials

Cofradal®	Height h [mm]	Concrete volume (l / m²)
200	200	100
260	260	120

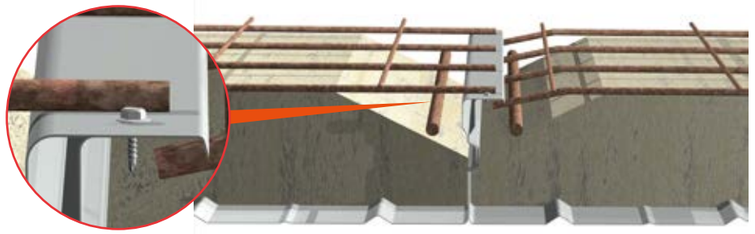


Cofradal® 200 & 260

Installation

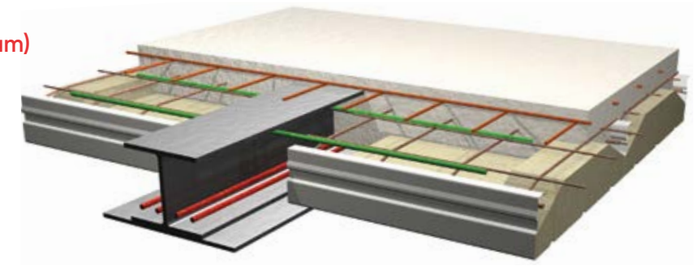
Stitching

The elements are stitched among each other using self-tapping screws 6.3 x 19 mm in a distance of 1,0 m supplied on site.

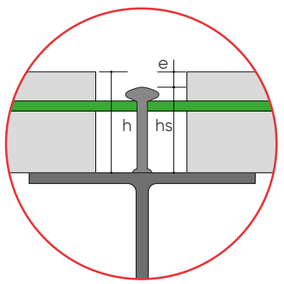


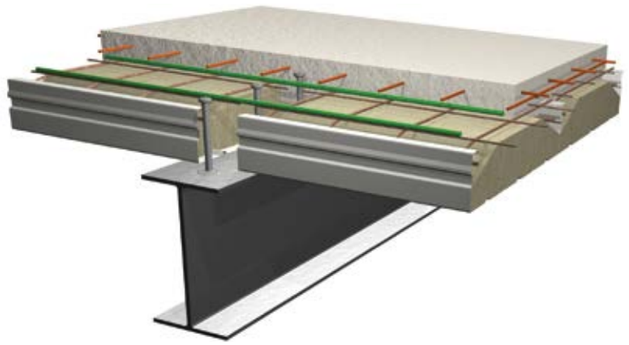
On SFB or CoSFB beam (composite slim floor beam)

Incorporation of the CoSFB beam in the thickness of the Cofradal® system avoids any joist and gives a fire resistant rating of R60 without any additional protection measures.



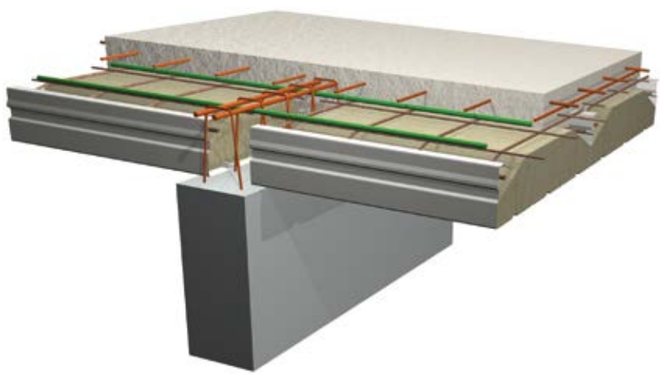
The height of the shear connectors hs depends on the height of the Cofradal system (h=200 or 260 mm)





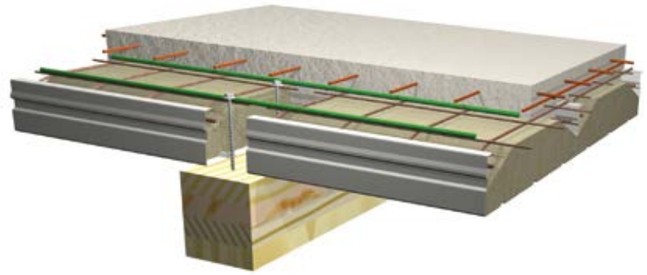
On reinforced concrete or pre-stressed concrete

On support negative moment reinforcement: Ø 8 mm minimum (e= 300 mm) length = L / 3



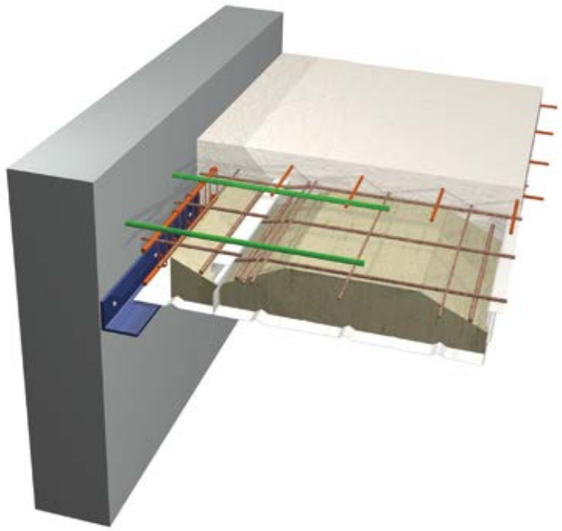
On composite timber beam

In order to transfer the horizontal forces of the floor to the load-bearing frame, it is recommended to fix connectors in the timber beam or timber wall. The connectors are designed inline with the bracing requirements.



Borders & edges

A layout plan provided for each site will give details of the slab edges. Fixing of edge trims is easy to implement and is adaptable to any type of support.

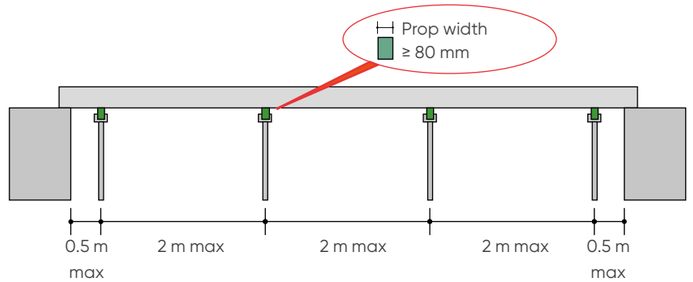


Propping

A shoring plan is provided, as well as an installation plan.

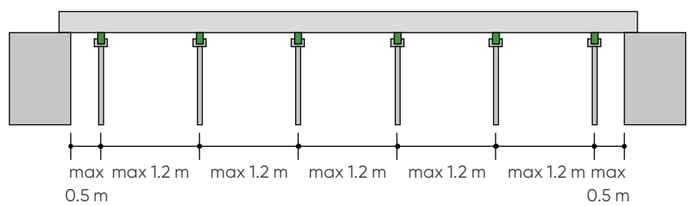
Cofradal® Standard

Without props for span ≤ 3 m according to a study by our engineering design office.



Cofradal® Decibel

In the case of a Decibel finish, particular attention should be paid to the quality and nature of the shoring finishing. Protection against scratches is recommended.



Installation

Installation

Composite floor decking

Cofrastra® 70 with profile filler installed on composite beam with double shear studs

Concrete pouring on Cofraplus® 220 filling first the ribs

Installation of Cofradal® 200

Edge trim with restraint stra$_p$ and nailed shear studs

Soffit of Cofradal® Decibel

Installation within rehabilitation project - Cofraplus® 60

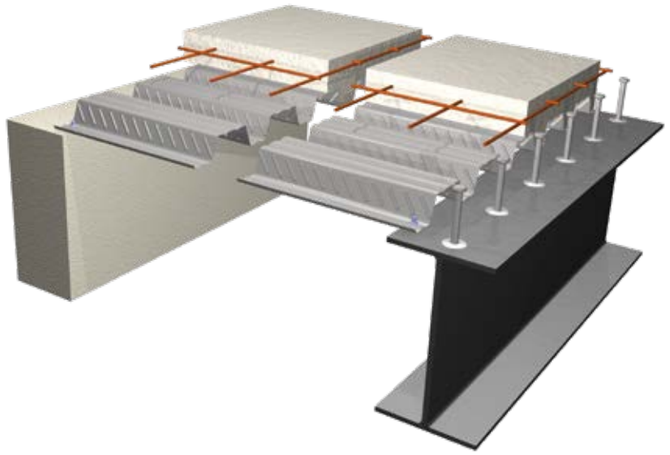
Installation

Composite floor decking

Support conditions and fastening

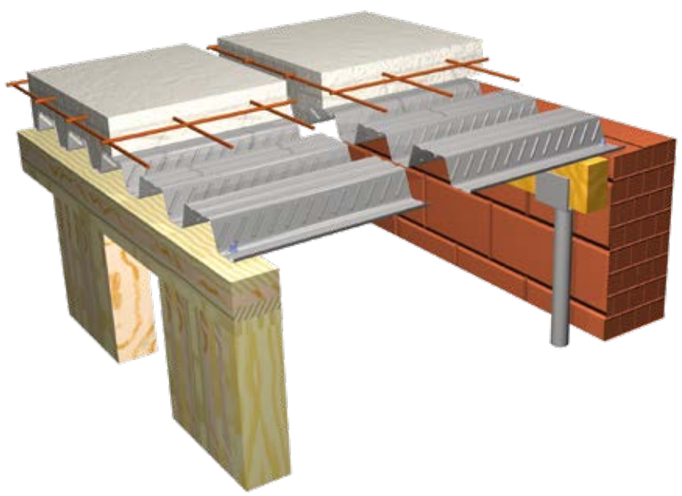
Installation on concrete or metal beam

Support width ≥ 50 mm



Installation on brick wall or timber structure

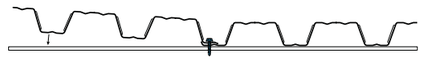
Support width ≥ 70 mm



Fastening and stitching

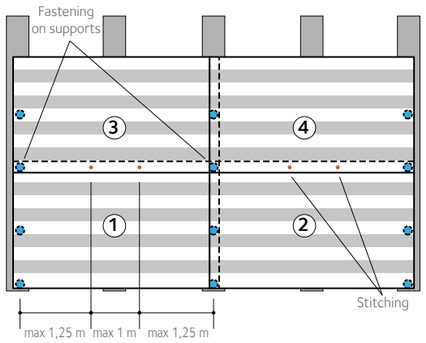
Each profile will be fixed at each end with 2 fasteners per support (except on intermediate supports in case the profile is continuous).
The fasteners will be choosen in respect of the type of support.

Fixing on supports



Stitching by rivets or self-taping screws

In the absence of fixing on a support, safety in the temporary phase can be ensured by a sliding rail.



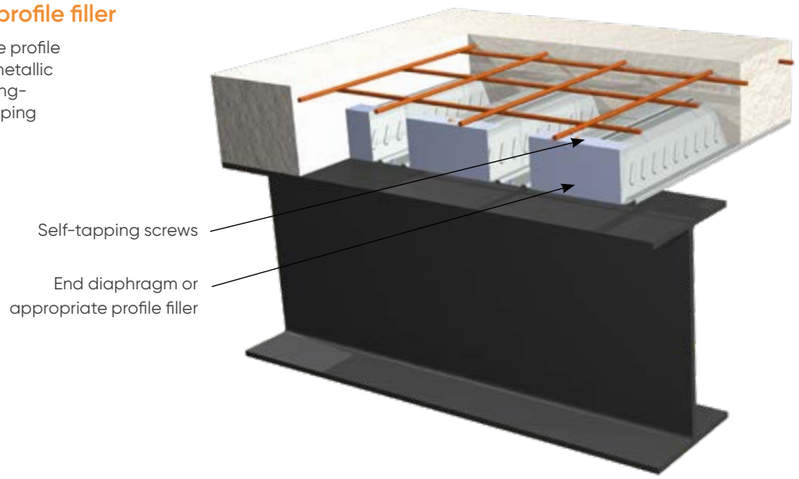
Installation

Composite floor decking

Overview

End diaphragm or appropriate profile filler

The ribs are getting closed at the end of the profile sheet either by appropriate profile filler or metallic diaphragm. The single elements or as running-band types get fixed by tape or by self-tapping screws.



Continuity between two profiles at their top end

In case the profiles can not be overlapped (re-entrant or dovetail shapes), adhesive tape might seal the join between the top end of 2 profiles.

Concrete cover

Applied concrete cover has to follow the indications of the calculation note (according to the exposure and structural class of the structure and / or its fire resistance). The anti-cracking reinforcement mesh respect a concrete cover of at least 20 mm.

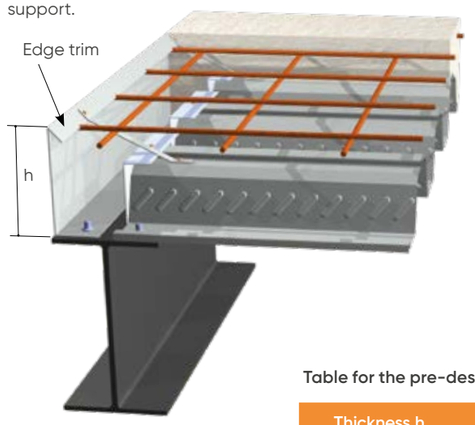
Installation

Composite floor decking

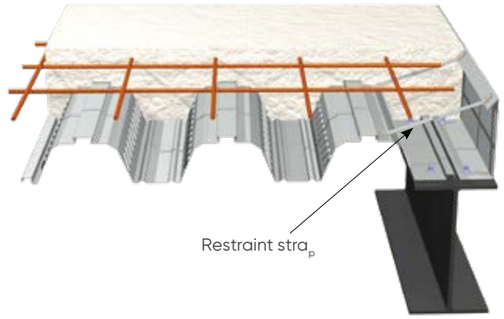
End supports

On steel beam

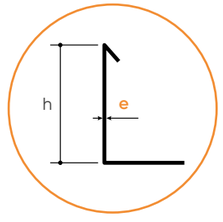
Edge trims serve as vertical formwork for the final slab. Its height is equal to the thickness of the final slab, and it gets fastened to the support.



Restraint straps are desirable for floor heights h > 150 mm in order to limit the deformation of the edge trim .



Edge trim

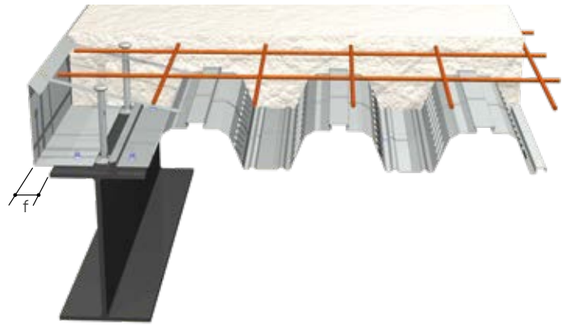


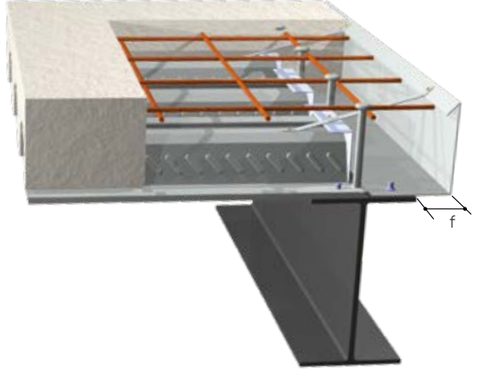
e: nominal thickness of galvanised metal for the edge trim [mm]

Table for the pre-design and definition of the steel thickness **e** of the edge trime[mm]

Thickness h of the slab [cm]	Cantilever f [mm]								
	0	25	50	75	100	125	150	175	200
9	0,88	0,88	1,00	1,00	1,20	1,20	1,50	2,00	2,50
10	0,88	0,88	1,00	1,00	1,20	1,20	1,50	2,00	2,50
11	0,88	0,88	1,00	1,20	1,20	1,50	1,50	2,00	2,50
12	0,88	0,88	1,00	1,20	1,50	1,50	2,00	2,00	2,50
13	0,88	1,00	1,20	1,50	1,50	2,00	2,00	2,50	2,50
14	1,00	1,20	1,20	1,50	1,50	2,00	2,00	2,50	2,50
15	1,20	1,20	1,50	1,50	2,00	2,00	2,50	2,50	2,50
16	1,20	1,50	1,50	2,00	2,00	2,50	2,50	2,50	2,50
17	1,20	1,50	1,50	2,00	2,00	2,50	2,50	2,50	2,50
18	1,50	1,50	2,00	2,00	2,50	2,50	2,50	2,50	3,00
19	1,50	1,50	2,00	2,00	2,50	2,50	2,50	2,50	3,00
20	2,00	2,00	2,50	2,50	2,50	3,00	3,00	3,00	3,00

On composite beams with shear studs





f: cantilever

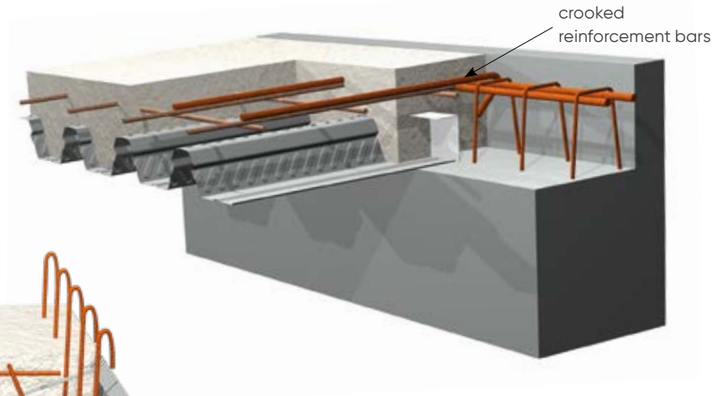
Installation

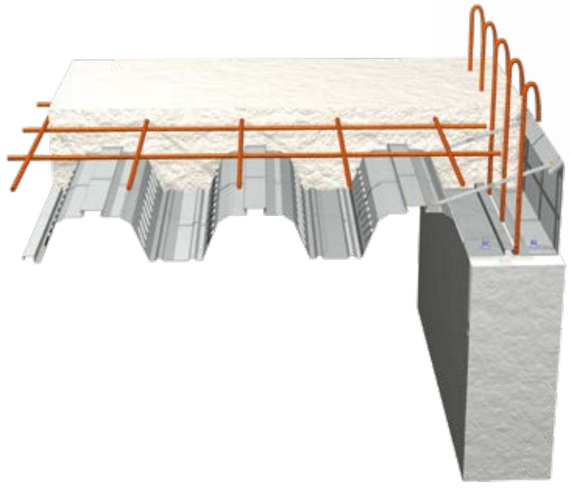
Composite floor decking

End supports

On concrete

The slab can be anchored by additional reinforcement bars, as traditionally used in reinforced concrete structures .

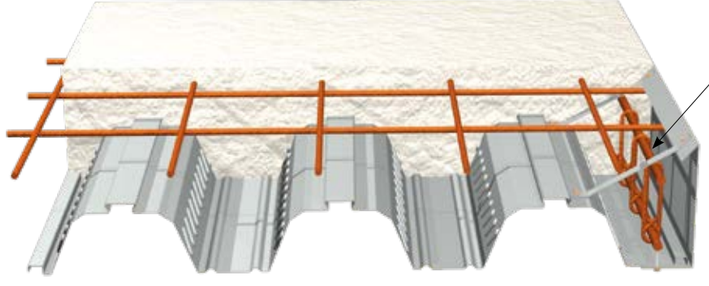




A layout plan should optimise the situation at the end supports.

Free edge

The free sides of the slab should receive a longitudinal stiffener.



Installation

Composite floor decking

End supports

On existing masonry

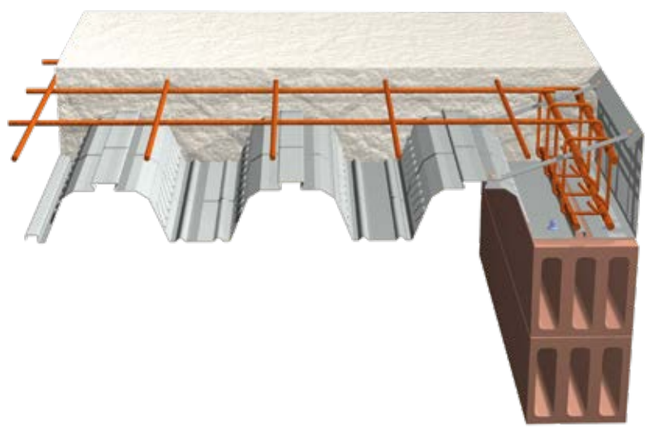
The steel angle must be pinned into the reinforced concrete pockets made beforehand in the existing wall.
The number of pins and their cross-section are to be defined by the supplier of the angle pieces.

Linear engraving

On running-band angle piece

On masonry

Side wall chaining will be produced in accordance with in accordance with the Eurocodes, in line with potential seismic requirements



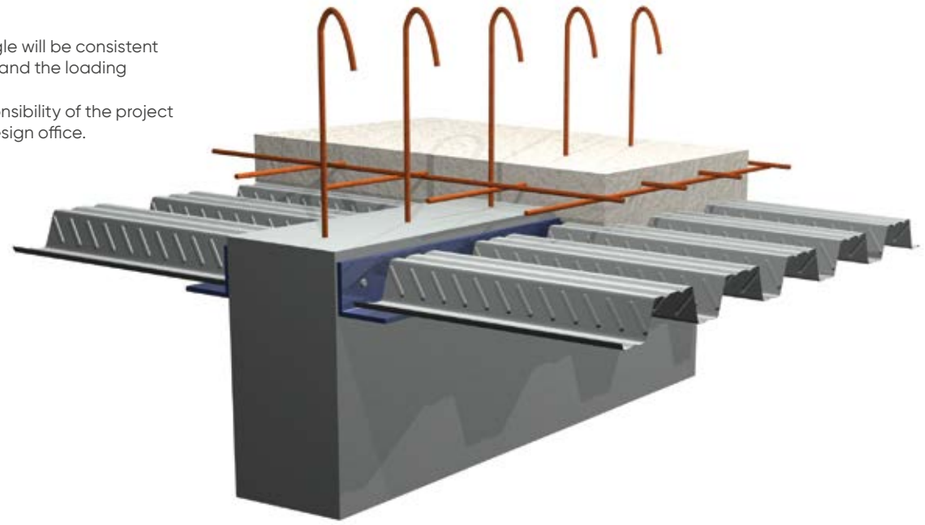
Installation

Composite floor decking

Mid-supports

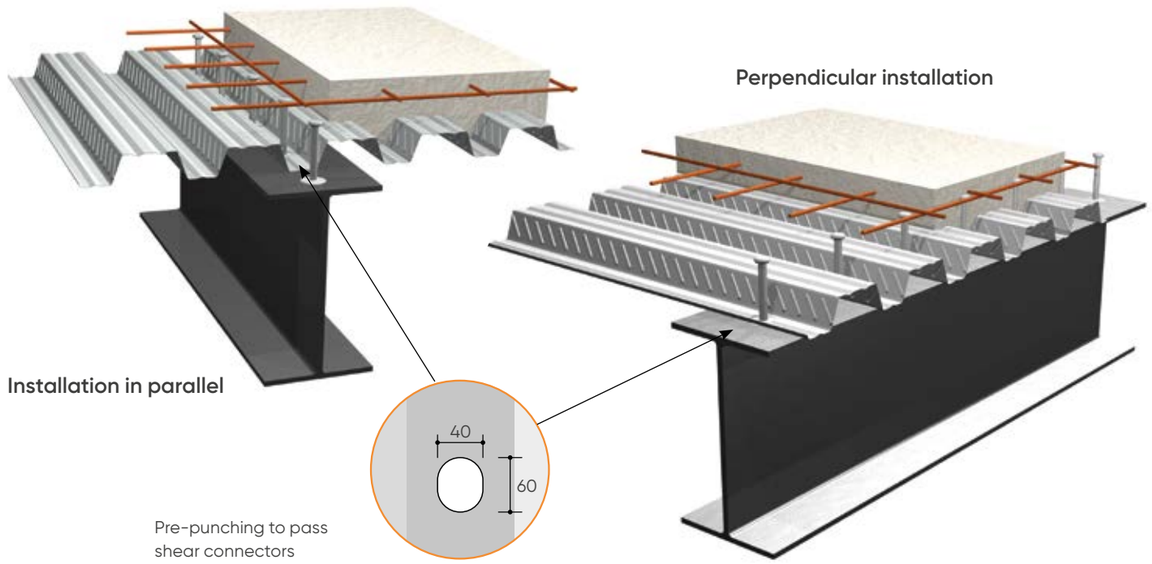
On concrete wall

The pinning of the steel angle will be consistent with the nature of the prop and the loading assumptions.
This calculation is the responsibility of the project engineer or responsable design office.



On composite steel beam with shear studs

The ribs of the floor decking can be perpendicular or parallel to the composite beams.
The pre-punching of the profiles gets done in the factory during the profiling process as per instructions on the form which will be given during the order.



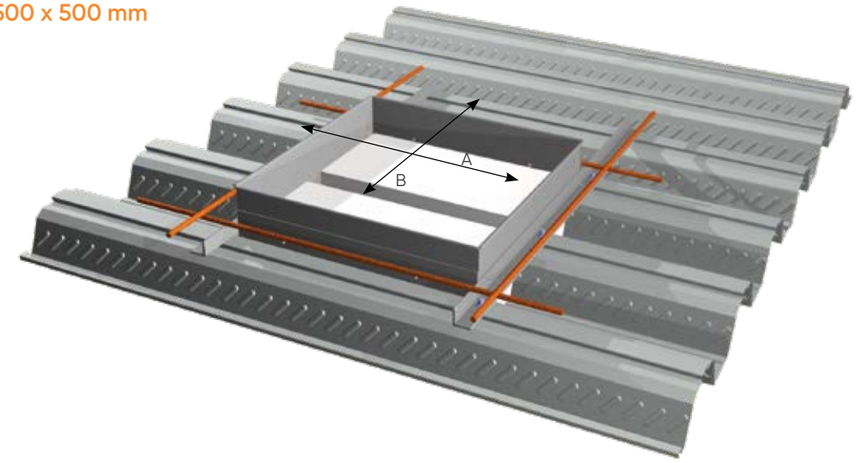
Installation

Composite floor decking

Openings & block-outs

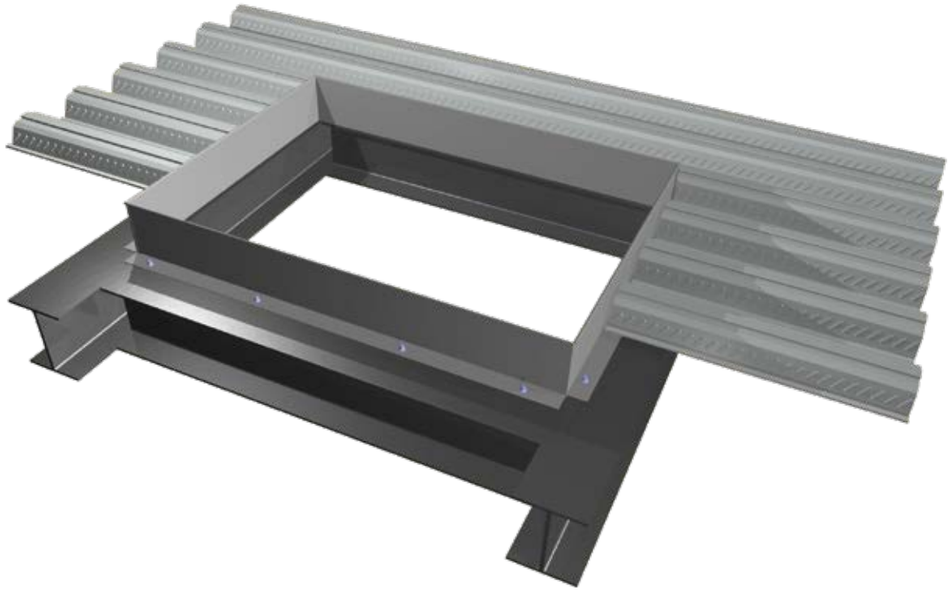
For openings or box out < 500 x 500 mm

The entire profile will be installed across the planned opening. Further, a box-out with a best matching negative geometry of the profile sheet gets installed at the place of the opening to keep away any fresh concrete. After the concrete has hardened, the box out will be removed and the the profile will be cuted on request. Additional reinforcement bars get positioned in the thickness of the slab (mini 4 x Ø 10mm).



For openings or box out > 500 x 500 mm

A replacing stringer around the opening must either be incorporated in the thickness of the slab (reinforced concrete calculation to be done by the project engineer), or a secondary frame must be installed below the slab.



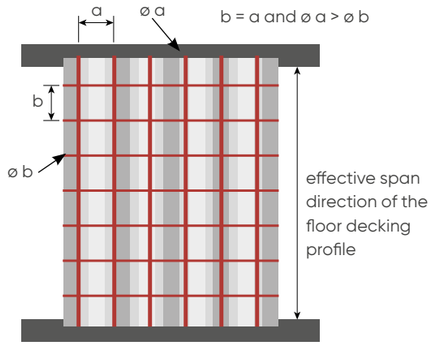
Installation

Reinforcement

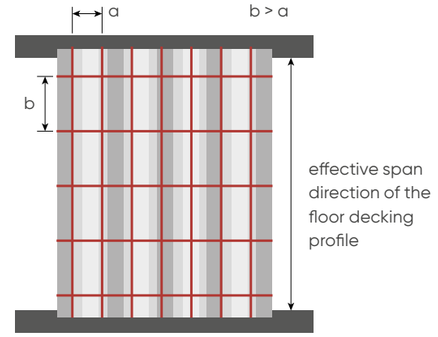
Installation recommendations for additional reinforcement

Orientation

The direction of the largest diameters of the welded mesh is always the direction of the effective span .

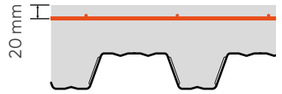


If the mesh consists of bars of the same diameter but different distances between 2 wires, the wire mesh must be positioned so that - per metre run - the greatest number of diameters is in the direction of the effective span of the floor decking.

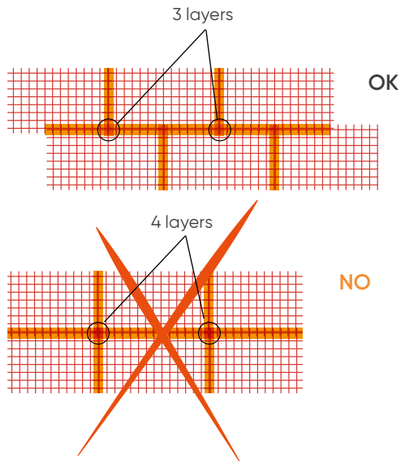


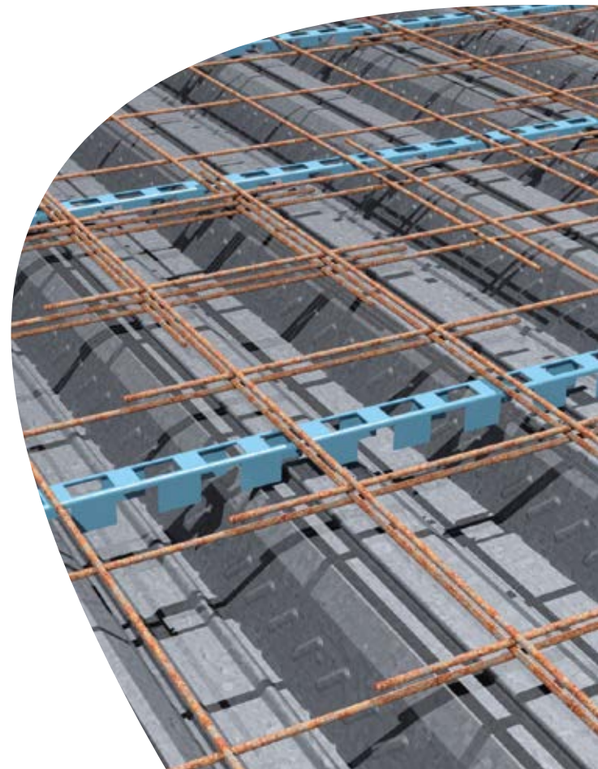
In order to provide the necessary concrete cover, only 3 layers of reinforcement meshes should be installed.
It is therefore important to respect the following recommendations:

Minimum concrete cover



Overlabs and lapped joints of reinforcement meshes





General safety instructions

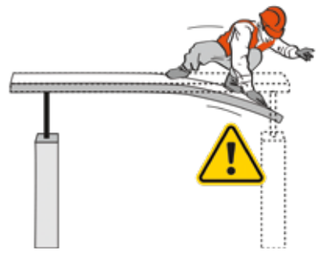
1 ■ Check usage & conditions of the PPE

2 ■ Use adequate slings and liftig tools to unload bundles

3 ■ Ensure individual safety

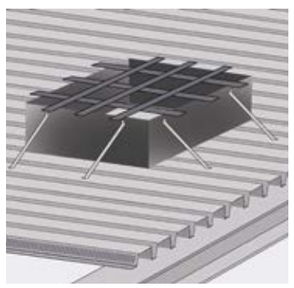
4 ■ Ensure collective safety

5 ■ Nail profiles in accordance with the installation progress



6 ■ Prop where cantilevers are larger than 200mm

7 ■ Survey concrete thicknesses using a pin rather than a laser level which is not considering deflection of the main structures

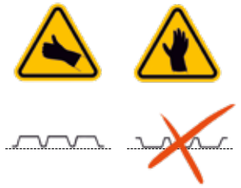


8 ■ Install fall protection for openings and block-outs

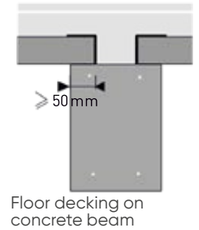
9 ■ Use a suitable prop equipement

10 ■ Store profile bundles with a slight slope to avoid accumulation of rainwater

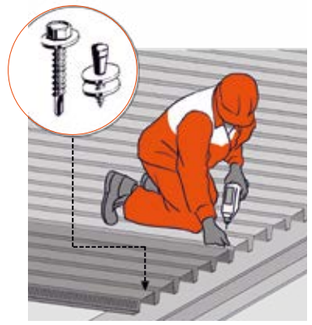
11 ■ Handle profile sheets correctly



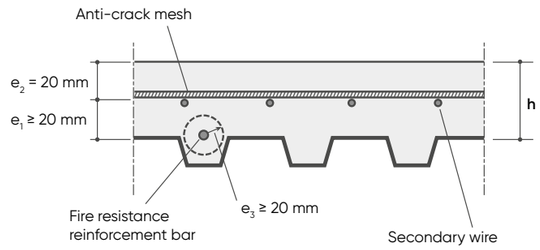
12 ■ Comply with correct orientation of the profile sheet



13 ■ Floor decking on concrete beam

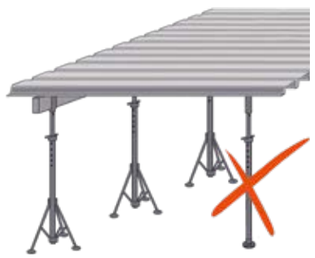


14 ■ Fix profiles sheets on supports and stitch them among each other (2 fixings per profile sheet and per end support)

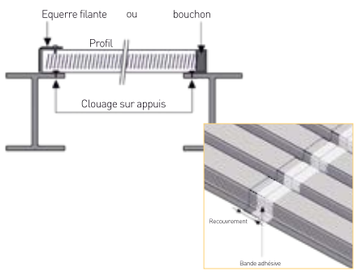


15 ■ Place the welded reinforcement mesh in the right position

16 ■ Comply with required concrete using adequate spacers for mesh and rebar reinforcement



17 ■ In case of propping, use a classical formwork beams instead of single props



18 ■ Ensure sealing & tightness at the end supports and on the overlaps

19 ■ Avoid any concrete accumulation while concreting

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