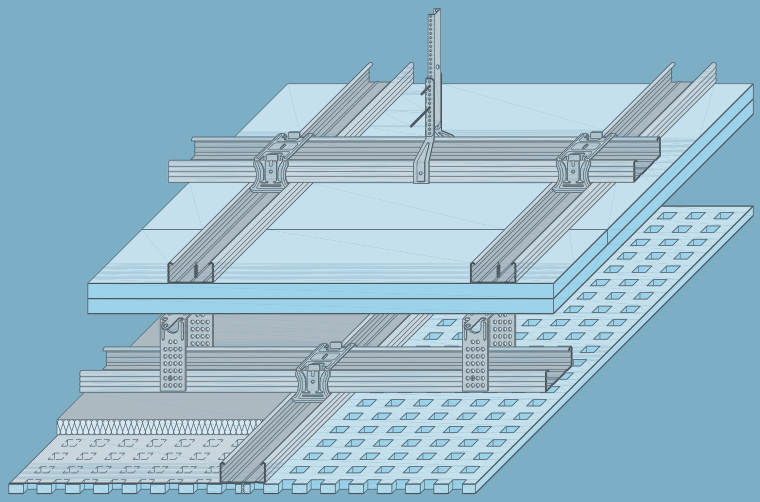


D11 **Knauf Board Ceilings**

D111 – wood frame

D112 – metal grid CD 60x27

D113 – flush metal grid CD 60x27

D116 – metal grid UA 50x40 + CD 60x27

New

Design options for fire protection

F30 to F90 solely from below and from above

Dimensioning of substructure

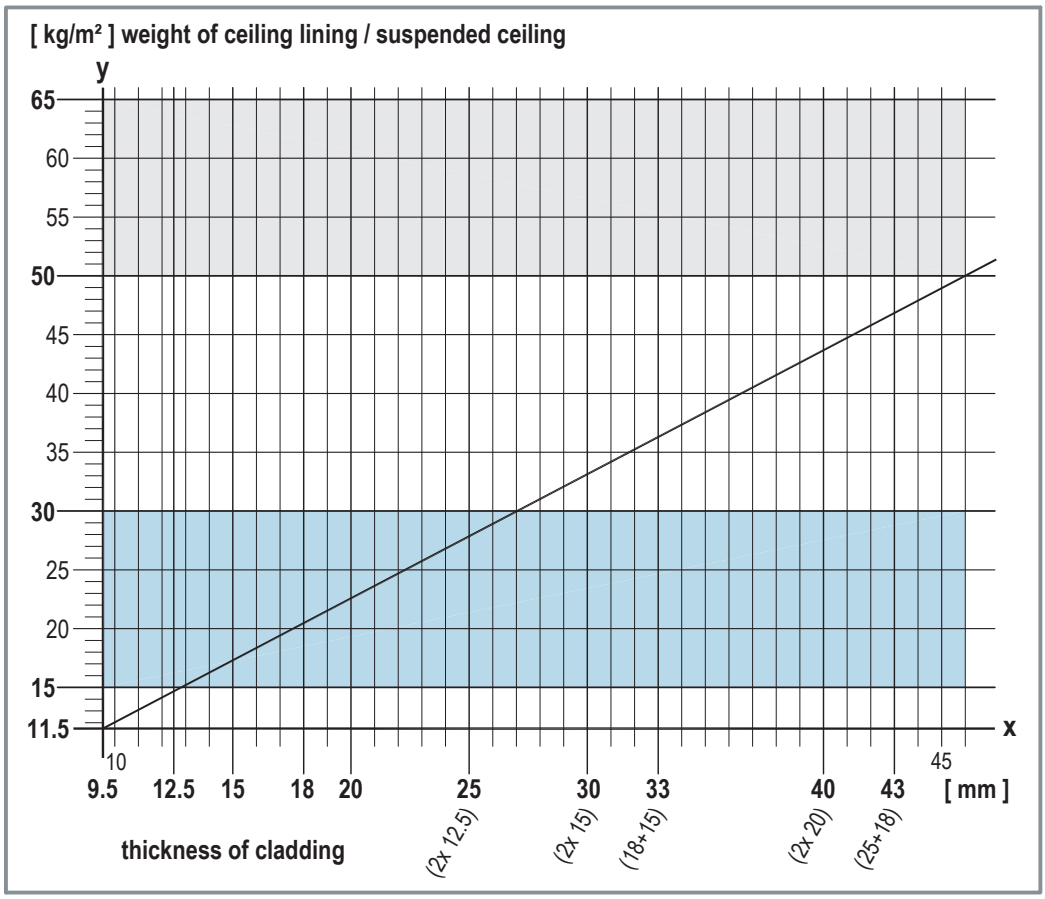
1. Determination of the weight of the ceiling lining / suspended ceiling depending on thickness of cladding

Depending on the chosen thickness of cladding in mm (x-axis) the weight per unit area of the ceiling lining / suspended ceiling including grid and suspension can be read off from the y-axis at the intersection point with the marked diagonal

load class [kN/m²]

- 0.50 < p ≤ 0.65 *)
- 0.30 < p ≤ 0.50
- 0.15 < p ≤ 0.30
- ≤ 0.15

*) design of ceilings ≥ 0.50 kN/m² as well acc. to DIN 18168



2. Consideration of extra loads

Extra loads from insulation required for fire protection **and** from insulation not required for fire protection (0.05 kN/m² = 5 kg/m² max.) as well as extra loads from system "Mulit-level Ceiling" (0.15 kN/m² = 15 kg/m² max.) increase the total weight per unit area of the suspended ceiling / ceiling lining and should be taken into account for the load class determination. The determined intersection point from the 1st step has to be parallel-shifted by the rate of the extra load in direction of the y-axis (upwards).

3. Determination of the load class

The load class (kN/m²) can be determined with the resulting total weight per unit area of the ceiling lining / suspended ceiling from steps 1 and 2.

4. Dimensioning the substructure

Depending on fire protection requirements and load class the following spacings of the substructure are specified: **a** **b** **c**

• without fire protection [1]
• fire protection from below [2]

spacings of suspenders / anchors	**a**	**normally dimensioned according to DIN 18168**
spacings of carrying channels / timber battens	**c**	
spacings of furring channels / timber battens	**b**	

1) **permissible span widths of cladding acc. to DIN 18181**

2) **according to fire protection proofs**

• normally use suspender 0.25 kN, for load class > 0.30 kN/m² use suspender 0.40 kN.

• fire protection from above (plenum)
• fire protection from below and from above

spacings of suspenders / anchors	**a**	**have to be installed according to fire protection proofs**
spacings of carrying channels / timber battens	**c**	
spacings of furring channels / timber battens	**b**	

• suspenders and connectors according to fire protection proofs;
Consider additionally required measures on pages 5 and 10.

D11 Knauf Board Ceilings

Knauf Boards / Span Widths of Cladding / Fastening of Cladding

Knauf Boards

Board type		General properties		Building physics			Sophisticated applications		
		easy installation	few control joints	fire protection	sound protection	statics / strength	surface quality	mitering technology	molded areas
Knauf Diamant (hard gypsum board)	GKFI *)	●●●	●●●	●●	●●●	●●●	●●	●●●	●●
Knauf Fireboard A1 (special board for fire protection)		●●	●●●	●●●	●	●	●	●	○
KNAUF Piano (sound shield)	GKB	●●●	●●●	●	●●	●	●●	●●●	●●
KNAUF Piano F (sound shield)	GKF / GKFI *)	●●●	●●●	●●	●●	●●	●●	●●●	●●
Knauf Fire-Resistant Board	GKF / GKFI *)	●●●	●●●	●●	●	●●	●●	●●●	●●
Knauf Solid Board	GKF / GKFI *)	●●●	●●●	●●	●	●●	●●	●●	○
Knauf Panel Board	GKF / GKFI *)	●●●	●●●	●●	●	●●	●●	●●	○
Knauf Wallboard	GKB / GKBI *)	●●●	●●●	●	●	●	●●	●●●	●●

○ unsuitable ● suitable ●● more suitable ●●● most suitable

*) GKBI and GKFI (impregnated) boards are most suited for humid rooms

Knauf 4AK Board for optimized surface quality	GKF	• 4-side tapered edges • filling of front edges and long edges with Joint Tape • cross-mounting

Allowable span widths of cladding according to DIN 18181

all dimensions in mm

Board thickness	Maximum spacings of furring channel / timber batten b		
	without fire protection	with fire protection	ball impact safety D112 / D113 • Universal Bracket / Nonius suspension
			single layer / double layer ≥ 2x 12.5
12.5 / 2x 12.5	**500**	spacings of furring channels / timber battens acc. to pages 6 to 9	**250** / **500**
15	**550**		
18	**625**		
20 Solid Board / Panel Board	**625**		proof: PZ 46/902 967-2 + annex
25 Solid Board	**800**		

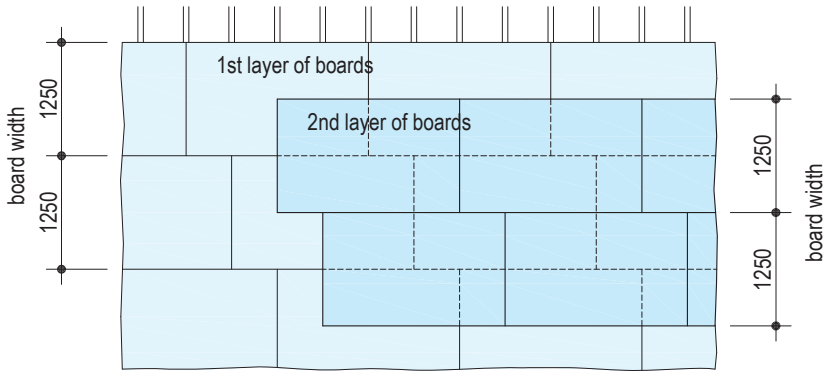
Knauf Boards, fastening with Knauf Drywall Screws TN

• spacing of screws 170 mm

Cladding Thickness in mm	Metal grid minimum penetration ≥ 10 mm Metal thickness s ≤ 0.7 mm	Wood frame minimum penetration ≥ 5 d_n (d_n = nominal diameter)
≤ 15	TN 3.5 x 25 mm	TN 3.5 x 35 mm
18 to 25	TN 3.5 x 35 mm	TN 3.5 x 45 mm
2x 12.5	TN 3.5 x 25 mm + TN 3.5 x 35 mm	TN 3.5 x 35 mm + TN 3.5 x 45 mm
2x 15	TN 3.5 x 25 mm + TN 3.5 x 45 mm	TN 3.5 x 35 mm + TN 3.5 x 55 mm
18 + 15	TN 3.5 x 35 mm + TN 3.5 x 45 mm	TN 3.5 x 45 mm + TN 3.5 x 55 mm
2x 20 / 25 + 18	TN 3.5 x 35 mm + TN 3.5 x 55 mm	-

Multi layer cladding

In case of multi layer cladding, apply layers with staggered joints according to application scheme.
Press boards of each layer firmly on to the substructure and screw each layer separately.
For fastening of first layer, spacing of screws can be increased up to max. 500 mm (for cladding thickness 25 + 18 mm/ 2x 20 mm up to max. 300 mm according to installation scheme on page 22) if second layer is applied immediately afterwards (within one working day).
In case of multi layer cladding, a filling of joints of first layer without further finishing is sufficient.



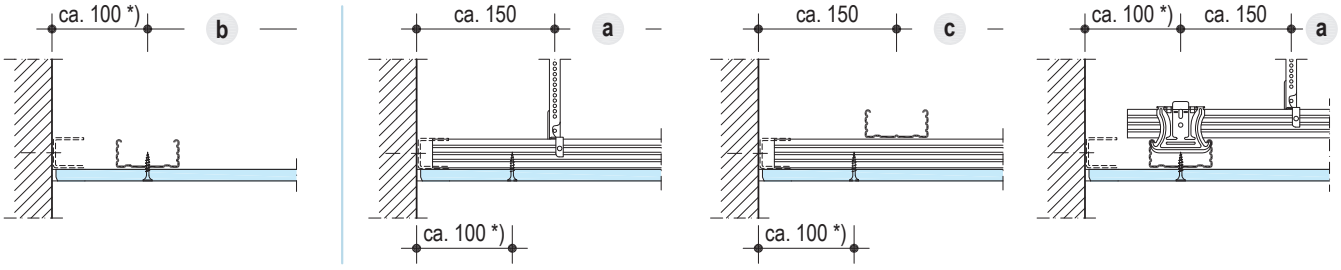
D11 Knauf Board Ceilings

Perimeter Spacings of Substructure / Height of construction

Perimeter spacings of substructure scheme drawings, examples — alle dimensions in mm

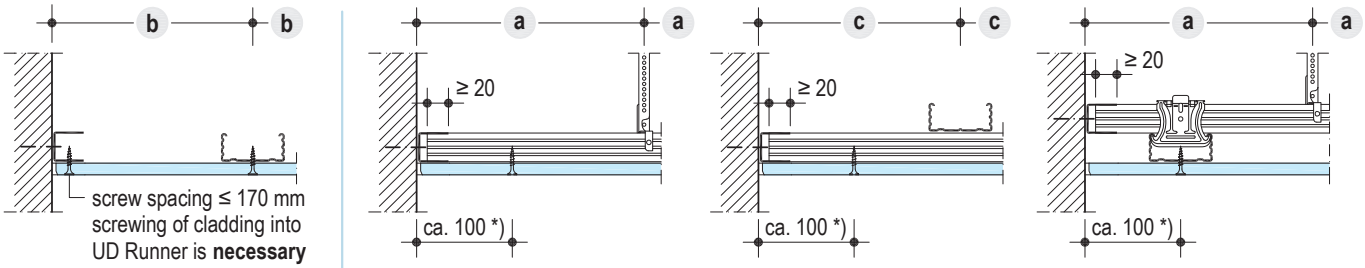
Option 1 non-bearing connection (connection does not bear loads of the ceiling)

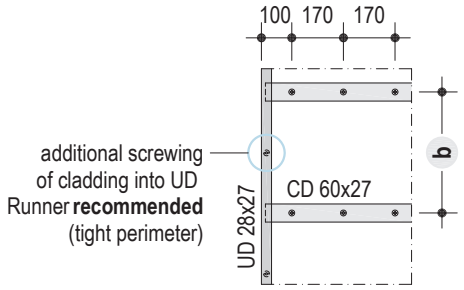
- without perimeter joint covering
- covering with UD Runner as installation aid / in case of fire protection and sound protection, spacing of anchors of UD Runner up to **approx. 1 m**



Option 2 bearing connection

- The spacing of anchors of the UD Runner is reduced to **≤ 625 mm** (use a dowel suitable for substrate).
- Carrying / furring channels should be inserted into bearing UD Runners for 20 mm min.
- Maximum allowable spacings (suspenders, carrying / furring channel) are given in tables of respective system.





Notes

All connections of board ceilings can be installed according either to option 1 or option 2. Connection details on the following pages show:

- **option 1** D111, D112, D116
- **option 2** D113

a = spacing of suspenders (span width of carrying channels / timber battens)

c = spacing of carrying channels / timber battens (span width of furring channels / timber battens)

b = spacing of furring channels / timber battens (span width of cladding)

***)** max. cantilever of cladding

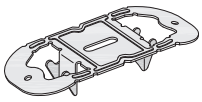
Height of construction height of construction = sum of suspension height, height of substructure and cladding thickness

System	Suspension								Substructure	
	with Nonius Hanger Top			with wire				Ceiling below Ceiling		
	Nonius Stirrup	Nonius Hanger Bottom	Combo Hanger	Ankerfix Rapid Hanger	Combo Hanger	Rapid Wood Hanger	Universal Bracket	Direct Bracket	timber batten / channel b x h	total height mm
D111	-	-	-	-	-	- 110	up to 180 -	-	50x30 + 50x30 50x30 + 40x60	60 90
D112	130	130	130	110	110	110	up to 180	1 -	60x27 60x27 + 60x27	27 54
D113	-	130	130	110	110	110	up to 180	-	60x27	27
D116	130	-	-	-	-	-	-	-	UA 50x40 + CD 60x27	67

Calculation example D112 with Nonius Hanger Bottom (130 mm), carrying channels and furring channels (54 mm) and cladding (2x 12.5 mm) = 209 mm
approx. 210 mm required height of construction for suspended ceiling

Ceiling below Ceiling

Direct Bracket for CD 60x27

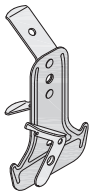


bend side tabs

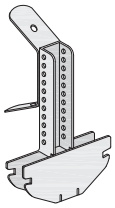
anchoring to fire protection ceiling
Knauf All Purpose Screw
FN 4.3x35 / FN 4.3x65
acc. to ABP P-VHT-1802/05-FN

0.25 kN (25 kg) load bearing capacity class

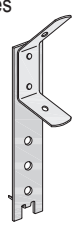
Ankerfix
with lock
for CD 60x27



Combo Hanger
for CD 60x27



Rapid Wood Hanger
for wood frames



suspended with
Hanging Wire

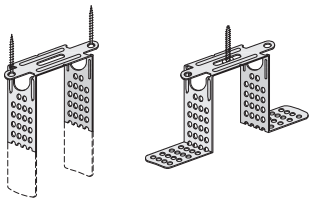
anchoring to wood joist ceiling
Knauf Flathead Screw
FN 5.1x35 mm
acc. to ABZ Z-9.1-251

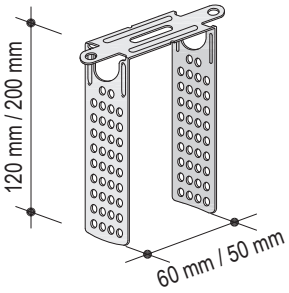
anchoring to concrete ceiling:
Knauf Ceiling Steel Dowel
acc. to ABZ Z-21.1-1519

0.40 kN (40 kg) load bearing capacity class

Universal Bracket for CD 60x27 / for timber batten 50x30 mm

Cut and bend Universal Bracket according to required suspension height



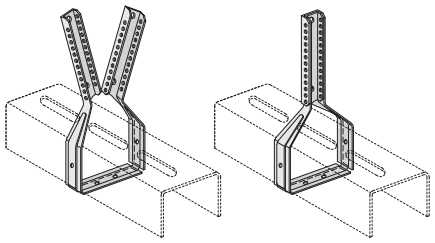


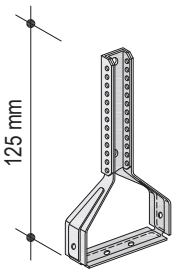
anchoring to wood joist ceiling
2x Knauf TN 3.5x35 into tabs
or
1x Knauf FN 5.1x35 in the middle
acc. to ABZ Z-9.1-251

anchoring to concrete ceiling:
Knauf Ceiling Steel Dowel
acc. to ABZ Z-21.1-1519

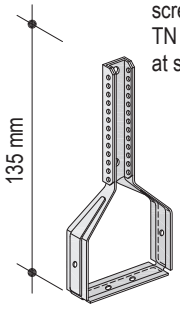
Nonius Stirrup for CD 60x27

Bend Nonius Stirrup around channel and fit together until it snaps

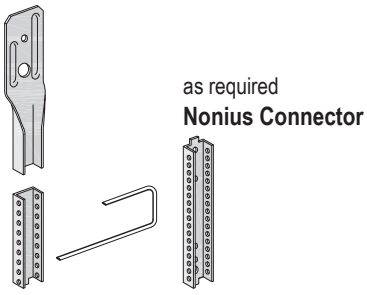




for UA 50x40 / for timber batten 50x30 mm screwed with TN 3.5x25 at sides

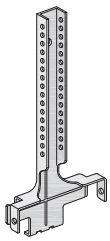


suspended with
Nonius Hanger Top
and
Nonius Pin
(secure against sliding out)



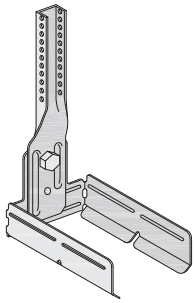
as required
Nonius Connector

Nonius Hanger Bottom
for CD 60x27



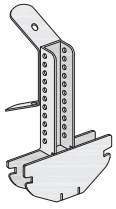
screw tabs to CD 60x27
(Metal Screws LN 3.5x9 mm) in case of:
- **fire protection from above** (plenum)
- **fire protection from below and from above** and / or
- **total load of ceiling ≥ 0.4 kN/m²**

Universal Connector
for CD 60x27



- in case of **fire protection** screw Universal Connector (used as suspender) to CD 60x27 (Metal Screws LB 3.5x9.5 mm)

Combo Hanger
for CD 60x27



anchoring to wood joist ceiling
Knauf Flathead Screw
FN 5.1x35 mm
acc. to ABZ Z-9.1-251

anchoring to concrete ceiling:
Knauf Ceiling Steel Dowel
acc. to ABZ Z-21.1-1519

Note

Additional measures in case of • **fire protection from above** (plenum) • **fire protection from above and from below**
use fastener approved for fire protection Knauf ceiling steel dowel (mounted in accordance with ABZ Z-21.1-1519)

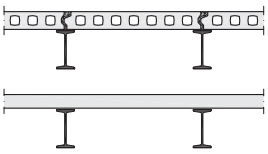
D11 Knauf Board Ceilings

Types of Basic Ceiling, Fire Protection from Below and from Above

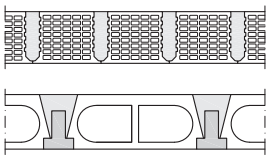
Types of basic ceiling I to III

Type I

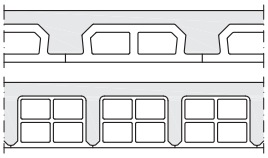
Ceilings with steel girders exposed to plenum with U/A ratio of ≤ 300 m-1 and top cover made of light concrete core panels according to DIN 4028 or aerated concrete slabs according to DIN 4223



Ceilings made of reinforced concrete beams according to DIN 1045 with intermediate units made of light concrete according to DIN 4158 or bricks according to DIN 4159 and DIN 4160



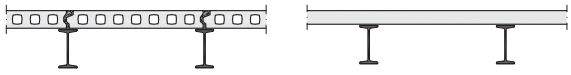
Reinforced concrete beam ceilings according to DIN 1045 with intermediate units made of light concrete according to DIN 4158 or made of bricks according to DIN 4159 and DIN 4160



Reinforced concrete ceilings in connection with embedded steel girders

Type II

Ceilings with steel girders exposed to plenum with U/A ratio of ≤ 300 m^{-1} and top cover made of light concrete in-situ concrete according to DIN 1045 or precast slabs with static effective coat of in-situ concrete according to DIN 1045 or precast units as core panels made of reinforced or prestressed concrete



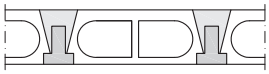
Type III

Ceilings made of reinforced or prestressed standard concrete slabs but without units or intermediate units made of light concrete or bricks

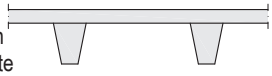
Reinforced or prestressed concrete slabs acc. to DIN 1045 resp. DIN 4227 made of standard concrete

Reinforced or prestressed core panels acc. to DIN 1045 resp. DIN 4227 made of standard concrete

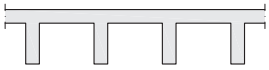
Reinforced concrete ceilings with beams and intermediate units acc. to DIN 1045 made of standard concrete



Reinforced concrete beam ceilings acc. to DIN 1045 without intermediate units or with intermediate units made of standard conrete

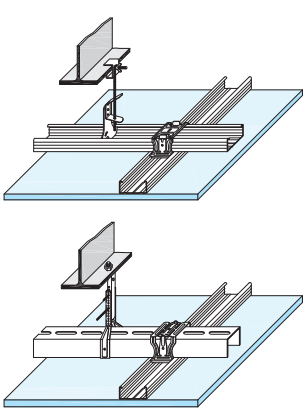


Two-way flat slab and coffered ceilings according to DIN 1045 made of standard concrete



Fire protection from below and from above (basic ceiling)

Board ceilings in connection with basic ceilings type I to III

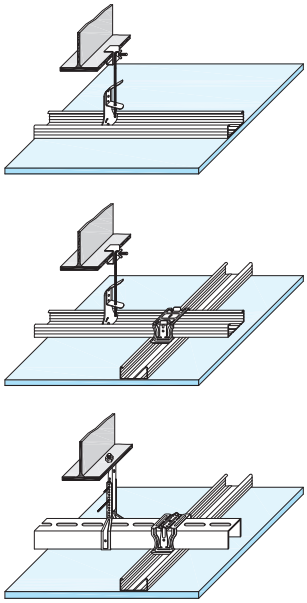
Knauf System	Basic ceiling type acc. to DIN 4102-4 I / II / III	Knauf System constr. cladding min. thickness	Knauf System constr. sub-structure max. spacing of furring channels b	Mineral wool insulation in plenum (see page 7)	Minimum plenum height between basic ceiling and cladding - a -	Proof (see page 7)
	Fire resistance class	mm	mm		mm	
K215 / K218 Knauf Fireboard Ceilings A1 with metal grid				• **Knauf Fireboard A1** (Z-PA-III 4.290)		
	F90	**25**		not allowed	-	7
		20		not allowed	40	
		15		not allowed	200	
		25		S	80	
	F90	**20**		not allowed	-	
		15	**400**	not allowed	40	
		12.5		not allowed	200	
		20		S	80	
	F90	**15**		not allowed	-	
		12.5		not allowed	40	
		15		S	80	

Note Spacings of suspenders and of carrying channels as well as installation and application according to Data Sheet K21 Knauf Fireboard Ceilings A1

D11 Knauf Board Ceilings

Fire Protection from Below and from Above (Basic Ceiling)

Board ceilings in connection with basic ceilings type I to III

Knauf System	Basic ceiling type acc. to DIN 4102-4	Knauf System constr. cladding: min. thickness (mm)	Knauf System constr. sub-structure: max. spacings of furring channels b (mm)	Mineral wool insulation in plenum (see page 7)	Minimum plenum height between basic ceiling and cladding - a - (mm)	Proof
D112 / D116 Knauf Board Ceilings with metal grid	Fire resistance class					
	F30	20		not allowed	-	
		15		without / G	40	
	F30	20		not allowed	-	
		12.5		not allowed	40	
		15	500	G	40	7
	F30	20		not allowed	-	
		12.5		not allowed	40	
		15		G	40	
		12.5		G	80	
	F60	2x 15		not allowed	-	
		25 (2x 12.5)		not allowed	40	
		20 (2x 12.5)		not allowed	80	
		25 (2x 12.5)		S	80	
	F60	25 (2x 12.5)	400 resp. 500 (in case of double layer cladding)	not allowed	-	
		20 (2x 12.5)		not allowed	40	
		15		not allowed	80	7
		20 (2x 12.5)		S	80	
	F60	20		not allowed	-	
		15		not allowed	40	
		12.5		not allowed	80	
		15		S	80	
	F90	15	500	not allowed	80	8

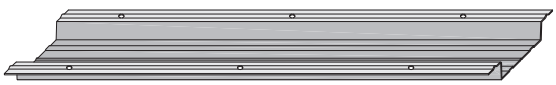
• Knauf Fire-Resistant Boards GKF A2

Note	Spacings of suspenders (anchors) and spacings of furring channels according to tables of respective system

Max. spacings single grid (only furring channels) all dimensions in mm

Grid	Spacings of suspenders / anchors a, load class kN/m² ≤ 0.15	≤ 0.30
CD 60x27	1250	1200
Collared Resilient Channel 98x15	1000	950

Collared Resilient Channel 98x15x0.6 for flat ceilings



Mineral wool insulation according to DIN EN 13162, chapter 3.1.1

S	building material class A melting point ≥ 1000° C acc. to DIN 4102-17 thickness ≥ 50 mm, density ≥ 40 kg/m³	G	building material class A

Proofs

7	ABP P-3155/3992
8	DIN 4102-4, chapter 6.5.5, table 99

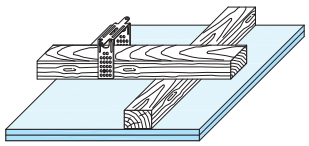
D11 Knauf Board Ceilings

Fire Protection from Below and / or from Above (Plenum)

Board ceilings with sole fire protection

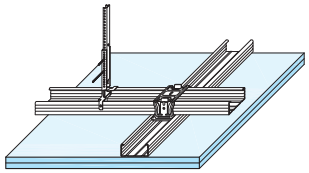
Requirement to basic ceiling in case of fire stress:	Fire resistance class in case of fire stress		Knauf System construction				
			cladding		sub-structure	insulation required for fire protection	
	from below	from above	type/ building material class	min. thickness mm	max. spacings carrying channels/ timber battens (b) mm	min. thickness mm	min. denisty kg/m³
from below no fire protection requirements for basic ceiling / roof							
from above (plenum) basic ceiling should be of same fire resistance class as suspended ceiling							

D111 Knauf Board Ceiling with wood frame

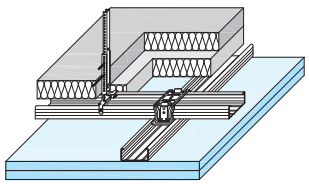


from below	from above	type/ building material class	min. thickness mm	max. spacings mm	min. thickness mm	min. denisty kg/m³
F30		Fire-Resistant Boards GKF, A2	20	625	-	
			2x 12.5	500		
F60			18 + 15	500		

D112 Knauf Board Ceiling with metal grid

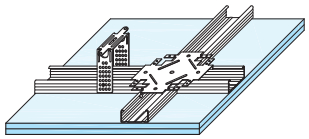


from below	from above	type/ building material class	min. thickness mm	max. spacings mm	min. thickness mm	min. denisty kg/m³
F30		Fire-Resistant Boards GKF, A2	20	625	-	
			2x 12.5	500		
F60			18 + 15	500		
F90			2x 20	500		
			25 + 18			



from below	from above	type/ building material class	min. thickness mm	max. spacings mm	min. thickness mm	min. denisty kg/m³
	F30	Fire-Resistant Boards GKF, A2	15	500	mineral wool (S) 40 (60)	40 (30)
F30	F30		18	625	+ mineral wool (S) 40 (60)	40 (30)
			2x 12.5	500		
F60	F60		18 + 15	500	150 mm wide on carrying channels	
F90	F90		2x 20	500	mineral wool (S) 2x 40 (60)	40 (30)
			25 + 18			

D113 Knauf Board Ceiling with flush metal grid



from below	from above	type/ building material class	min. thickness mm	max. spacings mm	min. thickness mm	min. denisty kg/m³
F30		Fire-Resistant Boards GKF, A2	18	500	mineral wool (G) 40	-
			2x 12.5	500		
F60			18 + 15	400	-	
F90			25 + 18	400		

Mineral wool insulation acc. to DIN EN 13162, chapter 3.1.1

(S) building material class A melting point ≥ 1000° C acc. to DIN 4102-17	(G) building material class A

Note	Spacings of suspenders and of carrying channels acc. to table of respective system or in case of • fire protection from above acc. to page 10
Proof	ABP P-3400/4965

D11 Knauf Board Ceilings

Fire Protection from Below and / or from Above (Plenum)

Board ceilings with sole fire protection

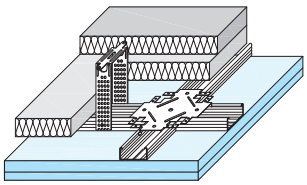
consider notes on page 8

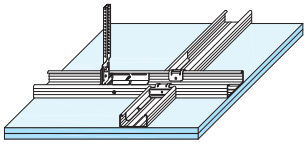
Requirement to basic ceiling in case of fire stress:

from below
no fire protection requirements for basic ceiling / roof

from above (plenum)
basic ceiling should be of same fire resistance class as suspended ceiling

Fire resistance class in case of fire stress		Knauf System construction cladding		sub-structure	insulation required for fire protection	
from below	from above	type/ building material class	min. thickness mm	max. spacings carrying channel b mm	min. thickness mm	min. denisty kg/m³
D113 Knauf Board Ceiling with flush metal grid						
	F30	Fire-Resistant Boards GKF, A2	15	500		
F30	F30		18	500	mineral wool S	
			2x 12.5		40 (60)	40 (30)
F60	F60		18 + 15	400		
F90	F90		25 + 18	400	mineral wool S	
					2x 40 (60)	40 (30)
F30	F30	Fire-Resistant Boards GKF, A2	2x 12.5	500	-	

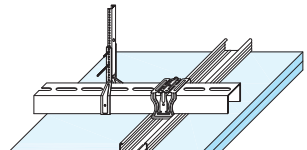


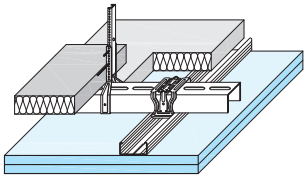


• Universal Connector

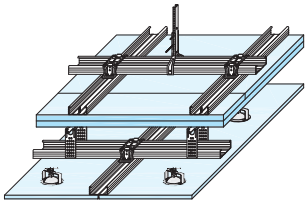
D116 Knauf Board Ceiling with metal grid UA / CD

F30		Fire-Resistant Boards GKF, A2	20	625	-	
			2x 12.5	500		
F60			18 + 15	500		
F90			2x 20	500		
			25 + 18			
	F30	Fire-Resistant Boards GKF, A2	15	500		
F30	F30		18	625	mineral wool S	
			2x 12.5	500	40 (60)	40 (30)
F60	F60		18 + 15	500	+	
			2x 20		mineral wool S	
F90	F90		25 + 18	500	40 (60)	40 (30)
					150 mm wide	
					on carrying channel	





Ceiling below Ceiling

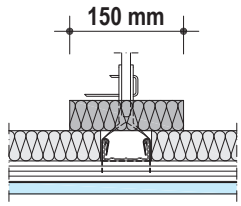
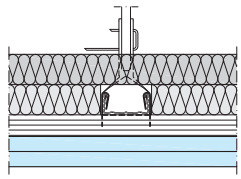
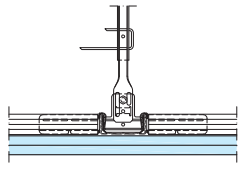
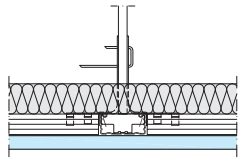
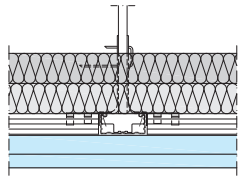
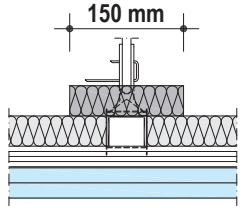


F30	**fire protection ceiling solely from below**
F60	**D112, D116**
F90	**+**
	exposed ceiling (e.g. Cleaneo Acoustic Design Ceiling)
	≤ 0.15 kN/m²

D11 Knauf Board Ceilings

Fire Protection Solely from Above / Solely from Below and from Above (Plenum)

Maximum grid spacings • fire protection from above

Spacings of carrying channel c mm	Spacings of suspenders a mm	type	Fire resistance class for fire protection • from above (from the plenum)	Mineral wool (S) required for fire protection: min. thickness mm	min. density kg/m³	scheme drawings
D112 Knauf Board Ceiling with metal grid						
850	**750**	Nonius Stirrup, Universal Bracket, Nonius Hanger Bottom	**F30 to F60**	40 (60) 150 mm wide on carrying channel 40 (60)	40 (30) 40 (30)	
750	**600**	Nonius Stirrup, Universal Bracket, Nonius Hanger Bottom	**F90**	40 (60) 40 (60)	40 (30) 40 (30)	
D113 Knauf Board Ceiling with flush metal grid						
1250	**650**	Universal Connector	**F30**	-	-	
1250	**650**	Nonius Hanger Bottom, Universal Bracket	**F30 to F60**	40 (60)	40 (30)	
1250	**500**	Nonius Hanger Bottom, Universal Bracket	**F90**	40 (60) 40 (60)	40 (30) 40 (30)	
D116 Knauf Board Ceiling with metal grid UA / CD						
1200	**1200**	threaded rod M8	**F30 to F60**	40 (60) 150 mm wide on carrying channel	40 (30)	
	800	Nonius Stirrup				
1000	**1200**	threaded rod M8	**F90**	40 (60)	40 (30)	
	800	Nonius Stirrup				

Further data on pages 8 to 9

- thickness / type of cladding
- spacings of furring channels b
- mineral wool S

Additional constructional measures

- **Flush Connector for CD 60x27:** bend tabs and screw to lower channel (Metal Screws LN 3.5 x 9 mm)
- **Nonius Hanger Bottom:** screw tabs to CD 60x27 (Metal Screws LN 3.5 x 9 mm)
- **Universal Connector as suspender:** screw to CD Channel 60x27 (Metal Screws LB 3.5 x 9.5 mm)
- **anchoring to basic ceiling:** use anchor approved for fire protection Knauf Ceiling Steel Dowel (mounted in accordance with ABZ Z-21.1-1519)

Connections of light-weight partitions to classified susepnded ceilings

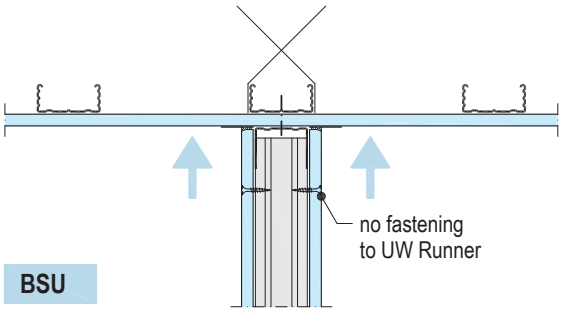
scheme drawings

Connections of partitions to classified ceilings (board ceilings) are only allowed if it is ensured that in case of fire and a premature collapse of the partition, the debris pieces of the partition may fall down without additional loading of the ceiling.

The following solutions are optional for the connection:

Fire protection from below

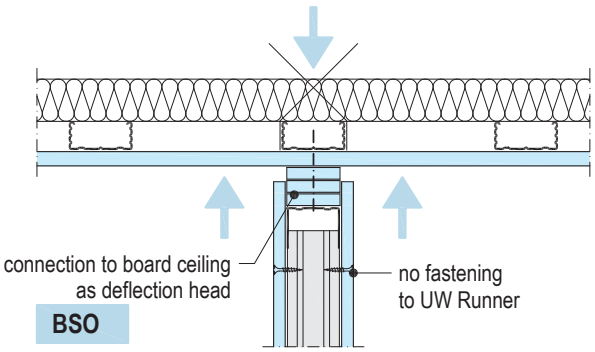
For suspended ceilings with fire protection **from below** do not fasten cladding to UW runner, but apply cladding tightly up to ceiling.



BSU

Fire protection from below and from above / from above

For suspended ceilings with fire protection **from below and from above / from above** install a deflection head as standard implementation with at least 15 mm allowable movement.



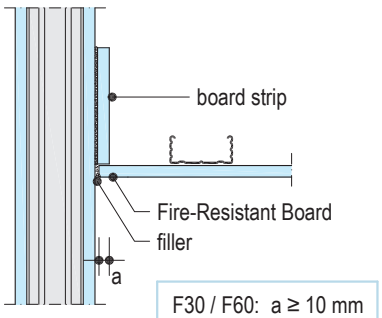
BSO

Note **In case of fire protection requirements for the partition the suspended ceiling should have at least the same fire resistance.**

Fire protective connections to walls

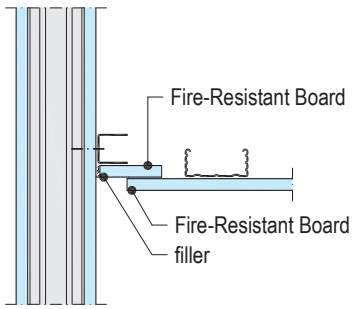
Suspended ceilings in connection with basic ceilings of type I to III as well as suspended ceilings for fire protection solely from below and / or from above that are fire rated F30 to F90 can be connected to partitions if they are of the same fire resistance class.

Surface of partition should be even in the area of the connection. Specific levelling preparations might be necessary.
The connection of the board ceiling has to be tight and covered.

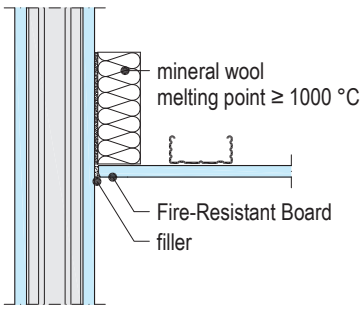


F30 / F60: a ≥ 10 mm
F90: a ≥ 20 mm

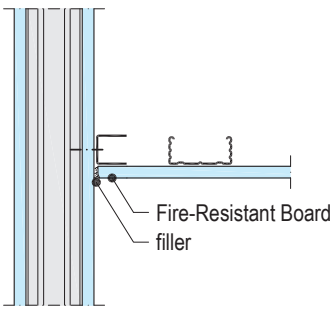
BSA 1



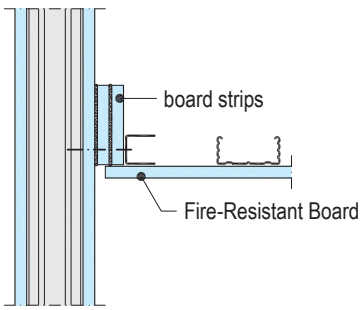
BSA 2



BSA 3

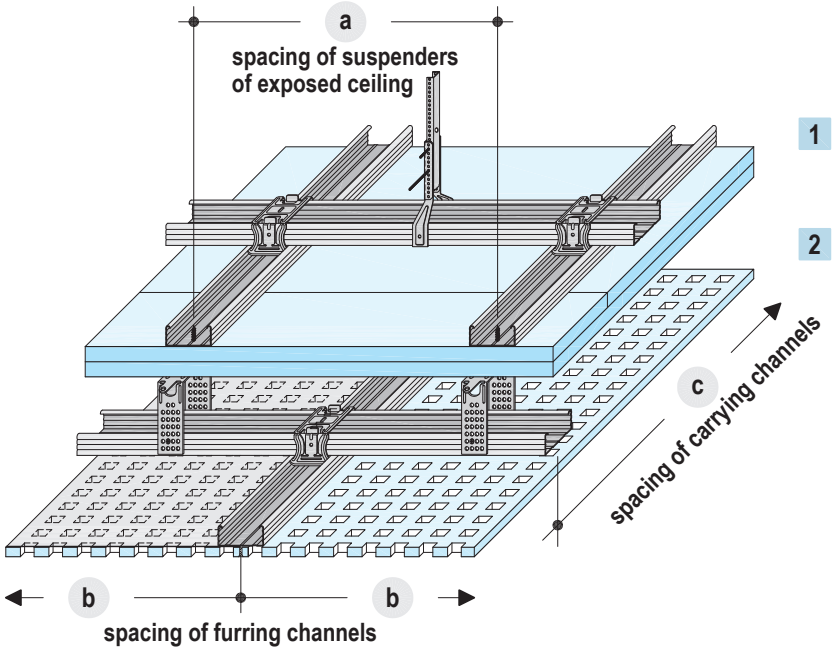


BSA 5



BSA 6

Exposed ceiling below fire protection ceiling



1 fire protection ceiling

Knauf Board Ceiling D112, D116

see fire protection survey on pages 8 to 9

F30 to F90 • solely from below

proof: see page 8

2 exposed ceiling ≤ 0.15 kN/m²

- e.g. Cleaneo Acoustic Design Ceiling (installation acc. to D12)
- in case of exposed ceilings made of metal suspension height should be 150 mm min.

1 Grid spacings fire protection ceiling

The additional load of the suspended ceiling (exposed ceiling ≤ 0.15 kN/m²) has to be considered for the substructure of the fire protection ceiling (see also page 2 "Dimensioning of substructure").

The spacings of the substructure of the fire protection ceiling are given by the specifications of the respective system ceiling (e.g. D112) under consideration of the additional load of the exposed ceiling.

2 Maximum spacings for exposed ceiling

all dimensions in mm

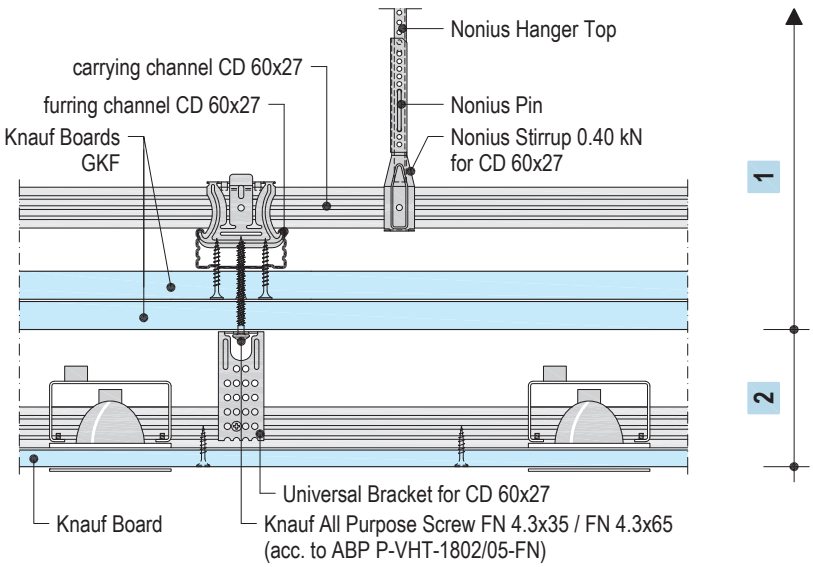
Spacings of carrying channels c	Spacings of suspenders *) load class kN/m² ≤ 0.15 a	Spacings of furring channels b
800	800 **)	500 (for Cleaneo Acoustic Ceilings see D12)
1000	400 / 500	
1200	400 / 500	

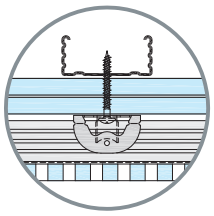
*) Fasten only to furring channels of fire protection ceiling.

**) • Fasten alternating to every second furring channel of the fire protection level if spacing of furring channels (fire protection level) is 400 mm.
• Fasten to every furring channel of fire protection level if spacing of furring channels (fire protection level) is 500 / 625 mm.

Detail scale 1:5

D112-D112 Knauf Multi-level Ceiling





alternative suspension: Direct Bracket

see page 5 and Data Sheet D12 Knauf Cleaneo Acoustic Ceilings

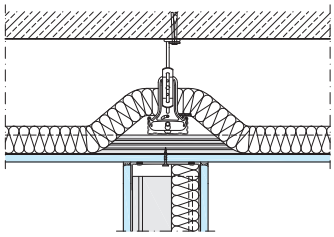
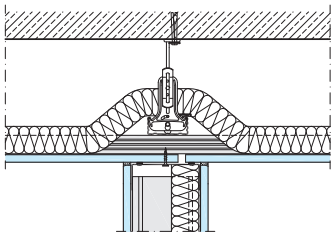
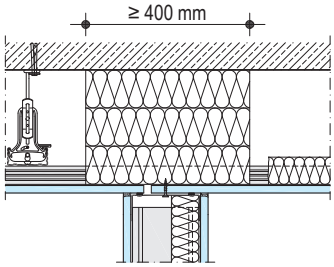
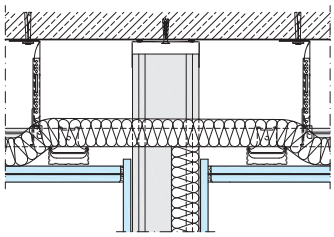
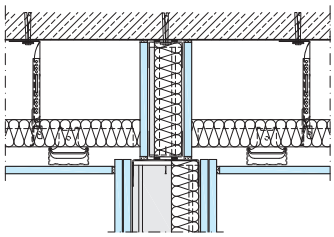
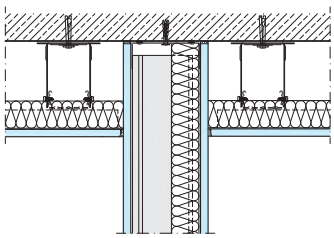
Notes

- install suspended channels of exposed ceiling always laterally to furring channels of fire protection ceiling
- max. load per suspension of exposed ceiling: 100 N

D11 Knauf Board Ceilings

Sound Protection following DIN 4109 Supplement 1 and 2

Longitudinal sound reduction index $R_{L,w,R}$

Board ceilings with non-perforated surface Suspension height 400 mm Examples of application		Cladding mm	Rated longitudinal sound reduction indices $R_{L,w,R}$ in dB without mineral wool	full area layer of mineral wool ≥ 40 mm	≥ 80 mm
Connection of partition to suspended ceiling, continuous cladding		**single layer ≥ 12.5 mm**	**46**	**47**	**48**
		double layer ≥ 2x 12.5 mm	**53**	**54**	**54**
Connection of partition to suspended ceiling, cladding separated		**single layer ≥ 12.5 mm**	**48**	**52**	**54**
		double layer ≥ 2x 12.5 mm	**55**	**57**	**57**
Connection of partition to suspended ceiling, cladding separated with absorbent bulkhead *) ≥ 400 mm		**single layer ≥ 12.5 mm**	**60**		
Connection of partition to solid basic ceiling, with separation of suspended ceiling at cladding and construction		**double layer ≥ 2x 12.5 mm**	**55**	**63**	
Separation of plenum by bulkhead made of boards		**single layer ≥ 12.5 mm**	**65**		
Connection of partition to solid basic ceiling (the cladding up to the solid ceiling is effective as separating bulkhead of the plenum)		**single layer ≥ 12.5 mm**	**65**		

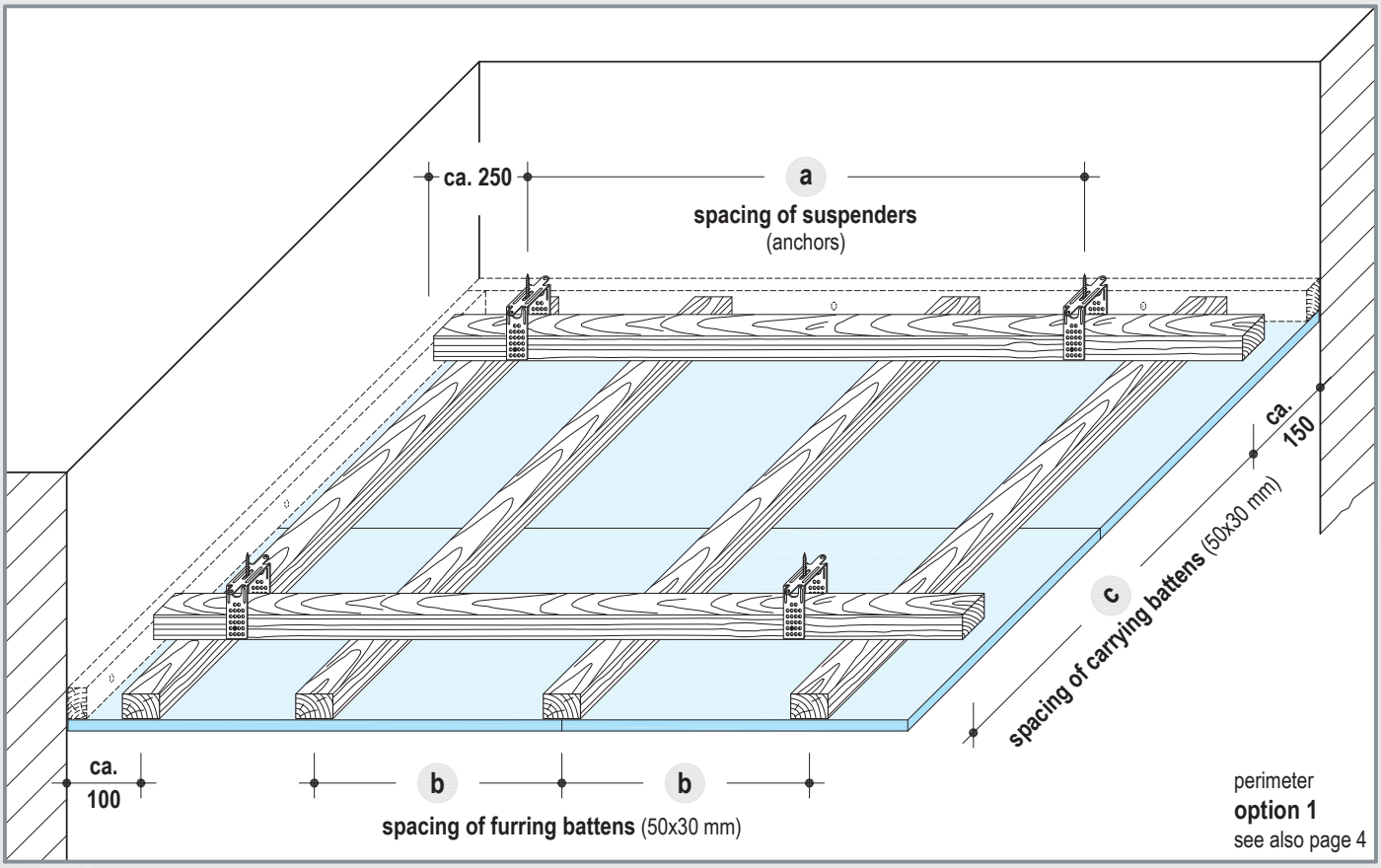
***) absorbent bulkhead made of mineral wool acc. to DIN EN 13162, length related flow resistance value r ≥ 8 kPa · s/m³**

Note	In case of suspension height of more than 400 mm the values should be reduced by 1 dB.

D111 Knauf Board Ceiling

Wood Frame

Carrying battens and furring battens / Universal Bracket



Max. spacings of substructure

• without fire protection • fire protection from below

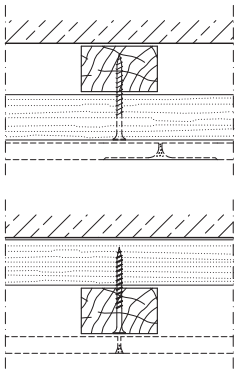
all dimensions in mm

Spacings of carrying battens c	Spacings of suspenders / anchors a load class kN/m² (see page 2) ≤ 0.15	≤ 0.30	≤ 0.50 1)
500	1200	950	800
600	1150	900	750
700	1050	850	700 2)
800	1050	800	-
900	1000	800 2)	-
1000	950	-	-
1100	900	-	-
1200	900	-	-

1) use suspenders of load capacity class 0.40 kN
2) not valid for spacing of furring battens of 800 mm

Fastening

Carrying / furring batten



fastening of furring battens 50x30 mm
to carrying battens 50x30 mm with
Knauf Drywall Screws TN 4.3x55
acc. to ABZ Nr. Z-9.1-251

Further construction information

without fire protection:
spacing of furring battens page 3

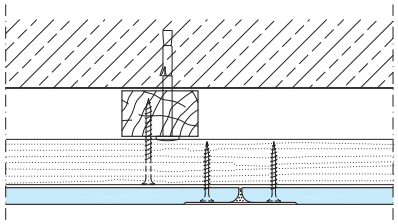
with fire protection:
spacings of furring battens and type / thickness of cladding page 8

Note A customized dimensioning of the ceiling substructure is possible on request (e.g. for different batten dimensions).

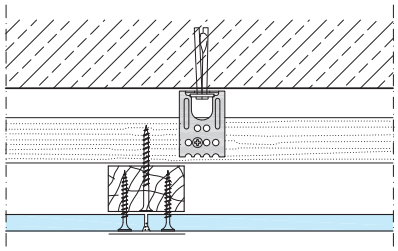
D111 Knauf Board Ceiling

Wood Frame

Direct anchoring / Universal Bracket 0.40 kN

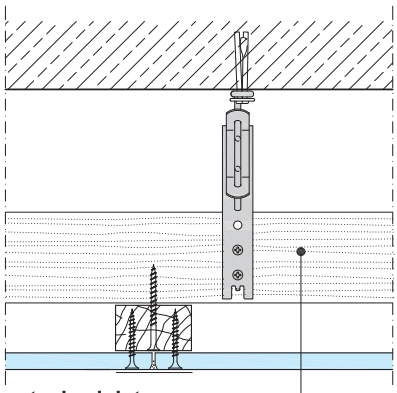


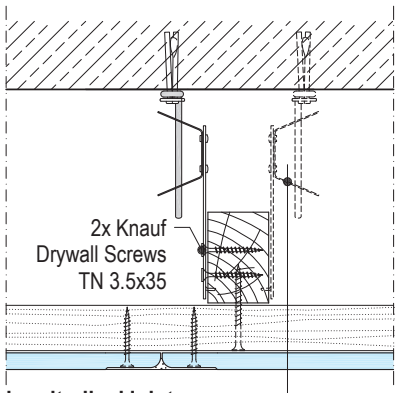
longitudinal joint



cut edge joint

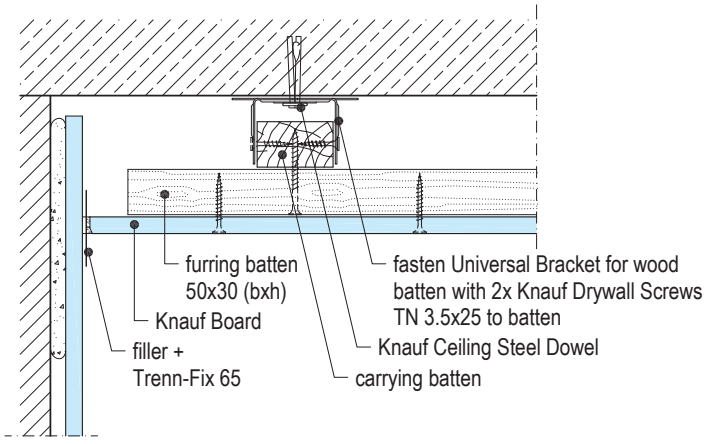
Rapid Wood Hanger 0.25 kN



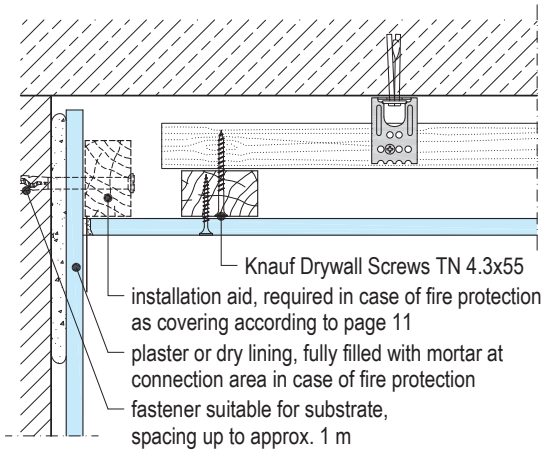


Details scale 1:5

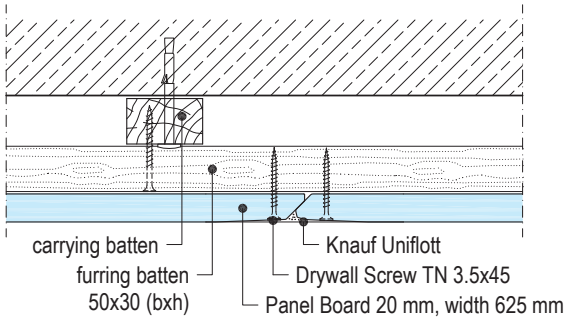
D111-A1 Connection to wall with dry lining



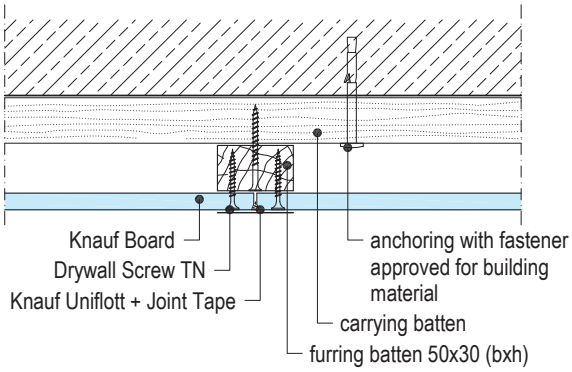
D111-D2 Connection to wall with dry lining



D111-B1 Longitudinal joint



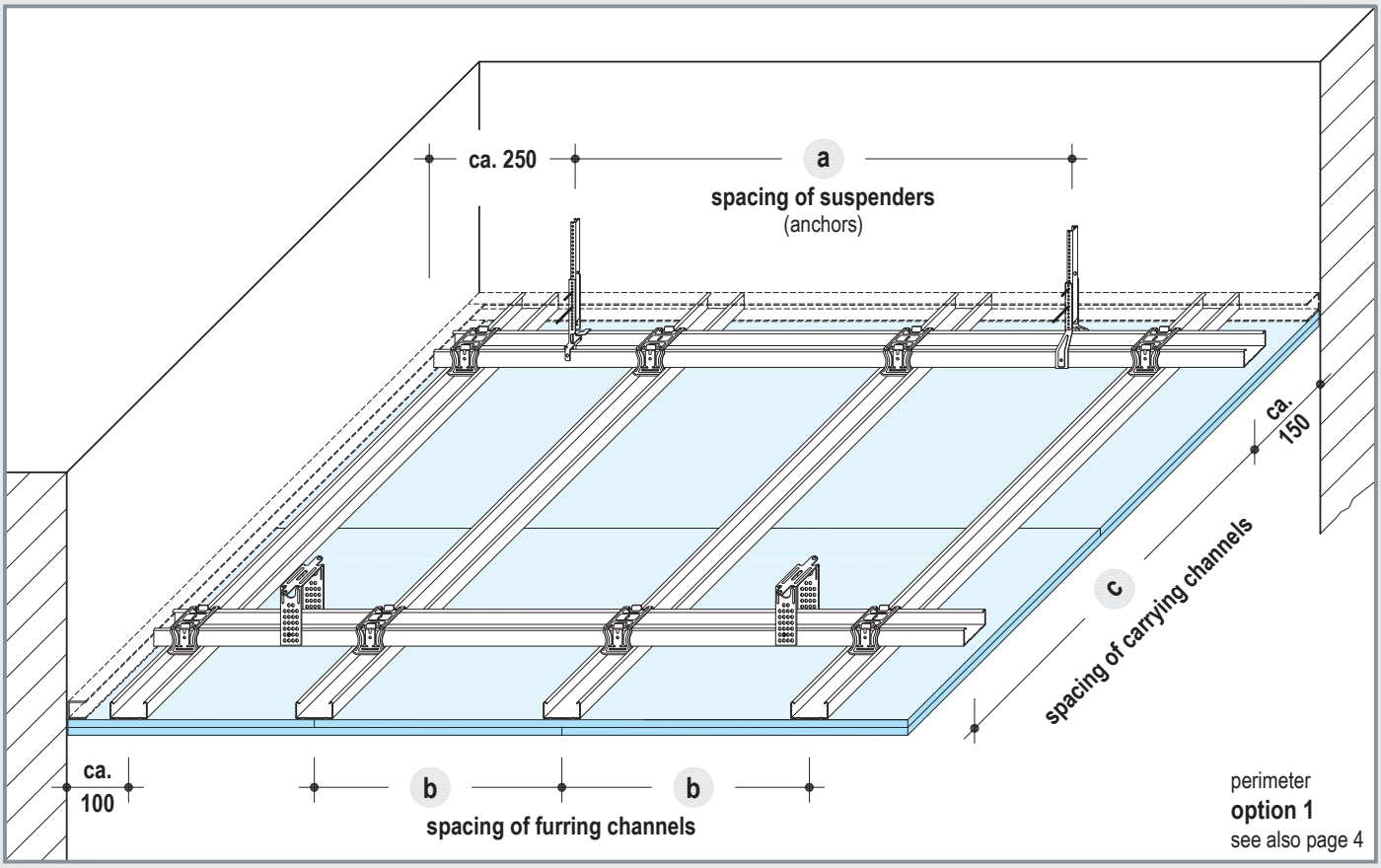
D111-C1 Cut edge joint



D112 Knauf Board Ceiling

Metal Grid

Carrying channels and furring channels / suspended



Maximum grid spacings

• without fire protection • fire protection from below

alle dimensions in mm

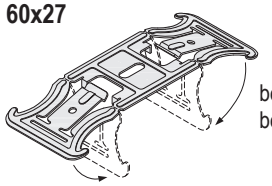
Spacings of carrying channel c	Spacings of suspenders a load class kN/m² (see page 2) ≤ 0.15	≤ 0.30	≤ 0.50 1)	only Ceiling below Ceiling F90 ≤ 0.65 1)
500	1200	950	800	750
600	1150	900	750	700
700	1100	850	700 2)	650
800	1050	800	700 2)	-
900	1000	800	-	-
1000	950	750	-	-
1100	900	750 2)	-	-
1200	900	-	-	-

1) use suspenders of load capacity class 0.40 kN
2) not valid for spacing of furring channels of 800 mm

Channel connections

Carrying channel to furring channel

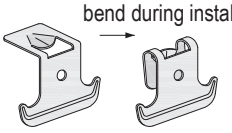
Intersection Connector for CD 60x27



bend to 90° before installation

alternative 2x Clip for CD 60x27

bend during installation



Further construction information

without fire protection:
spacing of furring channels — page 3

with fire protection:
spacings of furring channels and type / thickness of cladding — pages 7 to 8
max. grid spacings (fire prot. from above) — page 10

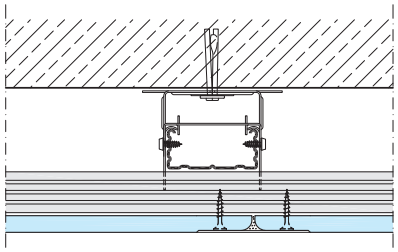
Notes

A customized dimensioning of the ceiling substructure is possible on request.
It is recommended to dimension the substructure considering a possibly additional ceiling (≤ 0.15 kN/m²).

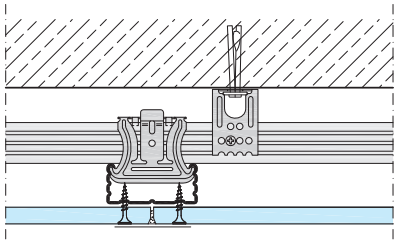
D112 Knauf Board Ceiling

Metal Grid

Universal Bracket 0.40 kN

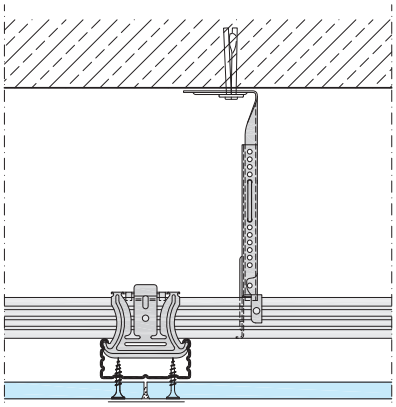


longitudinal joint

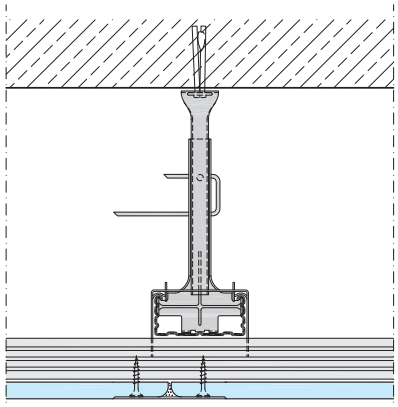


cut edge joint

suspended, e.g. with Nonius Suspension 0.40 kN



cut edge joint



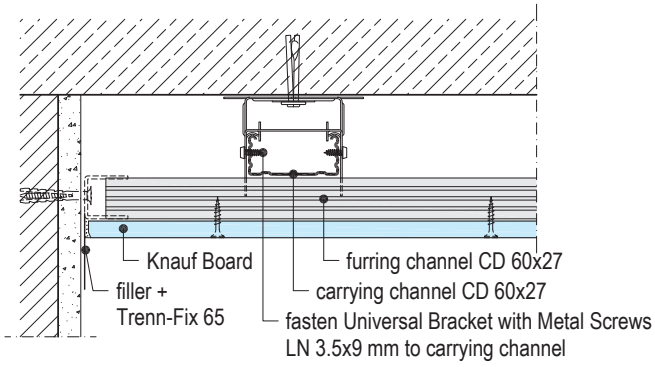
longitudinal joint

suspension options:

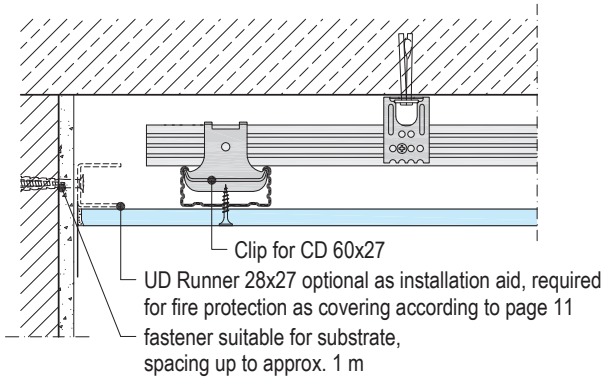
- Ankerfix Rapid Hanger 0.25 kN
- Nonius Suspension 0.40 kN
- Nonius Stirrup 0.40 kN
- Combo Hanger
  - with wire 0.25 kN
  - with Nonius Hanger Top 0.40 kN

Details scale 1:5

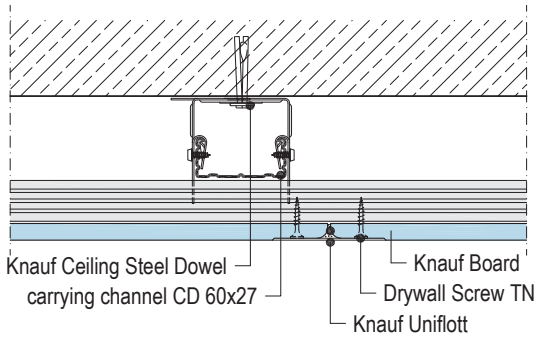
D112-A2 Connection to wall



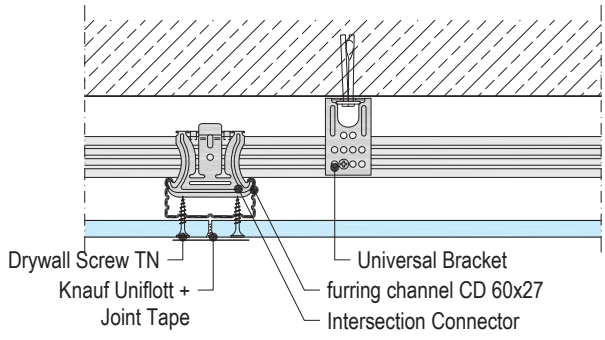
D112-D2 Connection to wall



D112-B2 Longitudinal joint

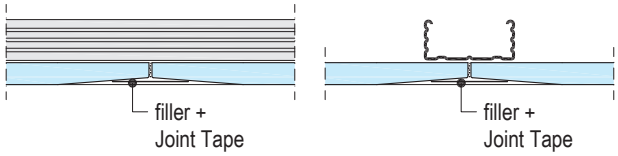


D112-C2 Cut edge joint

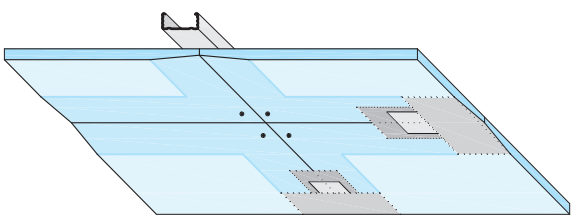


Knauf 4AK Board

scheme drawings



board joints with 4-side tapered edges



Knauf 4AK Board

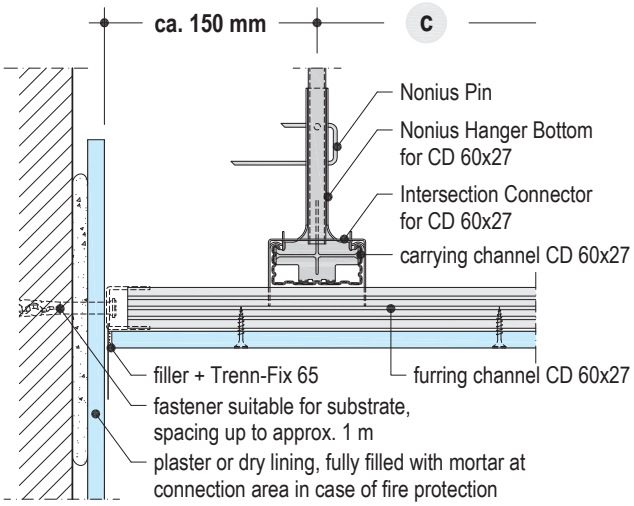
- cross mounting (staggering of joints not necessary)
- filling with Joint Tape

D112 Knauf Board Ceiling

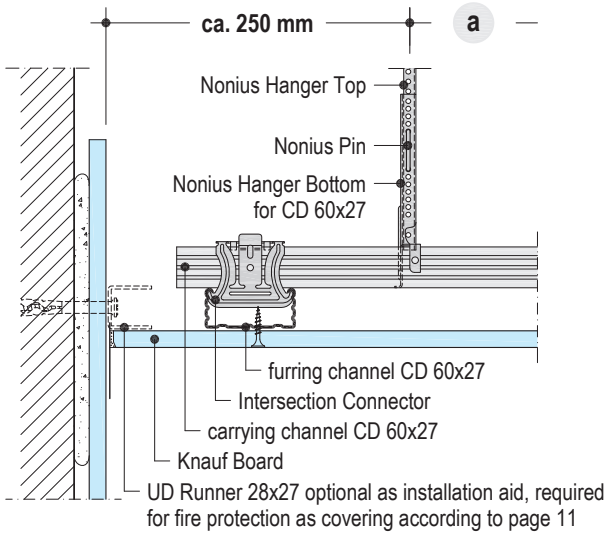
Metal Grid

Details scale 1:5

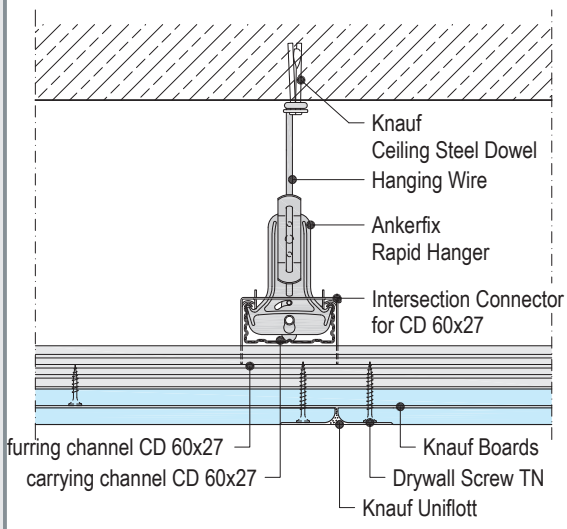
D112-A1 Connection to wall



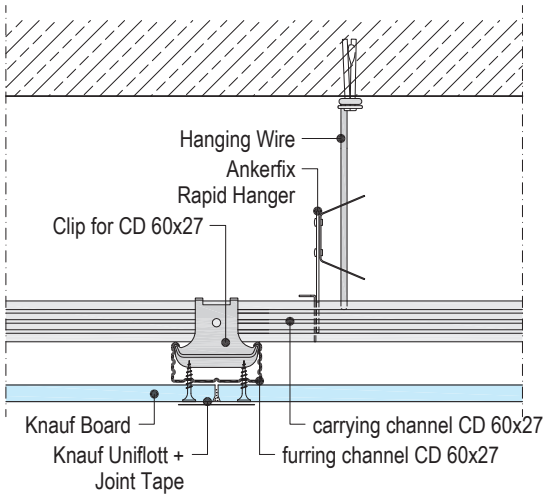
D112-D3 Connection to wall



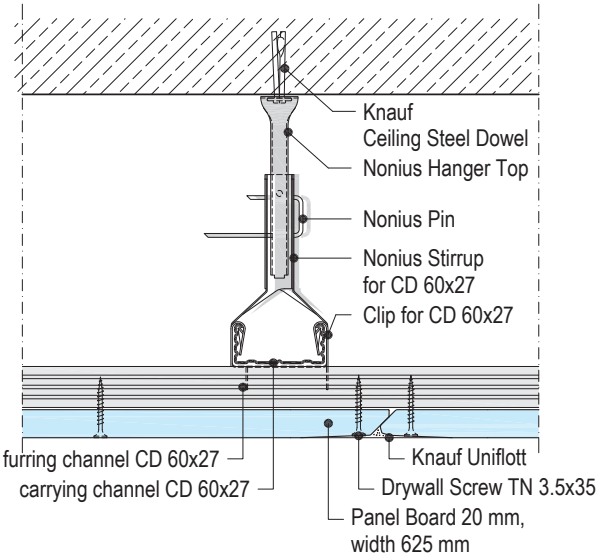
D112-B4 Longitudinal joint



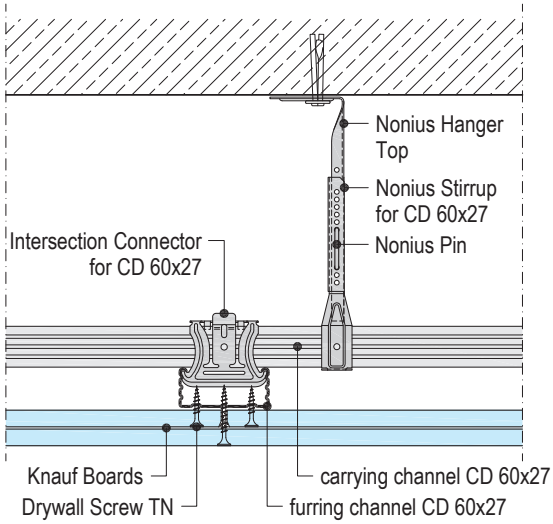
D112-C4 Cut edge joint



D112-B5 Longitudinal joint



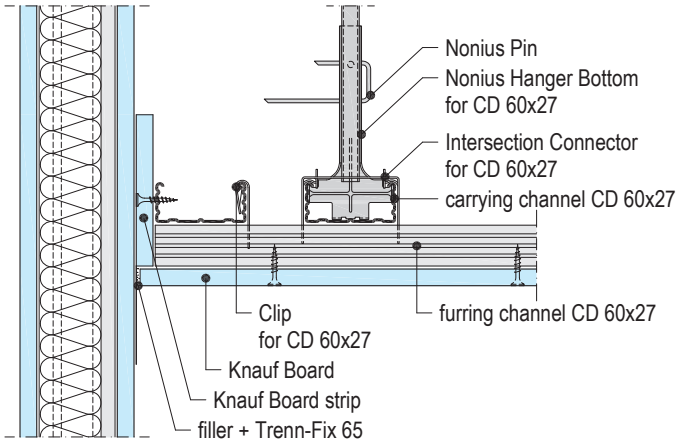
D112-C1 Cut edge joint



Details scale 1:5

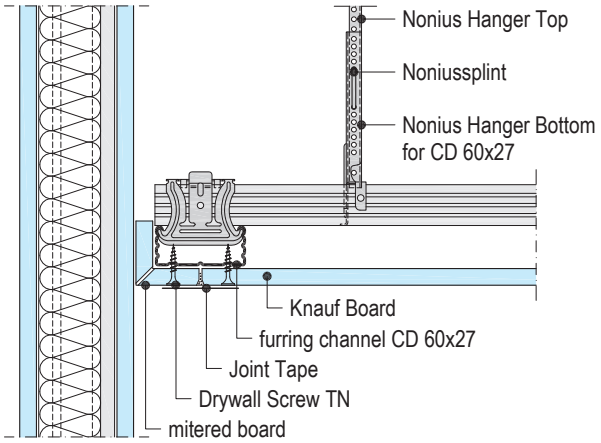
D112-A5 Vertically sliding connection to wall

option 1



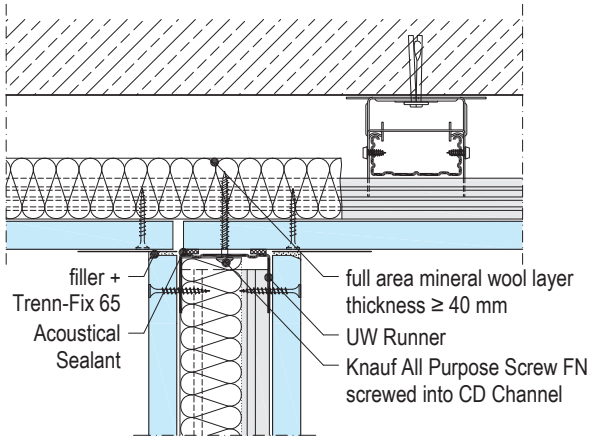
D112-D5 Vertically sliding connection to wall

option 2



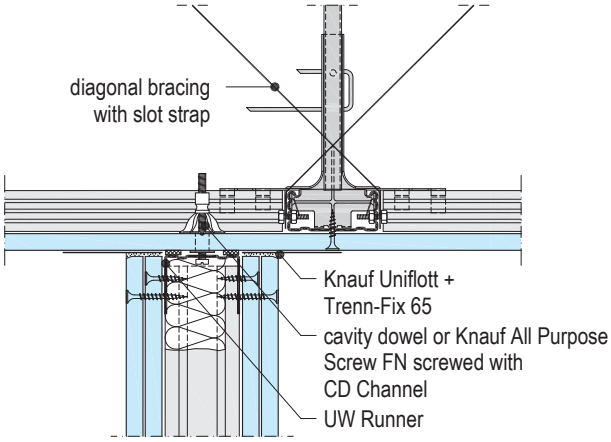
Sliding connections are suitable for fire resistance F30 as well.

D112-B6 Connection of partition to board ceiling



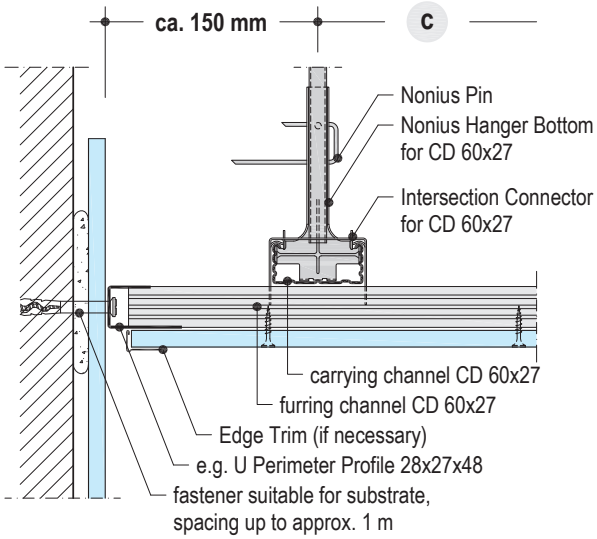
cladding separated at connection:
rated longitudinal sound reduction index $R_{L,w,R}$ 52 dB

D113-B4 Connection of partition to board ceiling

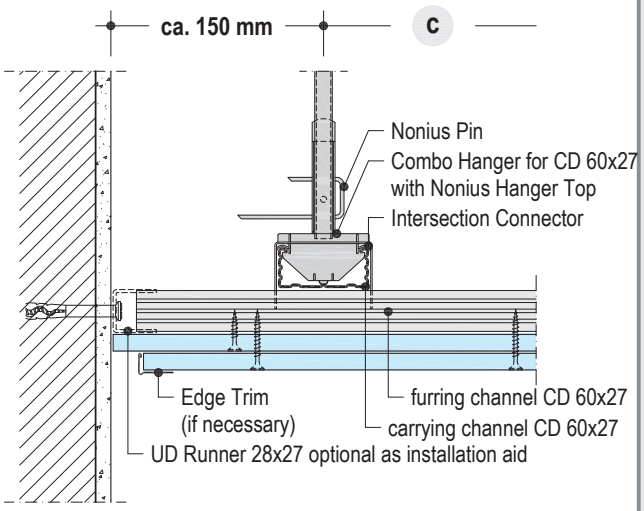


for connections of "lightweight" partitions to fire protective classified suspended ceilings see page 11.

D112-A3 Connection to wall with exposed joint



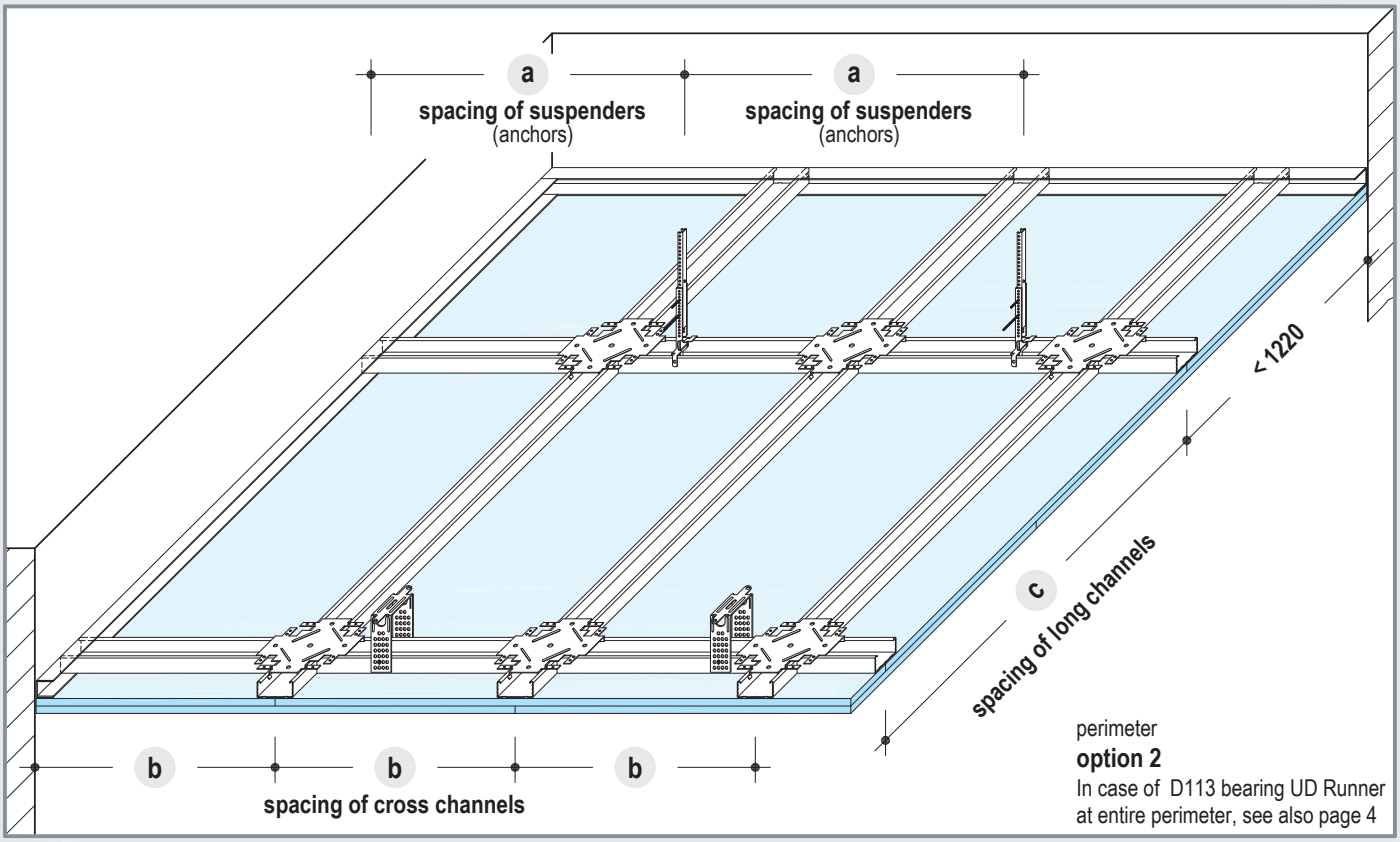
D112-A4 Connection to wall with exposed joint



D113 Knauf Board Ceiling

Flush Metal Grid

Flush metal grid with carrying channel as long channel and furring channels as cross channels / suspended



Maximum grid spacings

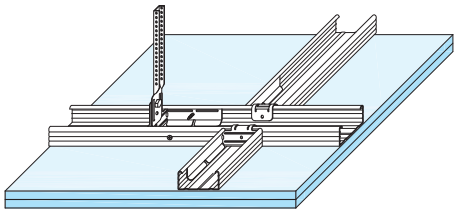
• without fire protection • fire protection from below

all dimensions in mm

Spacing of long channels c	Spacings of suspenders a load class kN/m² (see page 2) ≤ 0.15	≤ 0.30	≤ 0.50 1)	Spacings of cross channels b
1250	1100	650	-	500
	-	-	650	400

1) use suspenders of load capacity class 0.40 kN

Universal Connector as suspender

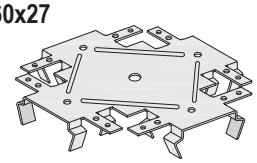


as suspender with Nonius Hanger Top 0.40 kN screw to CD Channel in case of fire protection

Channel connections

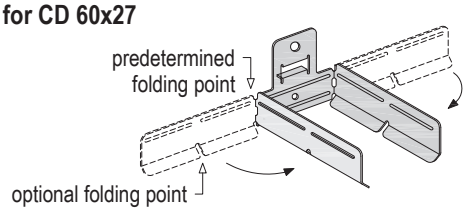
Long channel to cross channel, flush

Flush Connector for CD 60x27



• for additional measures for fire protection from above see page 10.

Universal Connector for CD 60x27



• delivered unbent
• adjust roughly, depending on use
• adjust correctly during assembly

Further construction information

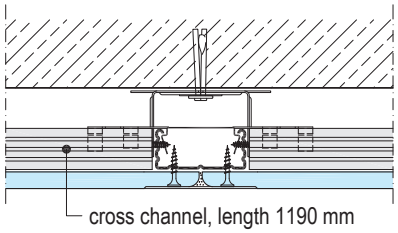
with fire protection:

Note A customized dimensioning of the ceiling substructure is possible on request.

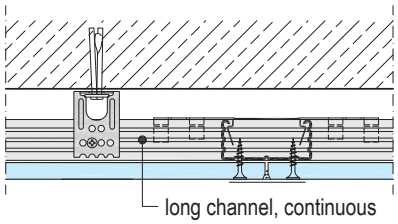
D113 Knauf Board Ceiling

Flush Metal Grid

Universal Bracket 0.40 kN

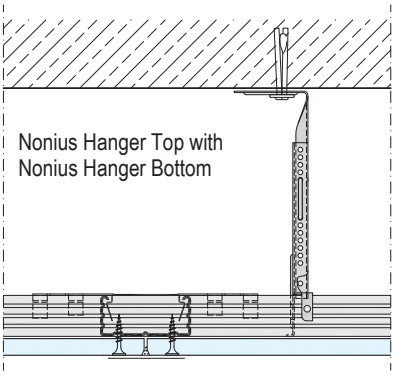


longitudinal joint



cut edge joint

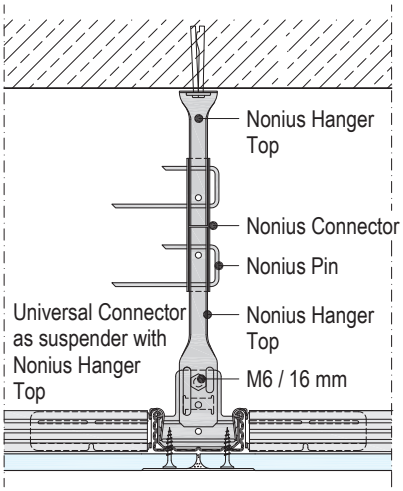
Suspended, e.g. with Nonius Suspension 0.40 kN



cut edge joint

suspension options

- Ankerfix Rapid Hanger 0.25 kN
- Nonius Suspension 0.40 kN
- Combo Hanger
  - with wire 0.25 kN
  - with Nonius Hanger Top 0.40 kN

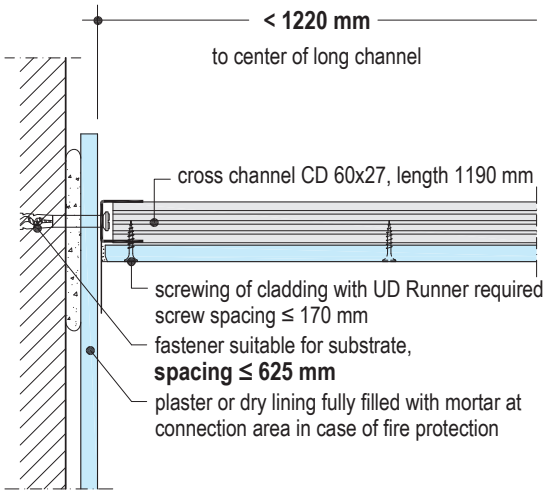


longitudinal joint

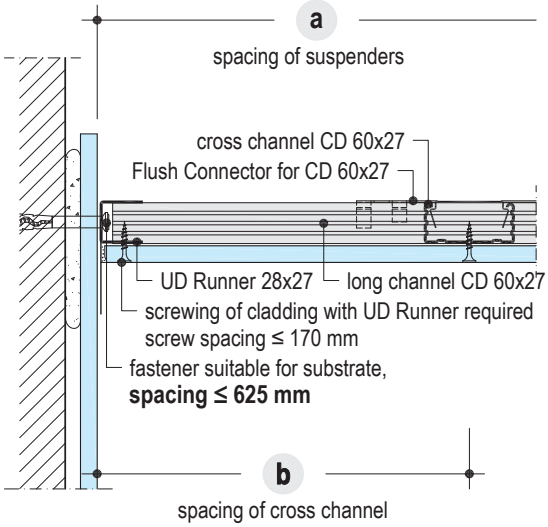
- Universal Connector as suspender with Nonius Hanger Top 0.40 kN

Details scale 1:5

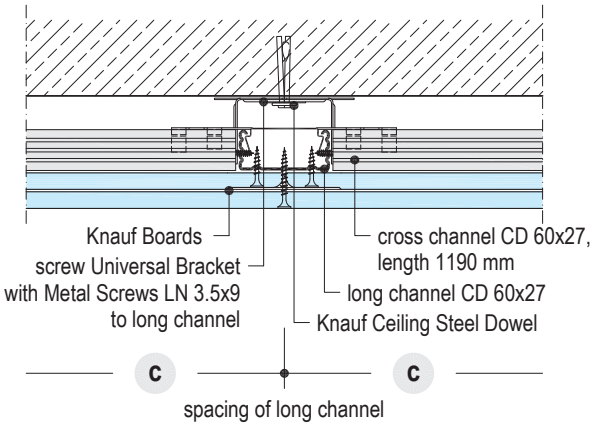
D113-A2 Connection to wall (load-bearing)



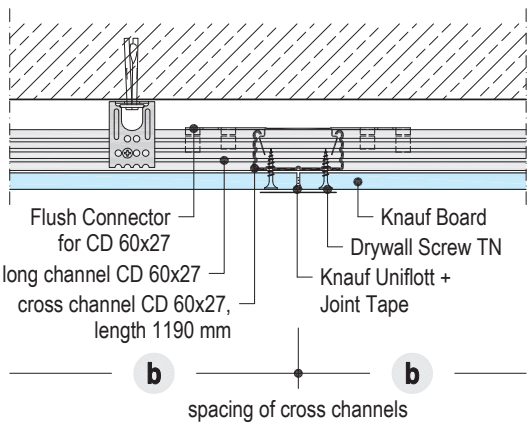
D113-D2 Connection to wall (load-bearing)



D113-B2 Longitudinal joint



D113-C2 Cut edge joint



D112/D113 Knauf Board Ceilings

Fire Resistance F90 • solely from below

D112 F90 • solely from below

see also page 8

installation scheme dimensions in mm

Cladding GKF

25 + 18 mm

or

2x 20 mm

Fastening screws

Knauf Drywall Screws	Spacing of screws
1st layer: **TN 3.5x35**	**300 mm** *)
2nd layer: **TN 3.5x55**	**170 mm**

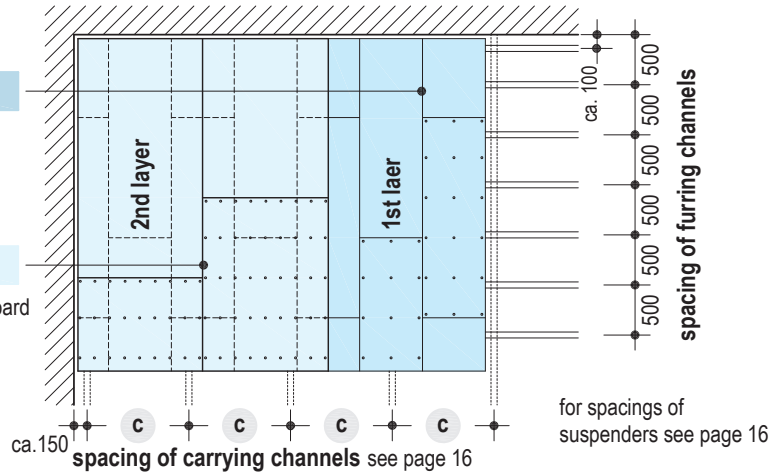
*) min. 3 screws per board width

1st layer

Solid Board GKF 25 mm, width 625 mm

2nd layer

Fire-Resistant Board GKF 18 mm, width 1250 mm



for spacings of suspenders see page 16

D113 F90 • solely from below

see also page 8

installation scheme dimensions in mm

Cladding GKF

25 + 18 mm

Fastening screws

Knauf Drywall Screws	Spacing of screws
1st layer: **TN 3.5x35**	**300 mm** *)
2nd layer: **TN 3.5x55**	**170 mm**

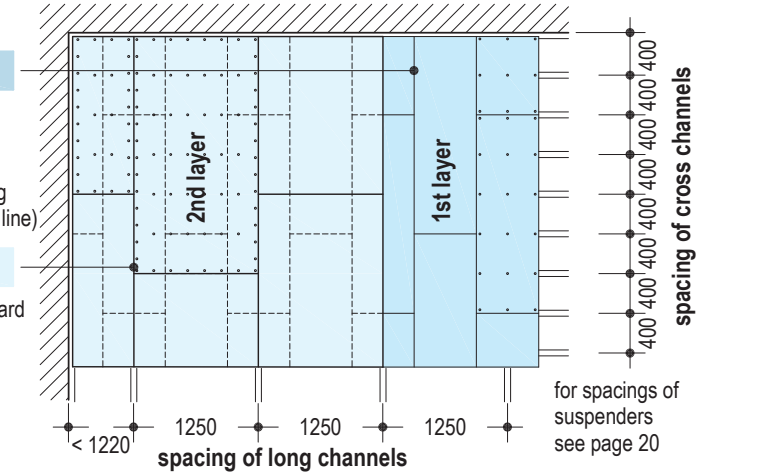
*) min. 3 screws per board width

1st layer

Solid Board GKF 25 mm, width 625 mm (installed with long channel at center line)

2nd layer

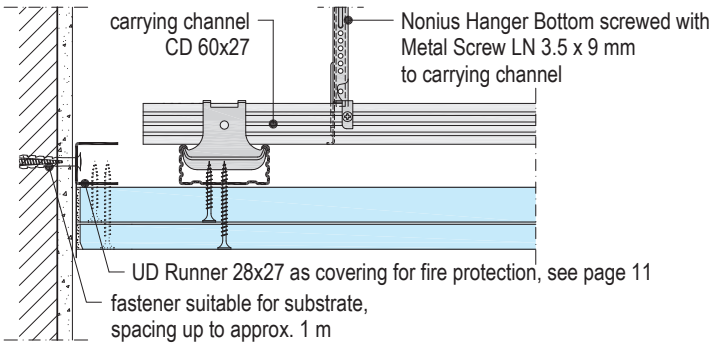
Fire-Resistant Board GKF 18 mm, width 1250 mm



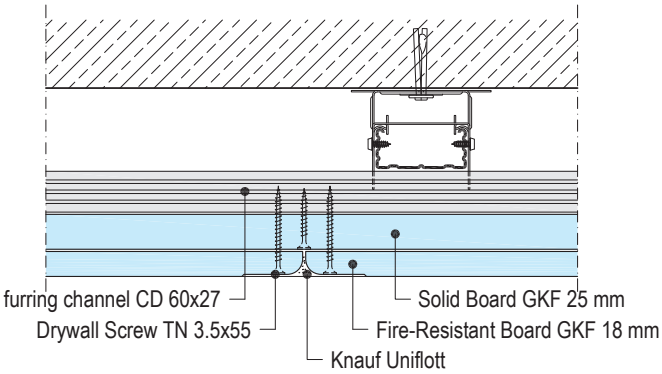
for spacings of suspenders see page 20

Details scale 1:5

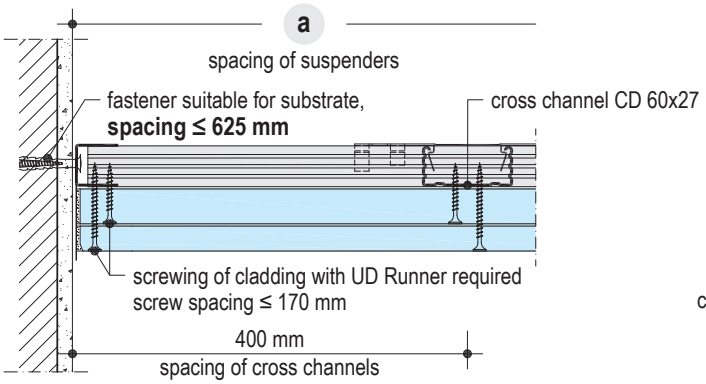
D112F90vu-D2 Connection to wall



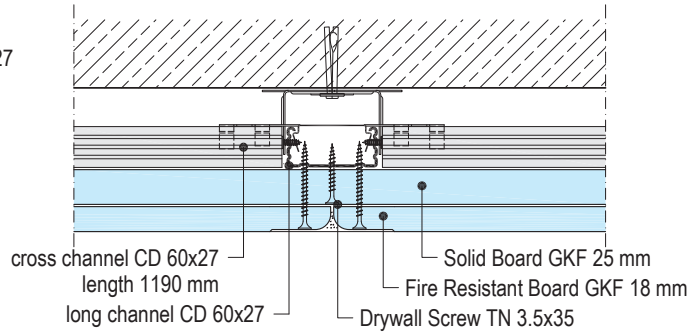
D112F90vu-B1 Longitudinal joint



D113F90vu-D3 Connection to wall (load-bearing)



D113F90vu-B3 Longitudinal joint

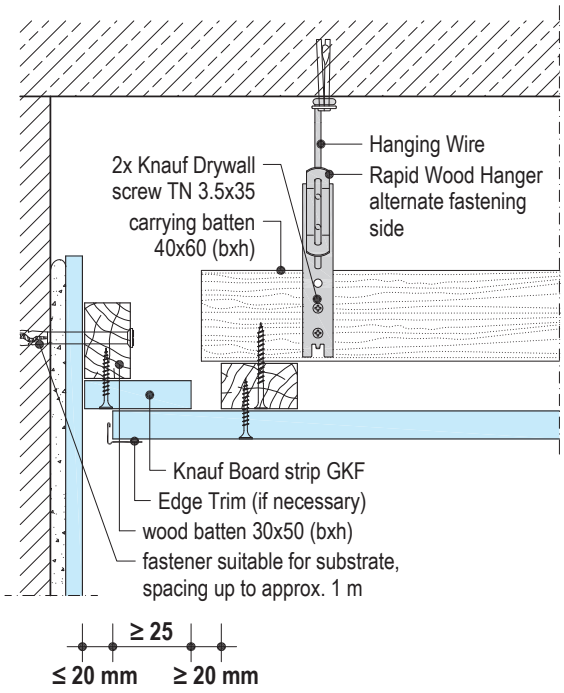


Details scale 1:5

all dimensions in mm

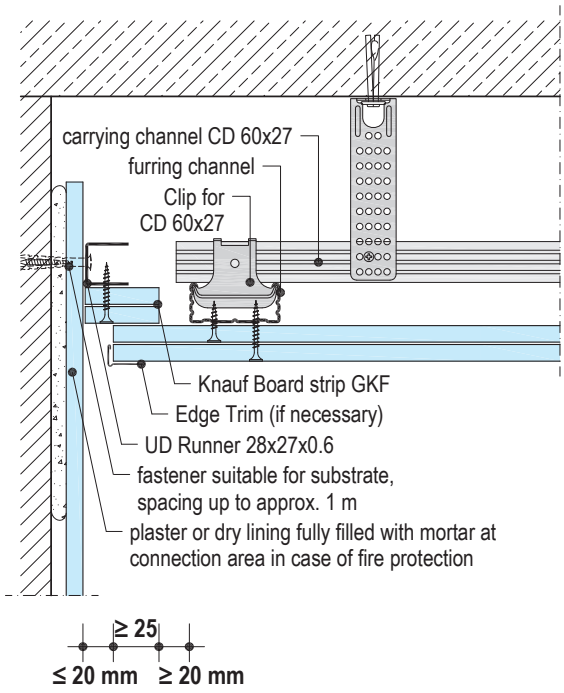
D111-D8 Connection to wall with shadow gap

fire protection design



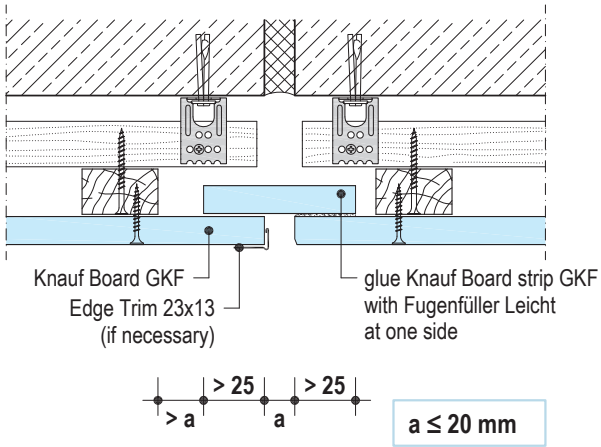
D112-D4 Connection to wall with shadow gap

fire protection design



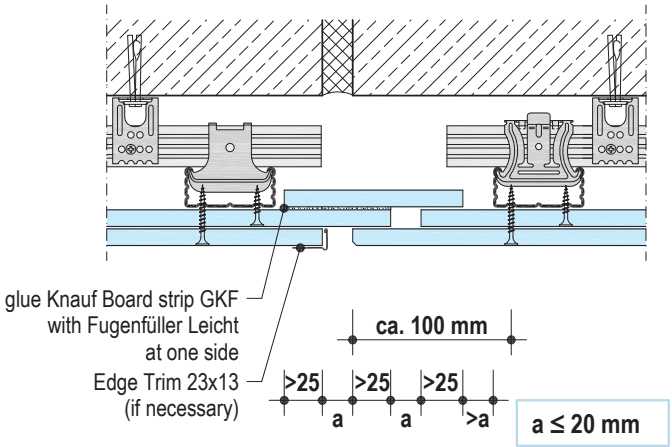
D111-C3 Settlement joint

fire protection design



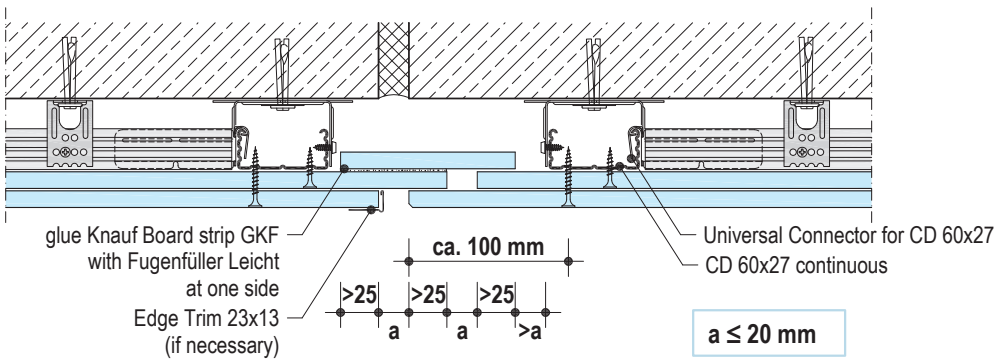
D112-C3 Settlement joint

fire protection design



D113-C4 Settlement joint

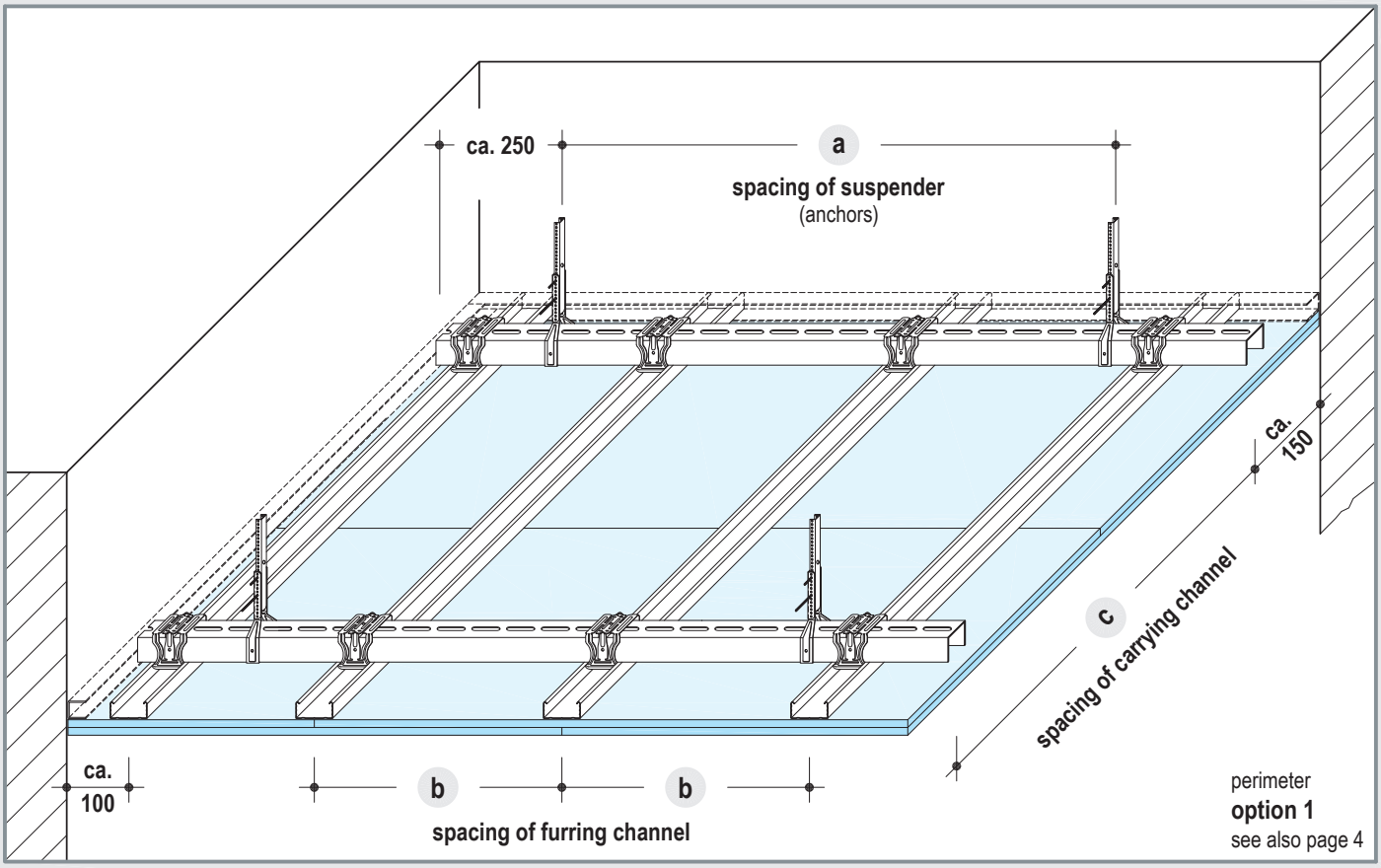
fire protection design



D116 Knauf Board Ceiling

Metal Grid UA / CD

Carrying channel UA + furring channel CD / suspended



Maximum grid spacings

• without fire protection • fire protection from below [1)]

alle dimensions in mm

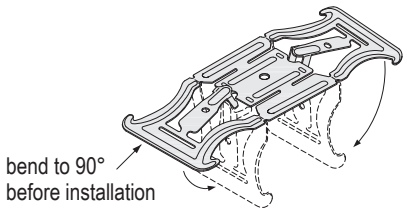
Spacing of carrying channels c	Spacings of suspenders a • Nonius Stirrup (0.40 kN) load class kN/m² (see page 2)			only Ceiling below Ceiling F90
	≤ 0.15	≤ 0.30	≤ 0.50	≤ 0.65
500	2600	2050	1600	1200
600	2450	1950	1300	1000
700	2300	1850	1100 [2)]	850
800	2200	1650	1000 [2)]	-
900	2150	1450	-	-
1000	2050	1300	-	-
1100	2000	1200 [2)]	-	-
1200	1950	-	-	-
1300	1900	-	-	-
1400	1850	-	-	-
1500	1750	-	-	-

1) spacing of suspenders max. 1700 mm
2) not valid for spacing of furring channels of 800 mm

Channel connection

Carrying channel UA to furring channel CD

Intersection Connector for UA Profile



Further construction information

without fire protection:
spacing of furring channels — page 3

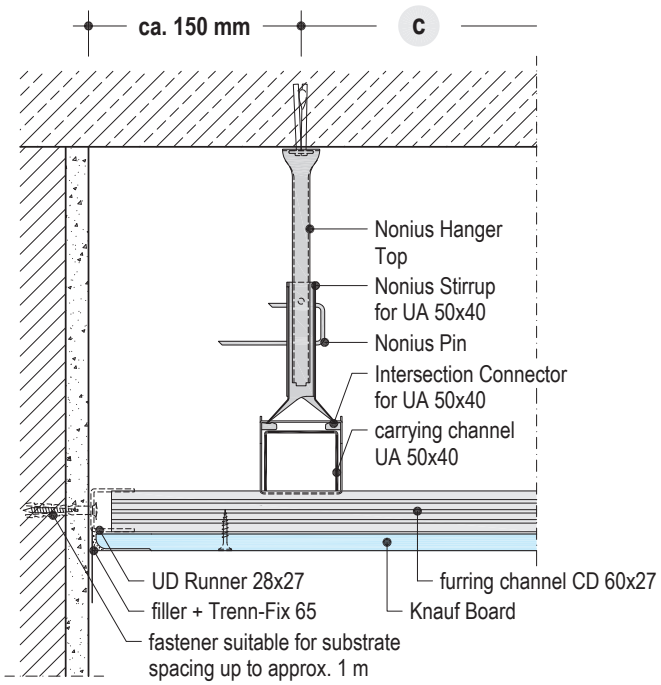
with fire protection:
spacings of furring channels and type / thickness of cladding — pages 7 + 9
max. grid spacings (fire prot. from above) — page 10

Notes

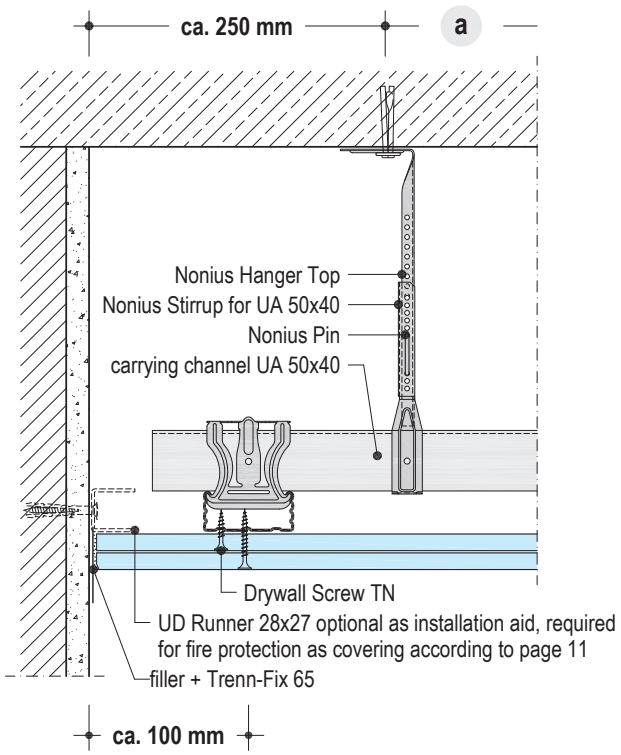
A customized dimensioning of the ceiling substructure is possible on request.
It is recommended to dimension the substructure considering a possibly additional ceiling (≤ 0.15 kN/m²).

Details scale 1:5

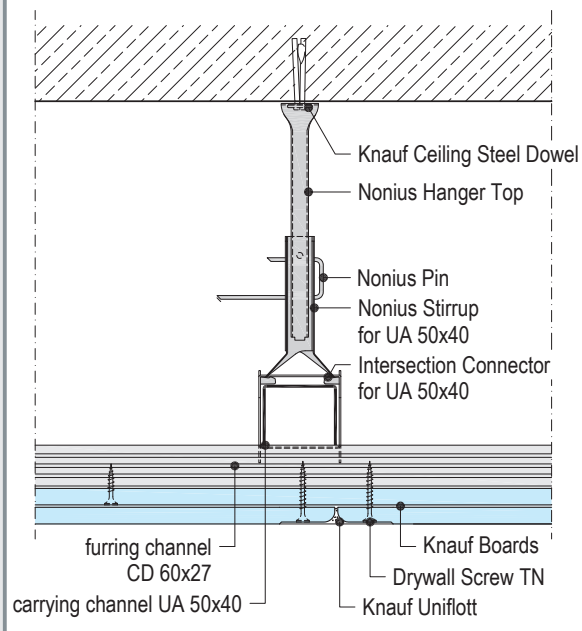
D116-A1 Connection to wall



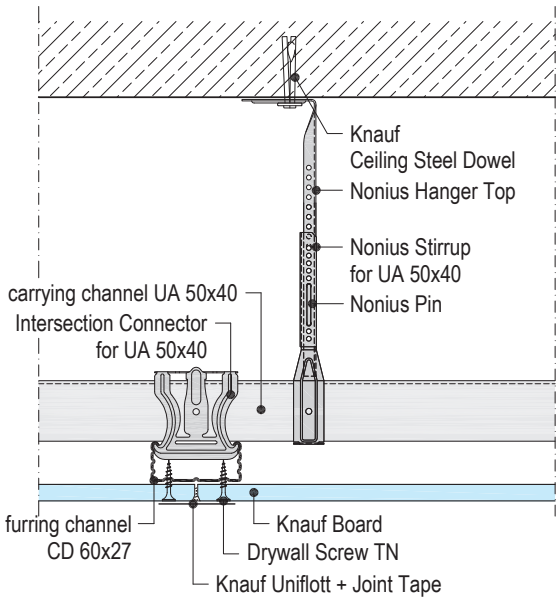
D116-D1 Connection to wall



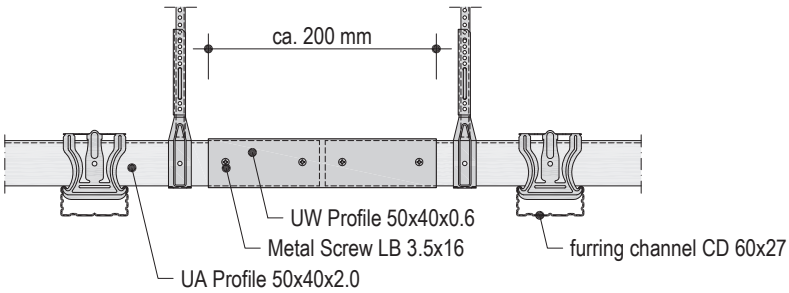
D116-B1 Longitudinal jojnt



D116-C1 Cut edge joint



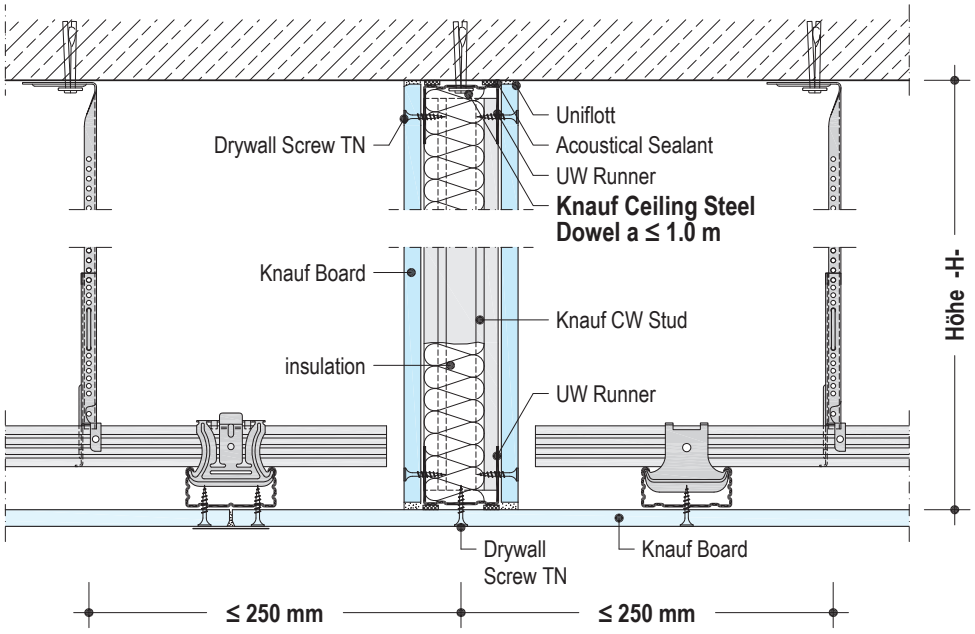
extension of UA Profiles with UW Profile 50x40



Details scale 1:5

Ceiling bulkhead

application according to Technical Data Sheet D16 Knauf Ceiling Built-ins



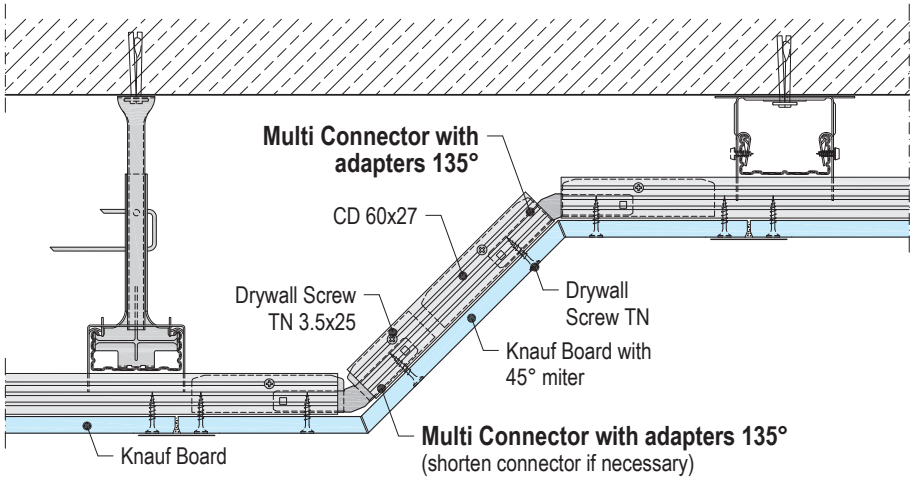
Height -H- m	Cladding of bulkhead Knauf Board mm
≤ 1.40	12.5
≤ 1.00	2x 12.5

If spacing of Ceiling Steel Dowel is reduced by 50 %, allowable heights may be doubled

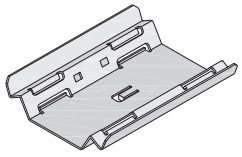
- rivet UW Runner with Knauf CW Stud

Split level ceiling 45°

application according to Technical Data Sheet D19 Knauf Designed Ceilings



Multi Connector for CD 60x27



Multi Connector Adapter

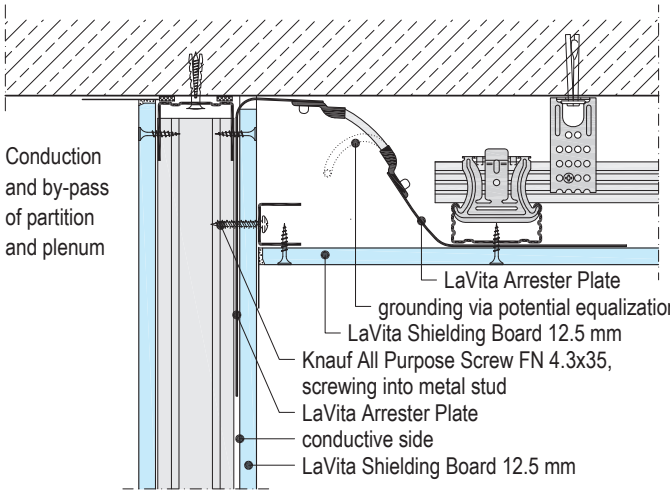
- **adapter e.g. 135°**

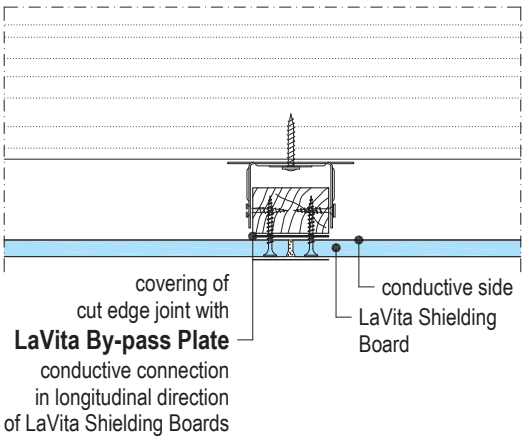
- for more adapters see Data Sheet D19

LaVita Shielding Boards

application according to Technical Data Sheet K736 Knauf LaVita Shielding Boards

Shielding: • **high frequency electromagnetic waves / electrical alternating fields of low frequency**





Reference for more information	D12 Knauf Cleaneo Acoustic Ceilings / D15 Knauf Wood Joist Ceilings / D16 Knauf Ceiling Built-ins (e.g. access panels, illuminations, ceiling bulkhead)

D11 Knauf Board Ceilings

Consumption of Material of selected Examples

Consumption of material per m² ceiling without allowance for loss and waste. Amounts refer to ceiling area of: 10 m x 10 m = 100 m²

Description *italic = not provided by Knauf*	Unit	Amount as average value D111		D113		
		1	2	1	2	3
connection to wall UD Runner 28x27x0.6; length 3 m	m	0.4	0.4	0.4	0.4	0.4
fastener approved for substrate e.g. Knauf Ceiling Steel Dowel for reinforced concrete	pcs	0.4	0.4	0.7	0.7	0.7
substructure						
alt. Knauf Ceiling Steel Dowel (for reinforced concrete)	pcs	1.3	2	0.7	1.2	1.2
approved fastener						-
Universal Bracket for CD 60x27	pcs	-	-	0.7	1.2	1.2
alt. Metal Screws 2x LN 3.5x9 mm (fastening to CD Channel)		-	-	1.4	2.4	2.4
Universal Bracket for timber batten 50x30		1.3	2	-	-	-
or Knauf Drywall Screws 2x TN 3.5x25 mm (screwing to batten)		2.6	4	-	-	-
Hanging Wire	pcs	1.3	2	0.7	1.2	-
alt. Ankerfix Rapid Hanger for CD 60x27		-	-	0.7	1.2	-
alt. Combo Hanger for CD 60x27		-	-	0.7	1.2	-
Rapid Wood Hanger		1.3	2	-	-	-
or Knauf Drywall Screws 2x TN 3.5x35 mm (screwing to batten)		2.6	4	-	-	-
Nonius Hanger Top	pcs	-	-	0.7	1.2	1.2
Nonius Pin		-	-	0.7	1.2	1.2
Nonius Hanger Bottom for CD 60x27		-	-	0.7	1.2	1.2
alt. Metal Screws 2x LN 3.5x9 mm (screwing to CD Channel)		-	-	-	-	2.4
alt. Combo Hanger for CD 60x27		-	-	0.7	1.2	-
Universal Connector (as suspender)		-	-	0.7	1.2	-
M 6 / 16		-	-	0.7	1.2	-
2x Nonius Hanger Top		-	-	1.4	2.4	-
Nonius Connector		-	-	0.7	1.2	-
2x Nonius Pin		-	-	1.4	2.4	-
Metal Screws 2x LB 3.5x9.5 mm		-	-	-	2.4	-
CD Channel 60x27x0.6; length 4 m	m	-	-	0.8	0.8	0.8
Multi-Connector (as longitudinal connection for CD Channels)	pcs	-	-	0.2	0.2	0.2
CD Channel 60x27x0.6; length 1.19 m	m	-	-	1.9	1.9	1.9
Flush Connector for CD 60x27		-	-	1.5	1.5	1.5
alt. Metal Screws 4x LN 3.5x9 mm (screwing to CD Channel)	pcs	-	-	-	-	6
Universal Connector				3	3	-
carrying batten 50x30 mm	m	1.2	1.5	-	-	-
furring batten 50x30 mm	m	2.1	2.1	-	-	-
Knauf Drywall Screw TN 4.3x55 mm (screwing furring batten to carrying batten)	pcs	2.5	3.2	-	-	-
mineral wool (consider fire protection specs, see pages 6 to 10)	m²	as req.	as req.	as req.	as req.	1
Knauf Boards (see below)	m²	1	2	1	2	1
Screw attachment (fastening of Knauf Boards)						
Knauf TN 3.5 x 25 mm	pcs	-	-	27	9	27
Drywall TN 3.5 x 35 mm		17	9	-	27	-
Screws TN 3.5 x 45 mm		-	17	-	-	-
Jointing Trenn-Fix 65	m	0.4	0.4	0.4	0.4	0.4
Knauf Uniflott for hand filling; 25 kg bag resp. 5 kg bag	kg	0.3	0.5	0.3	0.5	0.35
Knauf Jointfiller Super for machine filling; 20 kg bag	kg	0.4	0.6	0.4	0.6	0.45
Joint Tape (for cut edges)	m	0.45	0.45	0.45	0.45	0.45

D111

1 • **Standard**
Knauf Boards GKB / GKBI 12.5 mm
≤ 0.15 *) hanger: 1000 mm; carr. batten: 900 mm; furr. batten: 500 mm

2 • **Standard** • **F30 allein von unten**
Knauf Boards GKB / GKBI resp. GKF / GKFI 2x 12.5 mm
≤ 0.30 *) hanger: 850 mm; carr. batten: 700 mm; furr. batten: 500 mm

*) load class kN/m² **) only necessary for fire protection
as req. = as required

D113

1 • **Standard**
Knauf Boards GKB / GKBI 12.5 mm
≤ 0.15 *) hanger: 1100 mm; carr. chan.: 1250 mm; lfurr. chan.: 500 mm

2 • **Standard** • **F30 solely from below**
Knauf Boards GKB / GKBI resp. GKF / GKFI 2x 12.5 mm
≤ 0.30 *) hanger: 650 mm; carr. chan.: 1250 mm; furr. chan.: 500 mm

3 • **F30 solely from above**
Knauf Boards GKF / GKFI 15 mm
≤ 0.30 *) hanger: 650 mm; carr. chan.: 1250 mm; furr. chan.: 500 mm

D11 Knauf Board Ceilings

Consumption of Material of selected Examples

Consumption of material per m² ceiling without allowance for loss and waste. Amounts refer to ceiling area of: 10 m x 10 m = 100 m²

Description *italic = not provided by Knauf*	Unit	Amount as average value D112				D116		
		1	2	3	4	1	2	3
connection to wall								
UD Runner 28x27x0.6; length 3 m	m	0.4	0.4	0.4	0.4	0.4	0.4	0.4
fastener approved for substrate e.g. Knauf Ceiling Steel Dowel for reinforced concrete	pcs	0.4	0.4	0.4	0.4	0.4	0.4	0.4
substructure								
alt. Knauf Ceiling Steel Dowel (for reinforced concrete) *approved fastener*	pcs	1.2	1.5	2.1	2.4	0.7	1	1.4
Universal Bracket for CD 60x27 Metal Screws 2x LN 3.5x9 mm (fastening to CD Channel)	pcs	1.2 2.4	1.5 3.0	2.1 4.2	2.4 4.8	- -	- -	- -
or Hanging Wire alt. Ankerfix Rapid Hanger for CD 60x27 Combo Hanger for CD 60x27	pcs	1.2	1.5	- - -	- - -	- - -	- - -	- - -
or Nonius Hanger Top Nonius Pin Nonius Hanger Bottom for CD 60x27 alt. Metal Screws 2x LN 3.5x9 mm (screwing with CD Channel) alt. Combo Hanger for CD 60x27 Nonius Stirrup for CD 60x27	pcs	1.2 1.2 1.2 - 1.2 1.2	1.5 1.5 1.5 - 1.5 1.5	2.1 2.1 2.1 4.2 2.1 2.1	2.4 2.4 2.4 4.8 - 2.4	0.7 0.7 - - - -	1 1 - - - -	1.4 1.4 - - - -
Nonius Stirrup for UA 50x40	pcs	-	-	-	-	0.7	1	1.4
CD Channel 60x27x0.6; length 4 m Multi-Connector (as longitudinal connection for CD Channels)	m pcs	3.2 0.6	3.2 0.6	3.5 0.7	3.5 0.7	2.1 0.4	2.1 0.4	2.1 0.4
UA Profile 50x40x2.0 UW Profile 50x40x0.6 (for extension of UA Profiles)	m m	- -	- -	- -	- -	1.1 0.04	1.1 0.04	1.1 0.04
alt. Intersection Connector for CD 60x27 2x Clip for CD 60x27	pcs	2.3 4.6	2.3 4.6	2.9 5.8	2.9 5.8	-	-	-
Intersection Connector for UA 50x40	pcs	-	-	-	-	2.3	2.3	2.3
mineral wool (consider fire protection specs, see pages 6 to 10)	m²	as req.	as req.	as req.	1.2	as req.	as req.	1.2
Knauf Boards (see below)	m²	1	2	2	2	1	2	2
Screw attachment (fastening of Knauf Boards) Knauf Drywall Screws TN 3.5 x 25 mm TN 3.5 x 35 mm TN 3.5 x 55 mm	pcs	17 - -	9 17 -	- 13 21	- 13 17	17 - -	9 17 -	- 13 21
Jointing Trenn-Fix 65	m	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Knauf Uniflott for hand filling; 25 kg bag resp. 5 kg bag	kg	0.3	0.5	0.8	1	0.3	0.5	0.8
Knauf Jointfiller Super for machine filling; 20 kg bag	kg	0.4	0.6	-	-	0.4	0.6	-
Joint Tape (for cut edges)	m	0.45	0.45	0.45	0.45	0.45	0.45	0.45

D112

1	• **Standard** • **F30 below basic ceiling type II to III** Knauf Boards GKB / GKBI resp. GKF / GKFI	12.5 mm
≤ 0.15 *)	hanger: 950 mm; carr. chan.: 1000 mm; furr. chan.: 500 mm	
2	• **Standard** Knauf Boards GKB / GKBI	2x 12.5 mm
	• **F30 solely from below / F60 below basic ceiling I to III** Knauf Boards GKF / GKFI	2x 12.5 mm
≤ 0.30 *)	hanger: 750 mm; carr. chan.: 1000 mm; furr. chan.: 500 mm	
3	• **F90 solely from below** Knauf Boards GKF / GKFI (Solid Boards)	2x 20 mm
≤ 0.50 *)	hanger: 700 mm; carr. chan.: 800 mm; furr. chan.: 500 mm	
4	• **F90 solely from below and from above** Knauf Boards GKF / GKFI (Solid Boards)	25 + 18 mm
≤ 0.50 *)	hanger: 600 mm; carr. chan.: 750 mm; furr. chan.: 500 mm	

D116

1	• **Standard** Knauf Boards GKB / GKBI	12.5 mm
	• **F30 below basic ceiling type II to III** Knauf Boards GKF / GKFI	12.5 mm
≤ 0.15 *)	hanger: 2050 mm; carr. chan.: 1000 mm; furr. chan.: 500 mm	
2	• **Standard** Knauf Boards GKB / GKBI	2x 12.5 mm
	• **F30 solely from below / F60 below basic ceiling I to III** Knauf Boards GKF / GKFI	2x 12.5 mm
≤ 0.30 *)	hanger: 1300 mm; carr. chan.: 1000 mm; furr. chan.: 500 mm	
3	• **F90 solely from below and from above** Knauf Boards GKF / GKFI (Solid Boards)	2x 20 mm
≤ 0.50 *)	hanger: 800 mm; carr. chan.: 1000 mm; furr. chan.: 500 mm	

*) load class kN/m² as req. = as required

Item	Description	No. of units		Unit price	Total price
.....	Ceiling lining/ suspended ceiling * DIN 18168-1, installation height in m ....., suspension height in cm .....,* fire resistance class according to DIN 4102-2 F30/ F60/ F90/ F120 *,* in connection with basic ceiling type I/ II/ III * DIN 4102-4, */ for ceiling lining solely resistant to fire from below for protecting the basic ceiling, */ for suspended ceiling solely resistant to fire from below for protecting the basic ceiling and the plenum, */ for suspended ceiling solely resistant to fire from the plenum for protecting the room lying below, */ for suspended ceiling solely resistant to fire from the plenum and from below for protecting the room lying below, the basic ceiling and the plenum *,* anchored on reinforced concrete/ wooden beams, spacing in cm ...../ steel girder, type ....., spacing in cm ....., * single/ double * layer cladding made of Knauf Boards GKB/ GKBI/ GKF/ GKFI * 12.5/ 15/ 18/ 20/ 25 * mm / LaVita Shielding Boards GKF 12.5 mm *, jointing in accordance with Code of Practice no. 2 (IGG, April 2003) quality standard Q1 basic filling to be coated with plaster/ ..... */ quality standard Q2 standard jointing *. Product/ System: **Knauf Board Ceiling D111/ D112/ D113/ D116 ***	.....	m²	..... €	..... €
.....	Ceiling lining/ suspended ceiling * DIN 18168-1, installation height in m ....., suspension height in cm .....,* fire resistance class according to DIN 4102-2 F30/ F60/ F90 *,* for ceiling lining solely resistant to fire from below for protecting the basic ceiling, */ for suspended ceiling solely resistant to fire from below for protecting the basic ceiling and the plenum *,* anchored on reinforced concrete/ wooden beams, spacing in cm ...../ steel girder, type ....., spacing in cm ....., * installation of fire protection ceiling with carrying channels and furring channels, suspended with Universal Bracket/ Nonius Suspension *, single/ double * layer cladding, made of Knauf Fire-Resistant Boards GKF, thickness 20/ 2x12.5/ 18+15/ 20+20/ 25+18 * mm installation of exposed ceiling with furring channels / carrying channels and furring channels *, suspended with Direct Brackets/ Universal Brackets * on furring channels of fire protection ceiling, cladding made of Knauf Boards GKB 12.5 mm, jointing in accordance with Code of Practice no. 2 (IGG, April 2003) quality standard Q1 basic filling to be coated with plaster/ ..... */ quality standard Q2 standard jointing *. Product/ System: **Knauf Ceiling D112 below fire protection ceiling D112/ D116 ***	.....	m²	..... €	..... €
.....	Jointing as upgrade for gypsum board ceiling, for higher surface requirements, quality standard Q3 according to Code of Practice no. 2 (IGG, April 2003), tolerance flatness with higher requirements according to DIN 18202, table 3, line 7,* on ceiling, application height in m ....., substrate gypsum boards, application of filling compound on the entire surface, scratched. Product: **Knauf Readygips**	.....	m²	..... €	..... €
.....	Jointing as upgrade for gypsum board ceiling, for highest surface requirements, quality standard Q4 according to Code of Practice no. 2 (IGG, April 2003), tolerance flatness with higher requirements according to DIN 18202, table 3, line 7, on ceiling, application height in m ....., substrate gypsum boards, to be coated with: smooth/ textured * ceiling linings with shine/ glaze/ paint coats/ coats with medium shine/ Stuccolustro/ other sophisticated smoothing technique *, application of special primer , pigmented white, organic based, Product: **Knauf Putzgrund** plaster primer and finishing plaster (skim coat) on the entire surface, thickness of coat: 2 mm, smooth surface. Product: **Knauf Multi-Finish**	.....	m²	..... €	..... €

** Cancel not applicable items*

Sub-total ..... €

Item	Description	No. of units		Unit price	Total price
.....	Ceiling lining/ suspended ceiling * DIN 18168-1, installation height in m ....., suspension height in cm .....,* fire resistance class according to DIN 4102-2 F30,* for ceiling lining solely resistant to fire from below for protecting the basic ceiling, */ for suspended ceiling solely resistant to fire from below for protecting the basic ceiling and the plenum, * anchored on reinforced concrete/ wooden beams, spacing in cm ...../ steel girder, type ....., spacing in cm ....., * cladding: single layer made of Knauf Boards GKF (4AK) 12.5 mm/ double layer made of one layer Knauf GKF 12.5 mm and one layer Knauf Boards GKF (4AK) 12.5 mm *, Jointing for higher surface requirements, quality standard Q3 according to Code of Practice no. 2 (IGG, April 2003), tolerance flatness with higher requirements according to DIN 18202, table 3, line 7, application with Knauf Readygips/ TRIAS/ Jointfiller Super/ Fugenfüller Leicht * and Joint Tape. Product/ System: **Knauf Plattendecke D111/ D112/ D113/ D116 * 4AK**	.....	m²	..... €	..... €
.....	**Connection** as angle profile/ joint/ UD Runner *, sliding/ fastened/ fire resistance .....*, for ceiling lining/ suspended ceiling *, at entire perimeter, installation according to drawing no.	.....	m	..... €	..... €

** Cancel not applicable items* Sub-total ..... €

Construction

Knauf Board Ceilings are anchored directly to the basic ceiling as a ceiling lining, or with a suspension as suspended ceiling.
Knauf Boards are screwed on a wood frame made of carrying battens and furring battens (D111), on a metal grid made of carrying channels and furring channels (D112/ D116) or on a flush metal grid made of long and cross channels (D113.
Select board type considering technical and building physical requirements.

Settlement joints have to be taken over into the construction of the ceiling system.
Use control joints in the case of ceiling areas over approx. 15 m length, or for narrow ceiling spaces caused by a break of a wall.
Separate gypsum boards from building elements made with materials other than gypsum, especially columns, by creating control joints that allow for movement, e.g. shadow gap.

By applying Knauf LaVita Shielding Boards a strong shielding of high frequency electromagnetic waves and of electrical alternating fields of low frequency can be achieved.
Knauf profiles are delivered galvanized. This corrosion protective coating is sufficient for indoor rooms, including bathrooms and kitchens in private housing. For other areas, e.g. exposed to outdoor air, additional corrosion protection is necessary (see DIN 18168-1 table 2).

Application

Substructure

Anchoring to basic ceilings made of

- wood: Drywall Screws (used in accordance with Construction Supervisory Permit no. Nr. Z- 9.1-251),
- reinforced concrete: Knauf Ceiling Steel Dowel (used in accordance with Construction Supervisory Permit no. Z-21.1-1519),
- other building materials: anchors have to be permitted and standardized for the building material being used.

Fire protection from above: Use anchor that is approved for fire protection purposes (Knauf Ceiling Steel Dowel). Suspension of channels only with suspenders according to page 10 (consider additional measures).

Suspend with Hanging Wire and Ankerfix Rapid Hanger (lock lever), Universal Connector, Combo Hanger or Rapid Wood Hanger, Universal Bracket, Nonius Hanger (screw with channel in case of fire protection from above or total ceiling weight of ≥ 0.4 kN/m²) or Nonius Stirrup. Secure Nonius Pin against sliding out.
For spacings of anchors and channels or battens see tabels of systems. Connect carrying battens / channels with suspenders and align planely in required height.

Connections of channels / battens

- D111: carrying battens to furring battens 50/30 with Knauf Drywall Screw TN 4.3 x 55 mm
- D112: carrying CD channel to furring CD Channel with CD Intersection Connector or Clips for CD 60x27
- D113: long CD channel to cross CD Channel with Flush Connector or Universal Connectors
- D116: carrying UA Profiles to furring CD Channels with UA Intersection Connector

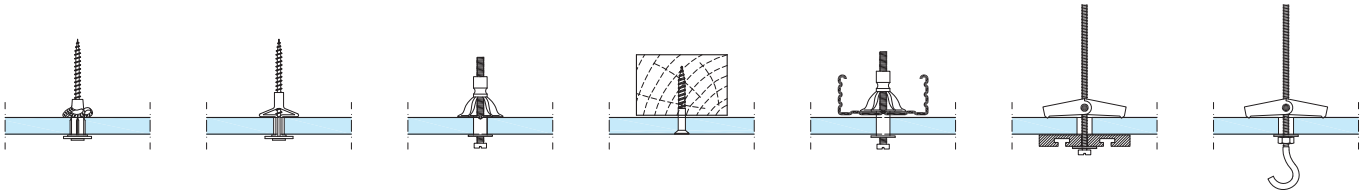
Connection to wall with UD Runner 28/27 as load-bearing connection, installation aid or in case of fire protection; fastening with anchor that is suitable for the respective building material, spacing of fasteners 1 m max. (non load-bearing) resp. 625 mm max. (load-bearing). For sound protection requirements seal up carefully with acoustical sealant according to DIN 4109, supplement 1, chapter 5.2; porous sealant strips like Sealing Tape are usually not suitable in this case.

Cladding

- Apply boards laterally to furring battens (D111)/ furring channels (D112/ D113/ D116).
- Apply cut edge joints on battens / channel and stagger them for at least 400 mm. If using 4AK Boards (4-side tapered egdes) cross joints are allowed in connection with filling with Joint Tape.
- Start fastening of Knauf boards either in the middle or at a corner in order to prevent upsetting deformation. Press boards firmly on to the grid and screw with Drywall Screws TN according to page 3.
- Carry out connections to other constructional components with Knauf Trenn-Fix 65 and filler, cover connection with runner/ board strips in case of fire protection.

Fastening of loads to Knauf Board Ceilings

- Ceiling lights, curtain rods etc. can be fastened to board ceilings using universal dowels, cavity dowels or toggles.
- Single loads fastened directly to the cladding should not exceed 0.06 kN per span width of board.
- Additional loads (extra loads like ceiling lights, curtain rods etc.) have to be considered for the calculation of the total ceiling load according to diagram on page 2 or should be fastened directly to the basic ceiling.
- In case of fire protection the fastening of loads to cladding or channels is not permissible, fastening of loads only to basic ceiling. „Ceiling below Ceiling“ allows the installation of exposed ceilings ≤ 0.15 kN/m² in case of fire protection.



Jointing

For higher optical quality requirements like occuring streak of light, Knauf boards with 4AK edges are the ideal basis for perfect jointing with Joint Tape, Knauf Fugenfüller Leicht or Readygips.
With 4AK Boards the usual displacement of cut edges of at least 400 mm can be replaced by the much more effective cross joint application and jointing.

Filling compounds

- without Joint Tape: hand filling with Knauf Uniflott/ Uniflott impregnated/ TRIAS
- with Joint Tape: hand filling with Knauf Fugenfüller Leicht or machine filling with Ames machine and Knauf Jointfiller Super
- Knauf TRIAS matches the color of the paper of gypsum boards and has reduced suction properties after hardening
- surfaces filled with Knauf TRIAS are of low contrast and particular advantageous for paint coats and fleece wallpapers
- Knauf Uniflott impregnated is the system filling compound for impregnated Knauf Boards. It is water-repellent and matches the color of impregnated Knauf Boards
- use Knauf Finish-Pastös for the final filling coat as fine skimming before sanding the joints

Application

- for multi layer cladding, fill in joints of first layers, smooth joints of top layer
- fill all visible screw heads as well
- Recommendation: Fill cut edge joints of visible layers using tape no matter which filling material is used
- use Knauf Spezialgrund to prime the entire surface of filled Knauf Boards to control suction and for optical harmonization of the surface. Knauf Spezialgrund is a system component for the creation of surfaces with higher quality requirements
- quality standards Q1 to Q4 according to Code of Practice no. 2 „Verspachtelung von Gipsplatten - Oberflächengüten“ of the IGG

Application time / climate

- Filling of joints should only take place after the boards have been allowed to rest in the given humidity and temperature zones, and no more longitudinal changes can be expected, i.e. expansion or contraction.
- Joints should be filled at a minimum temperature of +10°C (50°F).
- in case of mastic asphalt screed, fill in joints after screed has been applied

Surface treatment

Before applying paints or coats the filled surface should be dust-free. Use a primer on Knauf Boards before coating or painting them. Ensure that the primer and the coat or paint are compatible.
To settle the different suction properties of the filled areas and the paper surface, primers like e.g. Knauf Tiefengrund/ Spezialgrund/ Putzgrund are suitable.
In case of wallpaper lining a primer that allows an easier removal of wallpaper for redecoration is recommended.
After wallpapering or plastering ensure adequate ventilation for fast drying.

The following coats can be used on Knauf Boards:

- wallpapers: paper-, textile and synthetic wallpapers. Use only adhesives made of cellulose according to „Code of Practice no. 16 “Technische Richtlinien für Tapezier- und Klebearbeiten“, Frankfurt/Main 2002, released by Bundesausschuss Farbe und Sachwertschutz.
- Plasters: Knauf structured plasters, Knauf indoor plasters, Knauf Acoustic Plaster, entire surface smoothing like e.g. Knauf Readygips or Knauf Multi-Finish, mineral plasters in connection with paper taped jointing.
- Coats: Resin dispersion paints, multicolored (rainbow) emulsion, oil paint, matte-finish lacquer, alkyd resin paint, polymer resin paint, PUR lacquer, or epoxybased lacquer, according to intended use or as required.
- Alkaline coats such as lime, water glass paints and silicate-based paints are unsuitable for gypsum board surfaces.
- Silicate-based emulsion paints may be used after referring to the manufacturer’s recommendations and following the stipulated guidelines closely.

Gypsum plasterboard surfaces that have constantly been exposed to light without any protection can cause yellowing after coating. Therefore a trial coat is recommended that will extend across several boards including all joints. Yellowing can, however, be successfully avoided only by using a special primer.

D11 Knauf Board Ceilings

Declarations of Compliance

Declaration of compliance by the installer of the building component

Installer:
(name, address)

.....

.....

Site / building: .....

Date of installation: .....

Building Component / requirements: .....

.....

.....

It is certified herewith that the Knauf ceiling system as stated above has been built and installed in accordance with

Knauf Technical Data Sheet D11 Knauf Board Ceilings, edition 2006-03

with the system components specified there, and has therefore been built
regarding the declaration of compliance by the system manufacturer below
in accordance with the valid building supervisory proofs concerning statics, sound insulation and fire protection.

.....
Place, date

.....
Stamp and signature

Declaration of compliance by the system manufacturer

Knauf Gips KG
Am Bahnhof 7
97346 Iphofen, Germany

It is certified herewith that the construction variants, application details and specified products included in **Knauf Technical Data Sheet D11 Knauf Board Ceilings, edition 2006-03** are fully in accordance with the specified valid building supervisory proofs respectively.

As far as specified for the respective system / detail, this applies particularly to

- the calculation of statics according to DIN 18168 and / or DIN EN 13964
- the fire protection according to ABP P-3400/4965-MPA BS and ABP P-3155/3992-MPA BS

To fullfill the building supervisory requirements specified above in the installation of Knauf ceiling systems, building and application have to be done according to the valid edition of Knauf Technical Data Sheet D11 with system components specified there. This has to be certified by the installer of the component with the declaration of compliance (see above) towards the contractor.

Iphofen, March 2006

Prof. Dr. Hummel

Dr. Ruf

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The structural, statical properties, and characteristic building physics of Knauf systems can solely be ensured with the exclusive use of Knauf system components, or other products expressly recommended by Knauf.

* A rate of 0.39 € per minute will be charged if calling from the German landline network. Callers whose phone numbers are not registered within the address database of Knauf Gips KG (e.g. private builders or non-customers) will be charged a rate of 1.69 € per minute. Calls from mobiles will be charged 1.48 € per minute.
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