Hoesch Roof System 2000

A company
of ThyssenKrupp
Steel

ThyssenKrupp Hoesch Bausysteme

ThyssenKrupp

Efficient building means applying rational building techniques with appropriate materials. In order to carry out building tasks systematically with as little effort, time and expense as possible, functional building parts with a high degree of industrial prefabrication are required.
Hoesch Roof System 2000 uses a trapezoidal profile of the "3rd generation", designed to cope with extreme requirements in terms of load-bearing capacity and rigidity and to enable spans of up to 10 m. Hoesch Roof System 2000 offers distinct benefits compared with trapezoidal profiles with conventional spans, i.e.

- **obviating the requirement for secondary steelwork (purlins)**
- **high load-bearing capacity**
- **high rigidity**
- **low dead weight**
- **functional shape**
  with
- **high degree of industrial prefabrication**
- **technically proven system and**
- **an appealing visual appearance (underside)**

Requests by many planners, architects and building owners for more flexibility in the utilization of space led to the development of this new type of trapezoidal steel profile. Larger spans result in larger building grids. As a consequence, the number of roof girders can be significantly reduced.
This has a positive effect especially in the construction of multiple-bay halls. Less roof girders, supports and foundations give rise to considerable cost savings in construction and at the same time enhance rental income by gaining additional floor space.

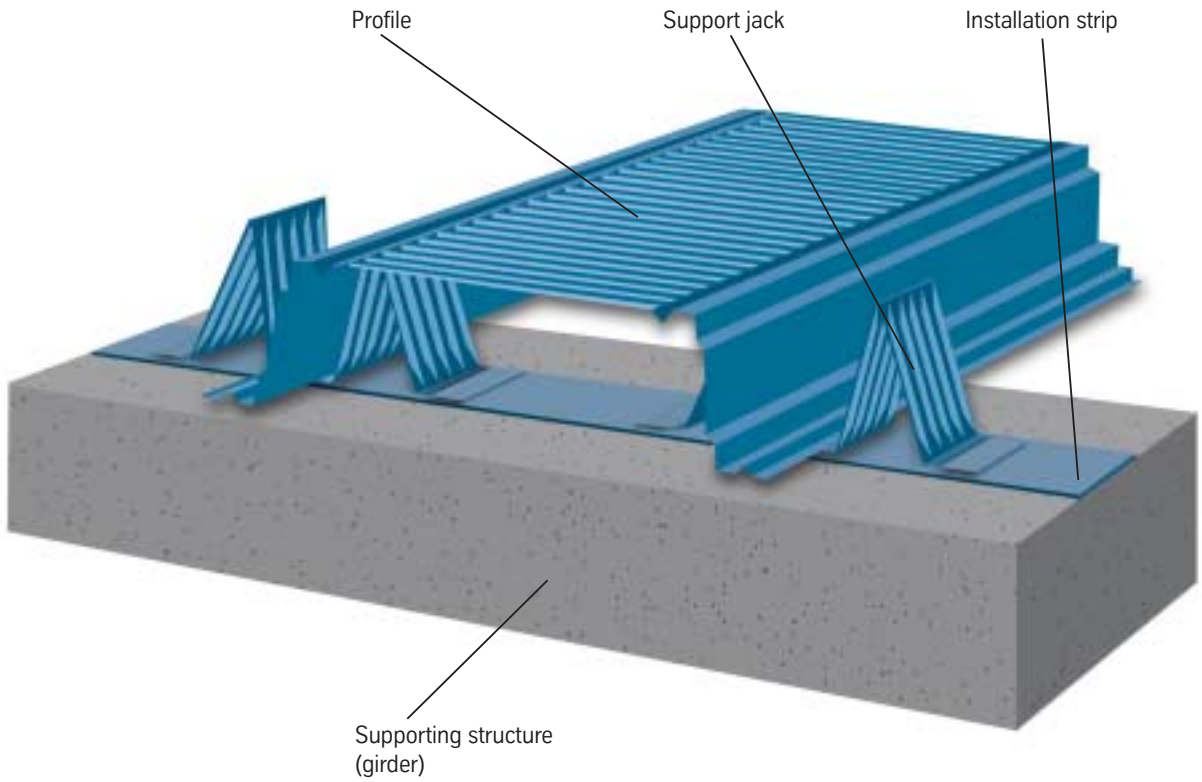
Hoesch Roof System 2000 is used as a plain-load-bearing roof element for both conventional single-sheet non-insulated roofs and double-skin roof structures.
Furthermore, the roof element can be designed as a shear field, subject to the engineer`s approval. It may be laid on a steel, concrete or wooden supporting structure. The load is transmitted to the supporting structure through a support jack, thereby creating the high load-bearing capacity of Hoesch Roof System 2000. Precise installation of the support cleats is ensured by the use of special installation strips which allow the trapezoidal profiles to be placed in position easily yet accurately without the need for laborious checks. Thanks to their low dead weight, the profiles can be installed swiftly and efficiently, even in unfavourable climatic conditions and regardless of the building height.

Approval / Quality assurance

Hoesch Roof System 2000 has been approved by the building inspectorate under approval no. Z-14.1-137. Internal production checks and external supervision by an independent testing institute, stipulated in the approval, ensure a constantly high product quality. The quality mark (U-mark) demonstrates compliance with the conditions laid down in the general approval.
Copies of this approval can be obtained on request or can be downloaded from the Internet (www.tks-bau.com).

Hoesch
Siegerlandwerke GmbH
Dachsystem 2000
Z-14.1-137
MPA NRW

Principle



Material:

Hot-dip galvanized steel, grade S350 GD + Z, ZA in accordance with DIN EN 10326
Zinc layer (275 g/m²) on both sides, or
GALFAN® layer (255 g/m²) on both sides,
layer thickness approx. 20 µm per side,
corrosion protection class I to DIN 55928-8

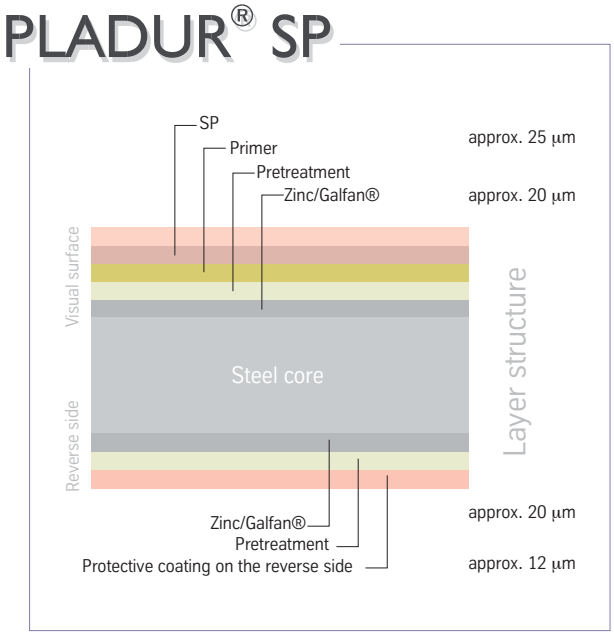
Corrosion protection:

Coil-coating using the following

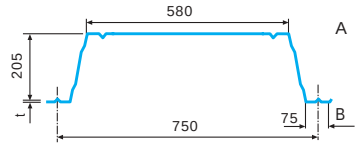
•PLADUR® SP
Corrosion protection class III to DIN 55928 – 8

•PLADUR® DU
Corrosion protection class II to DIN 55928 – 8

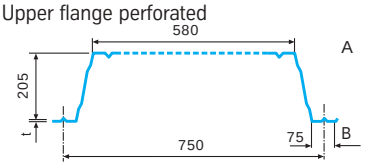
Other coatings available on request



Technical data

Hoesch Roof System 2000 (officially approved, approval no. Z-14.1-137)			
Profile Please note the A and B sides	Material thickness t	Profile weight	Max. length supplied
	mm	kg/m²	m
	0,75 0,88 1,00 1,25 1,50	9,60 11,30 12,80 16,00 19,20	24
Laying only using support jacks (part no. K32-011/-013/-014/-016) and installation strip (part no. K32-021, K32-023)			

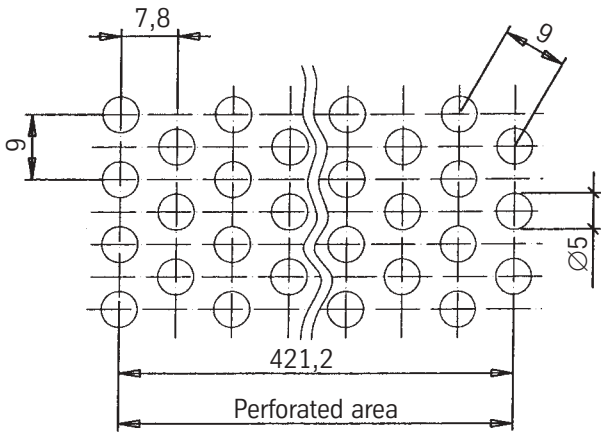
When sound absorption is required

Hoesch Roof System 2000 A (officially approved, approval no. Z-14.1-137)			
Profile Please note the A and B sides	Material thickness t	Profile weight	Max. length supplied
	mm	kg/m²	m
Upper flange perforated  Perforated portion 16%	0,75 0,88 1,00 1,25 1,50	8,36 9,84 11,20 14,00 16,00	24
Laying only using support jacks (part no. K32-011/-013/-014/-016) and installation strip (part no. K32-021, K32-023)			

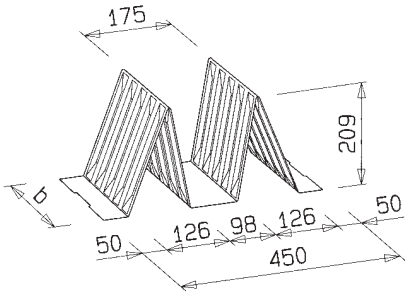
If different coatings are required on the A and B sides (upper and lower sides), please specify.

For sound absorbing roof structures, the profiles can be perforated in the area of the upper flanges according to a defined pattern. The perforation is 16 % of the total surface and does not affect the load-bearing capacity of the profiles. Perforated profiles are only available from coil-coated material.

Hole pattern 1:1



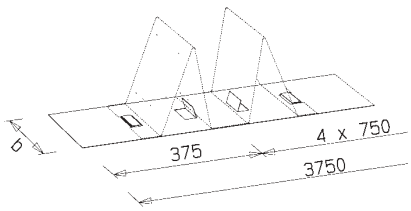
Accessories



Support jack

For transmitting load onto the supporting structure
Installation together with mounting strip K32 – 021 or K32 – 023
Surface: DU light on both sides
Other colours on request (subject to order volume)

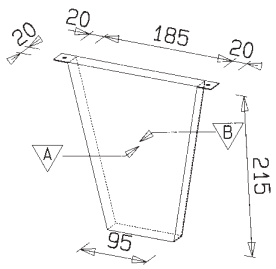
Part no.	Material thickness mm	Width b mm	Weight kg/piece	Availability
K32 – 011	1.00	150	1.3	Standard
K32 – 013	1.00	250	2.1	on request
K32 – 014	1.50	150	1.9	Standard
K32 – 016	1.50	250	3.2	on request



Installation strip

Material thickness: 1.00 mm
Effective length: approx. 3750 mm
Surface: both sides coil-coated (light)

Part no.	Width b mm	Weight kg/piece	
K32 – 021	150	4.5	5 support cleats for load transmission
K32 – 023	250	7.5	Support cleat



End cap

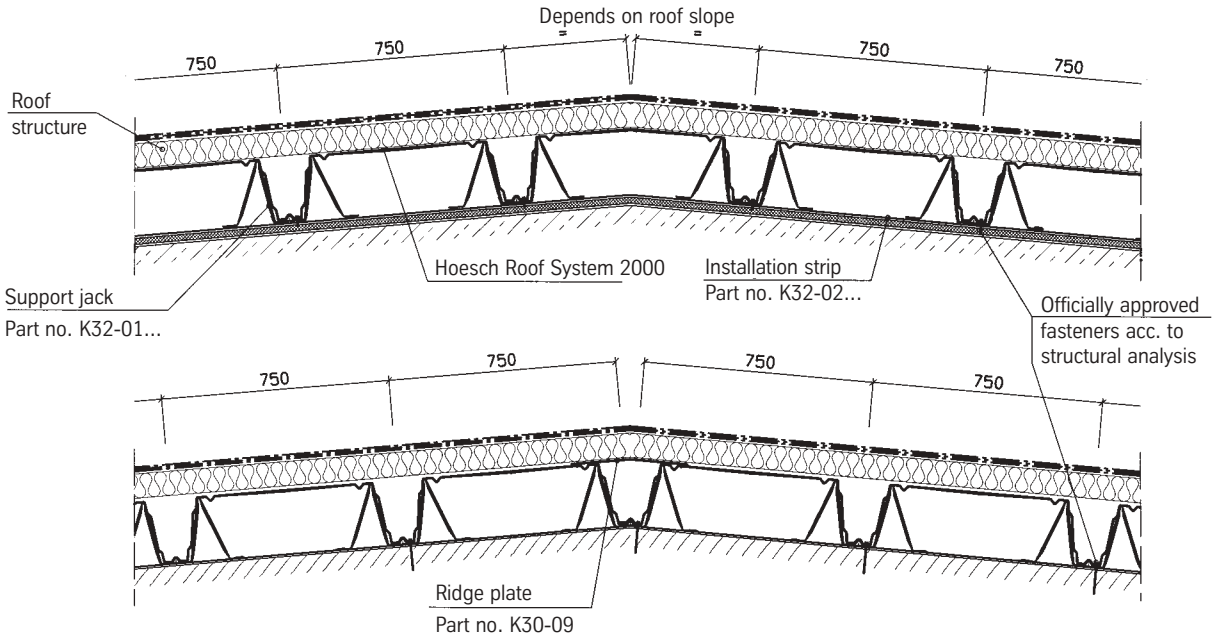
Material thickness: 0.75 mm
Surface: coil-coated or A side: DU light

Part no.	Weight kg/piece	
K32 - 031	0.2	For closing the ribs in roof apertures

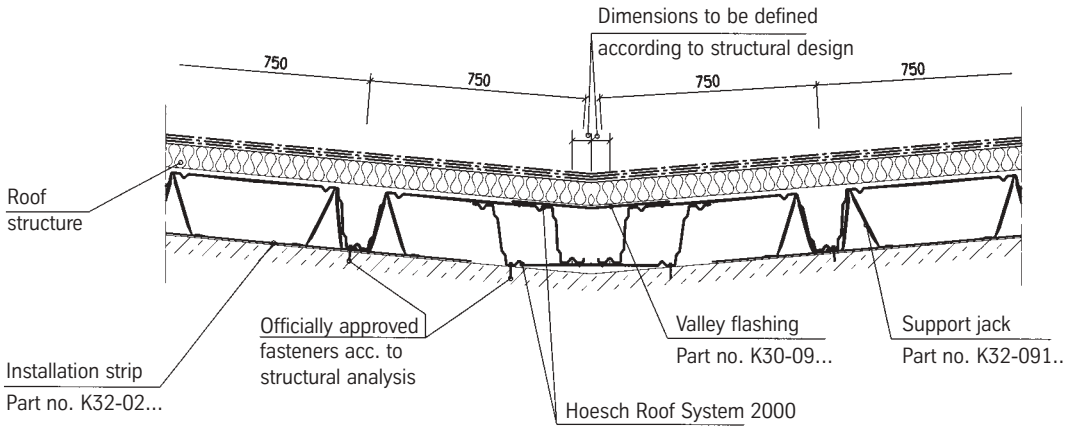
Design details (examples)

The following details are design proposals and are subject to modification.
Attention: Please note also the information on page 10.

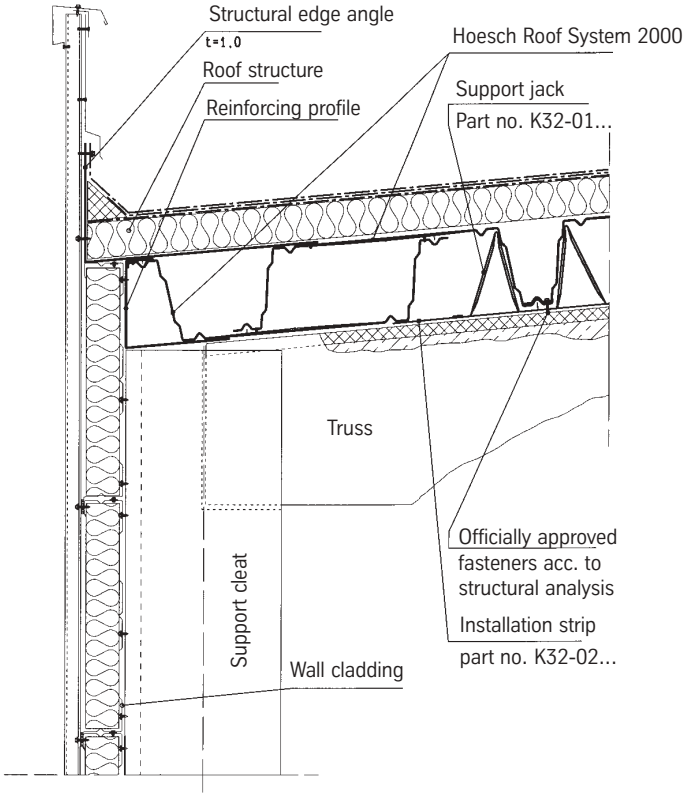
Ridge design



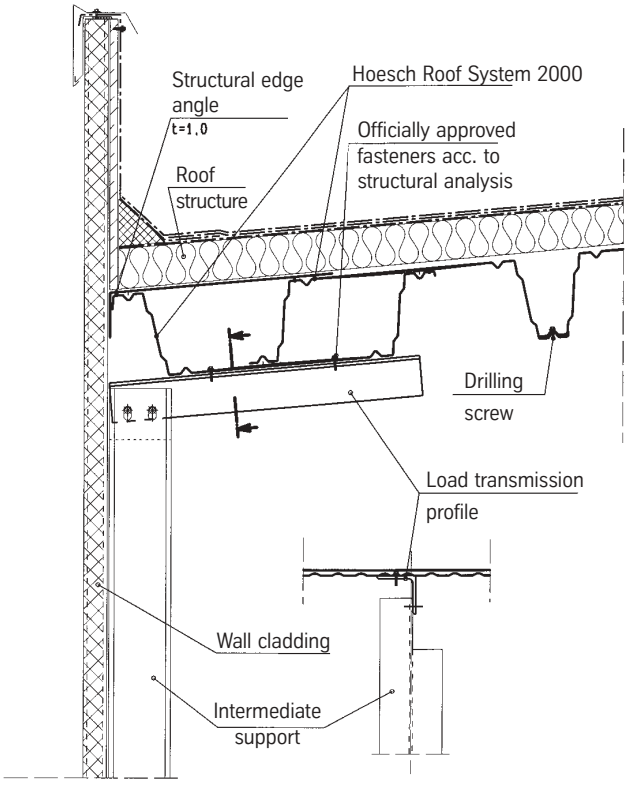
Valley design



Parapet design

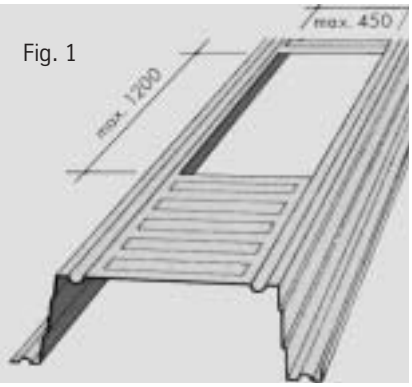


Connection of vertical wall member



Roof apertures (examples)

Fig. 1



Roof apertures with a max. width of 450 mm and a max. length of 1200 mm (fig. 1)

Apertures with these dimensions need no reinforcement to the broad upper flange. Thus, there is no need for stiffening apertures for roof gullies.

Fig. 2

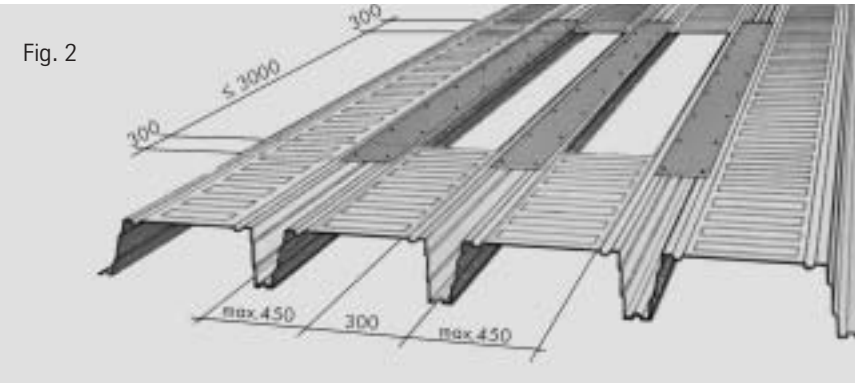


Fig. 3

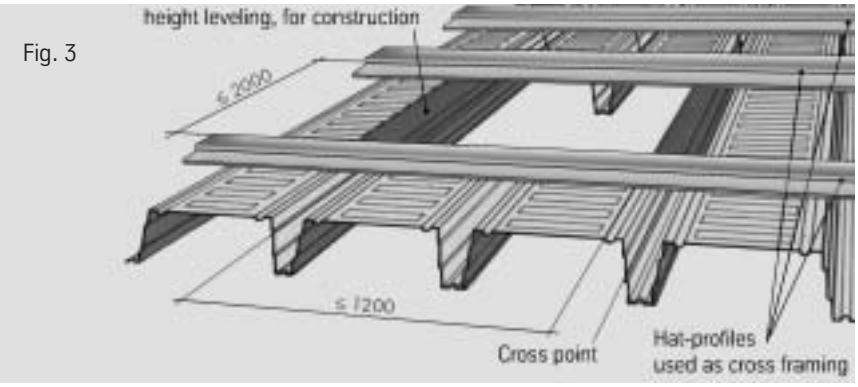
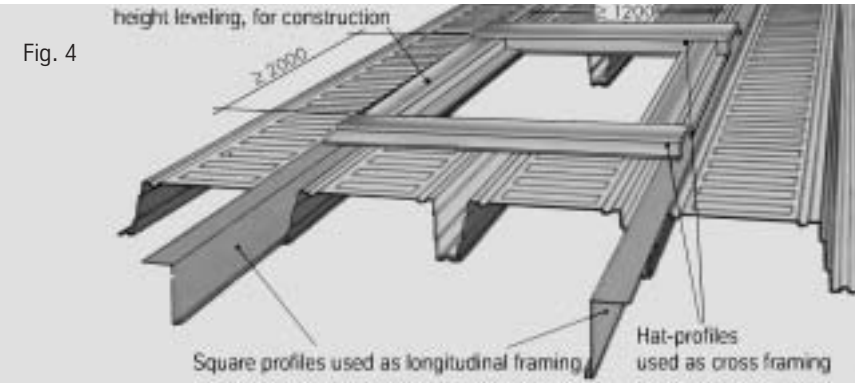


Fig. 4



Roof apertures with a max. width of 450 mm and a max. length of 3000 mm (fig. 2)

Apertures with these dimensions need no reinforcement once the webs have been stabilized using flat sheets fastened by means of rivets or screws.
Two or more apertures of this kind arranged side by side are the most economic design to place domelights or smoke exhaust systems. The web running through the centre of the domelight aperture gives a special architectural emphasis.

Roof apertures with a max. width of 1200 mm and a max. length of 2000 mm (fig. 3)

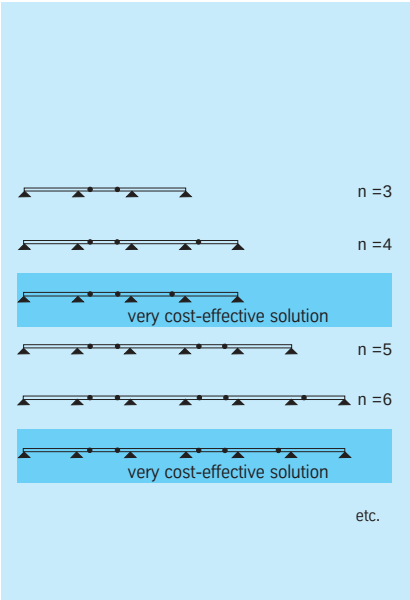
Apertures with these dimensions may be framed on the adjacent continuous trapezoidal profiles. The material thickness of these profiles may have to be increased for structural reasons. The cross framing is constructed in the usual way using top hat-profiles. In the case of a Gerber system, the cross joint adjacent to the roof aperture must be framed as well.

Roof apertures with a width of more than 1200 mm and any length (fig. 4)

These apertures may basically be framed in the usual way using longitudinal and cross profiles. Cross framing is preferably carried out using top hat-profiles on the longitudinal framing arranged from above, e.g. using additional trapezoidal profiles or square profiles.

Please note: In the case of cantilever girders with apertures, the adjacent spans must also be checked!

Structural systems



Systems with continuous cantilever girders

According to the official general approval, the use of a Gerber system is explicitly permissible for roofs.

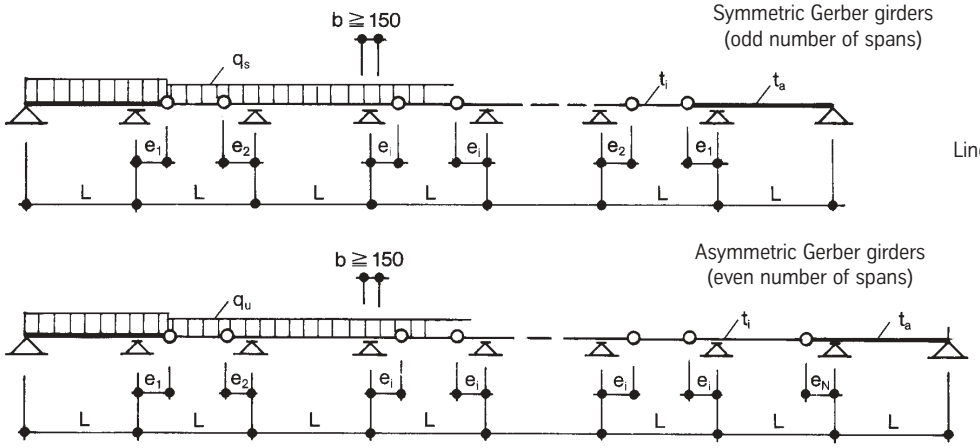
Hinged girder systems like Gerber girders are achieved by providing articulated cross joints in the spans. This permits precise adaptation of sheet thicknesses to suit the requirements in terms of load and rigidity. By suitable arrangement of the articulated joints and by optimizing their position, sheet thicknesses can be generally reduced as compared with conventional continuous systems.

Also, shorter profiled sheets may be installed without the need to use expensive bend resistant joints. Trapezoidal profiles are conveniently transported and installed in continuous Gerber girder systems. The maximum length available is hardly ever used.

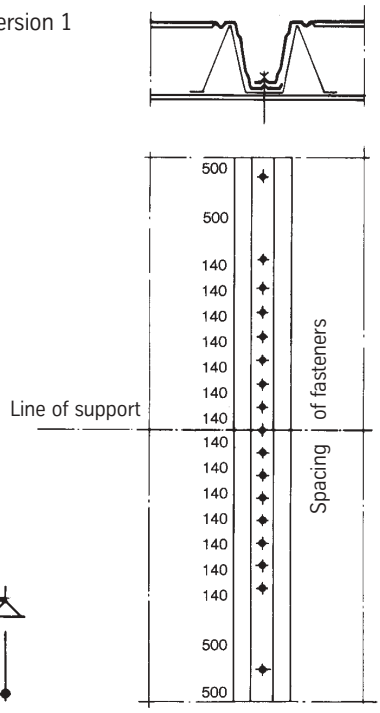
For achieving cost effective solutions, it should be noted that the first internal supports can accommodate a load which is approx. 20% higher than is the case when arranging the articulated joints above the support. By moving the hinge points, the additional loads on the supporting structure may be reduced to those usual for continuous girders or even less; however these additional loads must be considered when designing the supporting structure.

Important

- We advise that a Gerber girder system should not be used in conjunction with syphonic drainage
- The design must be such to prevent the formation of water ponding
- Sufficient emergency overflows must be provided for



Version 1



Hoesch Roof System 2000 — Gerber girders

Design tables for trapezoidal profiles in positive position
Permissible loads (perm. q)

Gerber girders with more than 5 spans Longitudinal joint version 1* t_i = 0,75 mm

Effective span L [m]		6,00	6,25	6,50	6,75	7,00	7,25	7,50	7,75	8,00	8,25	8,50	8,75	9,00	9,25	9,50	9,75	10,0
t_i / t_a		perm. q = evenly distributed load including profile dead load in kN / m²																
0,75 / 0,75	q_S	2,22	2,01	1,83	1,67	1,53	1,41	1,30	1,20	1,11	1,04	0,96	0,90	0,84	0,79	0,74	0,70	0,65
	e_1	1,48	1,58	1,69	1,79	1,90	2,00	2,11	2,22	2,32	2,44	2,55	2,66	2,77	2,89	2,99	3,11	3,21
	e_2	1,27	1,32	1,37	1,43	1,48	1,53	1,58	1,64	1,69	1,74	1,80	1,85	1,90	1,95	2,01	2,06	2,11
	e_I	1,27	1,32	1,37	1,43	1,48	1,53	1,58	1,64	1,69	1,74	1,80	1,85	1,90	1,95	2,01	2,06	2,11
	e_N	1,49	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,41	2,52	2,65	2,77	2,90	3,02	3,14	3,26	3,39
	q_U	2,22	2,01	1,83	1,67	1,53	1,40	1,29	1,20	1,11	1,03	0,96	0,90	0,84	0,79	0,74	0,69	0,65
	k_B	1,11	1,12	1,13	1,13	1,14	1,14	1,15	1,15	1,15	1,16	1,16	1,17	1,17	1,17	1,18	1,18	1,18
0,75 / 0,88	q_S	2,74	2,49	2,27	2,07	1,90	1,74	1,61	1,49	1,38	1,28	1,19	1,12	1,04	0,98	0,92	0,86	0,81
	e_1	1,54	1,65	1,75	1,86	1,97	2,08	2,19	2,30	2,41	2,52	,264	2,76	2,87	2,99	3,10	3,22	3,21
	e_2	1,20	1,24	1,29	1,34	1,39	1,44	1,49	1,54	1,59	1,64	1,69	1,74	1,79	1,84	1,89	1,94	1,69
	e_I	1,15	1,20	1,24	1,29	1,34	1,39	1,44	1,48	1,53	1,58	1,63	1,68	1,72	1,77	1,82	1,87	2,18
	e_N	1,54	1,66	1,77	1,89	2,01	2,12	2,24	2,37	2,49	2,61	2,74	2,86	2,99	3,11	3,24	3,33	3,52
	q_U	2,74	2,49	2,27	2,06	1,89	1,74	1,60	1,48	1,38	1,28	1,19	1,11	1,04	0,97	0,92	0,85	0,77
	k_B	1,13	1,14	1,14	1,16	1,16	1,17	1,17	1,18	1,18	1,19	1,19	1,20	1,20	1,21	1,21	1,22	1,23
0,75 / 1,00	q_S	3,10	2,87	2,65	2,44	2,24	2,06	1,90	1,76	1,63	1,51	1,41	1,32	1,23	1,15	1,06	0,98	0,90
	e_1	1,49	1,62	1,76	1,89	2,01	2,13	2,26	2,38	2,47	2,60	2,74	2,88	3,01	3,07	3,15	3,24	3,32
	e_2	1,07	1,13	1,21	1,29	1,37	1,45	1,52	1,60	1,58	1,67	1,77	1,87	1,95	1,87	1,92	1,97	2,02
	e_I	0,95	0,99	1,04	1,11	1,17	1,22	1,28	1,34	1,50	1,55	1,59	1,64	1,71	1,92	1,97	2,02	2,07
	e_N	1,49	1,62	1,76	1,89	2,01	2,13	2,26	2,38	2,48	2,67	2,74	2,93	3,07	3,23	3,32	3,41	3,50
	q_U	3,10	2,87	2,65	2,44	2,24	2,06	1,91	1,76	1,63	1,51	1,41	1,32	1,23	1,12	1,03	0,95	0,88
	k_B	1,14	1,15	1,15	1,16	1,16	1,18	1,18	1,19	1,18	1,20	1,18	1,21	1,21	1,22	1,22	1,23	1,23

Lines q_S and q_U: max. deflection L/300

Gerber girders with more than 5 spans Longitudinal joint version 1* t_i = 0,88 mm

Effective span L [m]		6,00	6,25	6,50	6,75	7,00	7,25	7,50	7,75	8,00	8,25	8,50	8,75	9,00	9,25	9,50	9,75	10,0
t_i / t_a		perm. q = evenly distributed load including profile dead load in kN / m²																
0,88 / 0,88	q_S	2,76	2,51	2,28	2,09	1,91	1,76	1,62	1,50	1,39	1,30	1,21	1,13	1,06	0,99	0,93	0,88	0,83
	e_1	1,56	1,66	1,77	1,88	1,99	2,10	2,21	2,32	2,43	2,54	2,66	2,77	2,89	3,00	3,11	3,22	3,20
	e_2	1,27	1,32	1,37	1,43	1,48	1,53	1,58	1,64	1,69	1,74	1,80	1,85	1,90	1,95	2,01	2,06	1,76
	e_I	1,27	1,32	1,37	1,43	1,48	1,53	1,58	1,64	1,69	1,74	1,80	1,85	1,90	1,95	2,01	2,06	2,11
	e_N	1,58	1,70	1,81	1,92	2,04	2,16	2,29	2,40	2,53	2,66	2,78	2,91	3,04	3,17	3,29	3,37	3,46
	q_U	2,75	2,50	2,28	2,08	1,91	1,76	1,62	1,50	1,39	1,30	1,21	1,13	1,06	0,99	0,92	0,86	0,79
	k_B	1,13	1,13	1,14	1,14	1,15	1,15	1,16	1,16	1,17	1,17	1,17	1,18	1,18	1,18	1,19	1,19	1,20
0,88/ 1,00	q_S	3,26	2,96	2,69	2,46	2,26	2,08	1,92	1,77	1,65	1,53	1,43	1,34	1,25	1,17	1,10	1,03	0,96
	e_1	1,60	1,71	1,82	1,93	20,4	2,15	2,27	2,38	2,50	2,61	2,73	2,85	2,97	3,06	3,04	3,02	3,10
	e_2	1,27	1,32	1,37	1,43	1,48	1,53	1,58	1,64	1,69	1,74	1,80	1,85	1,90	1,90	1,61	1,31	1,34
	e_I	1,27	1,32	1,37	1,43	1,48	1,53	1,58	1,64	1,69	1,74	1,80	1,85	1,90	1,95	2,01	2,53	2,59
	e_N	1,63	1,75	1,87	1,99	2,11	2,23	2,36	2,49	2,62	2,74	2,88	3,01	3,13	3,22	3,31	3,57	3,66
	q_U	3,25	2,95	2,68	2,45	2,25	2,07	1,91	1,77	1,65	1,53	1,43	1,33	1,24	1,14	1,05	0,95	0,88
	k_B	1,14	1,14	1,15	1,16	1,16	1,17	1,17	1,18	1,18	1,19	1,19	1,20	1,20	1,21	1,22	1,24	1,24
0,88/ 1,25	q_S	3,97	3,63	3,34	3,08	2,84	2,64	2,42	2,25	2,13	2,00	1,88	1,76	1,61	1,48	1,37	1,26	1,17
	e_1	1,48	1,58	1,71	1,84	1,98	2,12	2,22	2,36	2,55	2,70	2,89	3,00	3,05	3,14	3,21	3,30	3,38
	e_2	1,08	1,15	1,23	1,32	1,40	1,49	1,54	1,62	1,77	1,86	1,99	2,05	2,01	2,07	2,09	2,13	2,14
	e_I	0,96	1,02	1,09	1,15	1,22	1,28	1,37	1,44	1,48	1,54	1,61	1,68	1,83	1,86	1,95	2,03	2,13
	e_N	1,48	1,58	1,71	1,84	1,98	2,12	2,26	2,36	2,55	2,70	2,89	3,00	3,12	3,21	3,32	3,42	3,53
	q_U	3,97	3,63	3,34	3,08	2,85	2,64	2,42	2,25	2,13	2,00	1,88	1,76	1,60	1,47	1,35	1,24	1,14
	k_B	1,14	1,14	1,14	1,15	1,17	1,17	1,18	1,17	1,17	1,20	1,18	1,21	1,22	1,22	1,22	1,23	1,23

Gerber girders with more than 5 spans Longitudinal joint version 1* t_i = 1,00 mm

Effective span L [m]		6,00	6,25	6,50	6,75	7,00	7,25	7,50	7,75	8,00	8,25	8,50	8,75	9,00	9,25	9,50	9,75	10,0
t_i / t_a		perm. q = evenly distributed load including profile dead load in kN / m²																
1,00 / 1,00	q_S	3,28	2,97	2,71	2,48	2,27	2,09	1,93	1,79	1,66	1,55	1,44	1,35	1,27	1,19	1,11	1,05	0,98
	e_1	1,60	1,71	1,81	1,92	2,03	2,14	2,26	2,37	2,48	2,60	2,71	2,83	2,95	3,06	3,04	3,02	3,00
	e_2	1,27	1,32	1,37	1,43	1,48	1,53	1,58	1,64	1,69	1,74	1,80	1,85	1,90	1,95	1,68	1,36	1,06
	e_I	1,27	1,32	1,37	1,43	1,48	1,53	1,58	1,64	1,69	1,74	1,80	1,85	1,90	1,95	2,01	2,11	2,63
	e_N	1,63	1,74	1,86	1,98	2,10	2,22	2,35	2,47	2,60	2,73	2,86	2,98	3,11	3,20	3,29	3,39	3,65
	q_U	3,27	2,96	2,70	2,47	2,47	2,09	1,93	1,79	1,66	1,55	1,44	1,35	1,26	1,16	1,07	0,99	0,89
	k_B	1,13	1,14	1,14	1,15	1,15	1,16	1,16	1,17	1,17	1,18	1,18	1,18	1,19	1,19	1,20	1,22	1,23
1,00/ 1,25	q_S	4,35	3,96	3,60	3,29	3,02	2,78	2,57	2,38	2,21	2,05	1,92	1,79	1,67	1,54	1,42	1,31	1,21
	e_1	1,62	1,72	1,83	1,94	2,05	2,16	2,28	2,39	2,51	2,64	2,78	2,92	2,91	2,99	3,07	3,16	3,24
	e_2	1,18	1,23	1,28	1,33	1,38	1,42	1,47	1,52	1,58	1,67	1,78	1,88	1,59	1,64	1,68	1,72	1,76
	e_I	1,13	1,17	1,22	1,26	1,31	1,63	1,40	1,45	1,50	1,55	1,59	1,64	2,06	2,12	2,18	2,23	2,29
	e_N	1,62	1,75	1,86	1,98	2,10	2,23	2,35	2,47	2,60	2,73	2,85	2,98	3,20	3,29	3,38	3,48	3,57
	q_U	4,35	3,95	3,59	3,28	3,02	2,78	2,57	2,38	2,20	2,05	1,91	1,78	1,59	1,47	1,35	1,24	1,15
	k_B	1,14	1,16	1,16	1,17	1,17	1,18	1,19	1,19	1,20	1,20	1,20	1,21	1,22	1,22	1,23	1,23	1,23
1,00/ 1,50	q_S	4,73	4,33	3,99	3,68	3,40	3,16	2,94	2,74	2,56	2,40	2,25	2,10	1,93	1,77	1,65	1,52	1,40
	e_1	1,49	1,57	1,70	1,84	1,98	2,12	2,33	2,42	2,56	2,71	2,87	3,01	3,10	3,19	3,19	3,27	3,36
	e_2	1,10	1,17	1,25	1,34	1,42	1,51	1,64	1,71	1,80	1,89	1,99	2,08	2,14	2,19	1,99	2,03	2,09
	e_I	0,98	1,04	1,11	1,17	1,24	1,31	1,37	1,44	1,50	1,57	1,64	1,71	1,76	1,81	2,13	2,19	2,25
	e_N	1,49	1,57	1,70	1,84	1,98	2,12	2,33	2,42	2,56	2,71	2,87	3,02	3,11	3,20	3,39	3,49	3,58
	q_U	4,43	4,33	3,99	3,68	3,41	3,16	2,94	2,74	2,56	2,40	2,25	2,10	1,92	1,76	1,60	1,47	1,36
	k_B	1,13	1,14	1,14	1,16	1,17	1,16	1,17	1,17	1,17	1,20	1,18	1,21	1,21	1,22	1,23	1,24	1,24

* Longitudinal joint version 1: see approval Z-14.1-137, appendix 4

t_i [mm]: Material thickness of inner spans

t_a [mm]: Material thickness of outer spans

L [mm]: Width of all spans

e_1,e_2, e_1,e_N [m] : Gerber lengths (see page 10)

k_B [–]: Factor for largest support reaction
max. B = k_B • perm. q • L

q_S[kN/ m²]: Permissible evenly distributed load for symmetrical Gerber girders (odd number of spans) including profile dead load

q_U[kN/ m²]: Permissible evenly distributed load for asymmetrical Gerber girders (even number of spans) including profile dead load

The increased profile dead loads for larger material thicknesses in outer spans have been accounted for in the structural analysis.

Hoesch Roof System 2000 Continuous girders

Design tables for trapezoidal profiles in positive position
Permissible loads (perm. q)

Single-span girders

Min. width of support b = 150 mm Longitudinal joint version 1*

Effective span L [m]			6,00	6,25	6,50	6,75	7,00	7,25	7,50	7,75	8,00	8,25	8,50	8,75	9,00	9,25	9,50	9,75	10,0
t_N	g	maxf	perm. q = evenly distributed load including profile dead load in kN / m²																
0,75	0,096	L/300	1,19	1,05	0,93	0,83	0,75	0,67	0,61	0,55	0,50	0,46	0,42	0,38	0,35	0,32	0,30	0,28	0,26
		L/500	0,71	0,63	0,56	0,50	0,45	040	0,36	0,33	0,30	0,27	0,25	0,23	0,21	0,19	0,18	0,17	0,15
0,88	0,113	L/300	1,41	1,24	1,11	0,99	0,89	0,80	0,72	0,65	0,59	0,54	0,49	0,45	0,42	0,38	0,35	0,33	0,30
		L/500	0,84	0,75	0,66	0,59	0,53	0,48	0,43	0,39	0,36	0,32	0,30	0,27	0,25	0,23	0,21	0,20	0,18
1,00	0,128	L/300	1,63	1,44	1,28	1,14	1,02	0,92	0,83	0,75	0,69	0,63	0,57	0,52	0,48	0,44	0,41	0,38	0,35
		L/500	0,98	0,86	0,77	0,68	0,61	0,55	0,50	0,45	0,41	0,38	0,34	0,31	0,29	0,27	0,25	0,23	0,21
1,25	0,160	L/300	2,13	1,88	1,67	1,49	1,34	1,21	1,09	0,99	0,90	0,82	0,75	0,69	0,63	0,58	0,54	0,50	0,46
		L/500	1,28	1,13	1,00	0,90	0,80	0,72	0,65	0,59	0,54	0,49	0,45	0,41	0,38	0,35	0,32	0,30	0,28
1,50	0,192	L/300	2,56	2,27	0,02	1,80	1,61	1,45	1,31	1,19	1,08	0,99	0,90	0,83	0,76	0,70	0,65	0,60	0,55
		L/500	1,54	1,36	1,21	1,08	0,97	0,87	0,79	0,71	0,65	0,59	0,54	0,50	0,46	0,42	0,39	0,36	0,33

Two-span girders

Min. width of support b = 150 mm Longitudinal joint version 1*

Effective span L [m]			6,00	6,25	6,50	6,75	7,00	7,25	7,50	7,75	8,00	8,25	8,50	8,75	9,00	9,25	9,50	9,75	10,0
t_N	g	maxf	perm. q = evenly distributed load including profile dead load in kN / m²																
0,75	0,096	L/300	1,75	1,63	1,51	1,41	1,31	1,23	1,15	1,08	1,02	0,96	0,91	0,86	0,82	0,77	0,72	0,67	0,62
		L/500	1,71	1,52	1,35	1,20	1,08	0,97	0,88	0,79	0,72	0,66	0,60	0,55	0,51	0,47	0,43	0,40	0,37
0,88	0,113	L/300	2,28	2,12	1,97	1,83	1,71	1,60	1,51	1,41	1,33	1,26	1,19	1,09	1,00	0,92	0,85	0,79	0,73
		L/500	2,03	1,80	1,60	1,42	1,28	1,15	1,04	0,94	0,86	0,78	0,71	0,65	0,60	0,55	0,51	0,47	0,44
1,00	0,128	L/300	2,78	2,58	2,39	2,23	2,09	1,95	1,83	1,72	1,62	1,50	1,37	1,26	1,16	1,07	0,98	0,91	0,84
		L/500	2,34	2,07	1,84	1,65	1,48	1,33	1,20	1,09	0,99	0,90	0,82	0,76	0,69	0,64	0,59	0,55	0,51
1,25	0,160	L/300	3,81	3,53	3,28	3,06	2,86	2,68	2,51	2,36	2,16	1,97	1,80	1,65	1,52	1,40	1,29	1,19	1,11
		L/500	3,07	2,72	2,41	2,16	1,93	1,74	1,57	1,42	1,29	1,18	1,08	0,99	0,91	0,84	0,77	0,72	0,66
1,50	0,192	L/300	4,67	4,32	4,01	3,73	3,48	3,26	3,05	2,86	2,60	2,37	2,17	1,99	1,93	1,68	1,55	1,44	1,33
		L/500	3,70	3,27	2,91	2,60	2,33	2,10	1,89	1,72	1,56	1,42	1,30	1,19	1,10	1,01	0,93	0,86	0,80

Three-span girders

Min. width of support b = 150 mm Longitudinal joint version 1*

Effective span L [m]			6,00	6,25	6,50	6,75	7,00	7,25	7,50	7,75	8,00	8,25	8,50	8,75	9,00	9,25	9,50	9,75	10,0
t_N	g	maxf	perm. q = evenly distributed load including profile dead load in kN / m²																
0,75	0,096	L/300	2,16	1,99	1,77	1,58	1,41	1,27	1,15	1,04	0,95	0,86	0,79	0,72	0,67	0,61	0,57	0,52	0,49
		L/500	1,35	1,19	1,06	0,95	0,85	0,76	0,69	0,63	0,57	0,52	0,47	0,43	0,40	0,37	0,34	0,31	0,29
0,88	0,113	L/300	2,66	2,35	2,09	1,87	1,68	1,51	1,36	1,23	1,12	1,02	0,94	0,86	0,79	0,73	0,67	0,62	0,57
		L/500	1,60	1,41	1,26	1,12	1,01	0,90	0,82	0,74	0,67	0,61	0,56	0,51	0,47	0,44	0,40	0,37	0,34
1,00	0,128	L/300	3,07	2,72	2,42	2,16	1,94	1,74	1,57	1,43	1,30	1,18	1,08	0,99	0,91	0,84	0,77	0,72	0,66
		L/500	1,84	1,63	1,45	1,30	1,16	1,05	0,94	0,86	078	0,71	0,65	0,59	0,55	0,50	0,46	0,43	0,40
1,25	0,160	L/300	4,03	3,56	3,17	2,83	2,54	2,28	2,06	1,87	1,70	1,55	1,42	1,30	1,19	1,10	1,01	0,94	0,87
		L/500	2,42	2,14	1,90	1,70	1,52	1,37	1,24	1,12	1,02	0,93	0,85	0,78	0,72	0,66	0,61	0,56	0,52
1,50	0,192	L/300	4,85	4,29	3,81	3,41	3,05	2,75	2,48	2,25	2,05	1,87	1,71	1,56	1,44	1,32	1,22	1,13	1,05
		L/500	2,91	2,58	2,29	2,04	1,83	1,65	1,49	1,35	1,23	1,12	1,02	0,94	0,86	0,79	0,73	0,68	0,63

* Longitudinal joint version 1: see page 10

Installation recommendations

Regulations / Directives

Among other things, the following must be noted:

- General approval no. Z-14.1-137 issued by the building inspection authorities for Hoesch Roof System 2000
- This item of technical information
- Accident prevention regulations issued by the employers' liability insurance associations
- Directive for the installation of profiled steel sheets for roof, wall and floor decking issued by IFBS (EPPF)
- Information for roofing using profiled steel sheets and strips issued by the United Union of German Roofers
- Guide to good practice from the National Federation of Roofing Contractors (UK)

Unloading

The packages must be checked when they arrive on site. Any claims must be noted in the shipping documents and must be immediately notified to the representative or sales office responsible. Belated claims cannot be considered. Unloading must be made using appropriate hoists. Ensure that edges are protected.

For elements with a length of more than 10.0 m, a spreader bar must be used.

Storage

The packages must be stored with a slight inclination in the longitudinal direction to allow trapped water to drain off.
In the event of an extended period of outdoor storage, the profiles must be protected against rain, storms and dirt. The formation of condensate must be prevented.
Packages must not be stacked on top of one on another. Opened packages must be secured. For structural reasons, any intermediate storage on the roof is only permitted above the trusses and must be agreed with the site management.

Preparation for installation

Prior to installation, the supporting structure must be checked for compliance with the conditions required for installation. Any differences must be notified to the site management.

Cutting on site

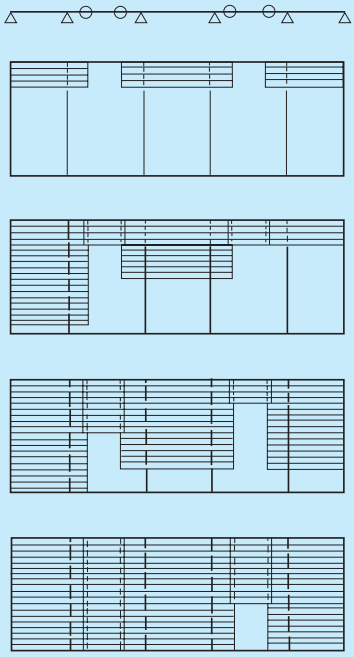
Only use appropriate cutting tools (e.g. compass saws, plate shears, nibblers).
Swarf must be removed immediately.
Do not use parting-off grinders.

Installation of support jacks and installations strips

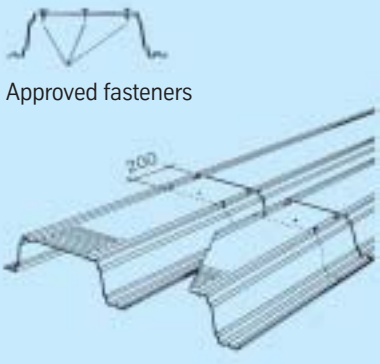
To reduce the workload and the cost of installation, patented installation strips are used to install the support jacks. Precise prefabrication of the installation strips ensures constant compliance with the modular width without the need for laborious checks.
The strips are either placed during profile installation or in advance on the supporting structure before it is erected. This enables a very easy and thus low cost building process.

The support jacks are simply clipped into the installation strips and pushed from the roofing already completed onto the load-bearing supporting structure unless they have been installed in advance. A fastener protects the installation strip against being displaced. No further fasteners are needed for the support jacks. Only when designing the roofing as a shear field must special measures be taken (see table).

Installation recommendations



Connection at cantilever ends



Approved fasteners

Cross joint connection (Hinged joints)

Installation

When using Gerber girders, the installation sequence as shown on the left should be followed.
Double- or multiple-span girders with cross joints above the supports and an overlap of approx. 150 mm should be placed as common trapezoidal profiles. The trapezoidal profiles are hung in the support jacks which have been laid first and then fastened together with the jacks on the supporting structure.

Important information

To prevent accidents, all profiled roofing sheets must be fastened to the supporting structure immediately after placing. Only once this has been completed and a row of several profiled sheets has been built to form a larger roof section can the cantilevering components be accessed.

Preparation of drop-in girder positioning

Before positioning the drop-in girders between salient components, the ends of the cantilever girders must be connected at their longitudinal joints using blind rivets. This connection facilitates the formation of cross-joints, so that the underside of the roof has a perfect visual appearance.

Cross joints

Immediately after positioning the drop-in profiles, they must be fastened to the cantilevering sheets. The profile overlap at the cross joint is 200 mm. Two connections are provided in the upper part of the webs and at least one connection should be made in the middle of the upper flanges. For structural reasons, the lower flanges are not interconnected.

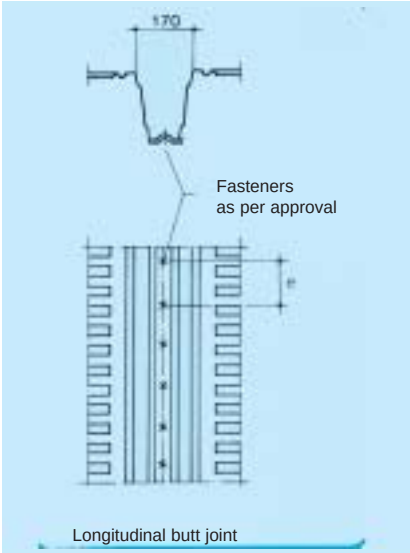
Installation recommendations

Longitudinal joints

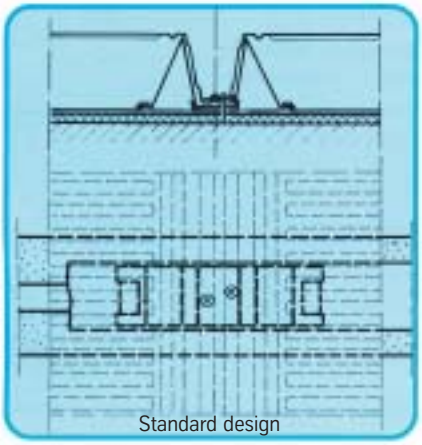
Trapezoidal profiles are interconnected at the longitudinal edge starting from the support towards mid-span, preferably using screws.
In the case of standard designs, the fasteners should be spaced by e = 666 mm. Roofing systems subject to high loads require a reduced spacing of fasteners, i.e. e = 140 mm in the area of supports (1 m on either side) and e = 500 mm in the remaining areas (see approval and page 10).

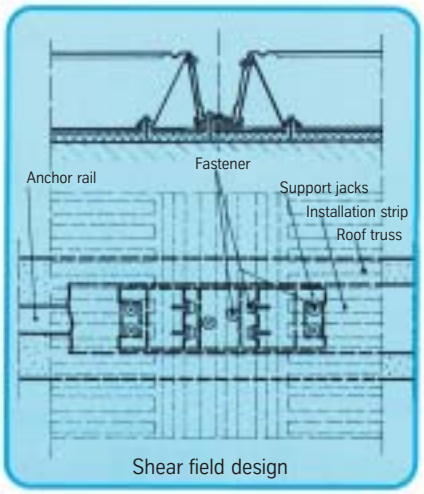
For the connection of trapezoidal profiles, self-tapping screws made b.e. by Ejot and SFS, which have been developed for this purpose, have proved to be very suitable. Using appropriate tools, they are screwed into the centre of the reinforcing bead at points marked by the manufacturer. These screws offer the following benefits:

- Exact drawing together and alignment of trapezoidal profiles due to the recess on the screw head.
- Visually perfect underside of the roof thanks to the precisely arranged fasteners in the centre of the reinforcing bead.
- Significant reduction of the time required to place the fasteners.
- Favourable working conditions as a result of the use of special tools.



Fasteners





Fasteners Type of supporting structure	Steel	Concrete with flat steel	Concrete with anchor rail, .e.g. HTU-60/20/6	Concrete with anchor rail, .e.g. HTU-60/25/3	Wood
Material thickness	> 6 mm	≥ 5 mm	6 mm	3 mm	
Fastening of support jacks – Standard design	not required				
Fastening of support jacks – Shear field design	1 2 3 4			3	5
Fastening of trapezoidal profile – Standard design	1 2 3 4			3	5
Fastening of trapezoidal profile – Shear field design	I: 1 2 3 4 II:			I: 3 II: 6 7	I: 5
Longitudinal butt joint			6 7 8		

The sketches and tables show the arrangement and the minimum number of recommended load-transmitting fasteners.

The fasteners must be officially approved and calculated by way of structural analysis.

① Thread-rolling screw EJOT® JZ 2-8.0 x L-V 22 for material thicknesses 0.75 - 1.60 mm

② Thread-rolling screw DIN 7513 AM 8 x L Washer Ø ≥ 16 for material thicknesses 0.75 - 1.50 mm

③ Thread-rolling screw Ø 6.3 x L washer Ø for material thicknesses 0.75 - 1.25 mm (recommended: 2 screws/support)

④ Hilti set bolt ENPH3-21L15 for material thicknesses 0.75 - 1.25 mm (recommended: 2 set bolts/support)

⑤ Hexagon head wood screw DIN 571 Ø 8 x L washer Ø ≥ 16 for material thicknesses 0.75 - 1.25 mm

⑥ Drilling screw SFS spedec SL 2 H 15 6.3 x 22 (2 x 1.0 mm) spedec SL 3 H 15 6.3 x 35 (2 x 1.5 mm)

⑦ Hexagon head tapping screw DIN 7976 Ø 6.3 x L washer Ø 16

⑧ Blind rivet AlMg (DIN 1725) or similar Ø 5

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