HMODEX®

Modular scaffold

User guide

HÜNNEBECK

BY BRAND SAFWAY

Contents

Contents

1 General information

This user guide meets the requirements of an instruction manual on erection and usage, meaning that it should always be easily accessible wherever the MODEX scaffold is used. Only qualified personnel familiar with this user guide and the current MODEX certificate of approval may assemble, modify, dismantle or use the scaffold.

The MODEX modular scaffold manufactured by HÜNNEBECK meets the requirements of DIN 4420 EN 12810 and EN 12811.

The manufacturing and labelling of all components comply with the German Technical Approval Z-8.22-67.

Only undamaged, original scaffold components made by HÜNNEBECK may be used. Inspect all components for damage and to determine their origin before installing them, and when replacements are needed, use only original parts.

Repairs may be made only by properly qualified HÜNNEBECK personnel. The user may not in any way modify scaffold components.

The illustrations in this user guide are merely examples. All relevant regulations pertaining to occupational safety must be complied with. Always comply with the locally applicable ordinance on industrial health and safety.

This user guide contains technical details that are intended to be helpful to the erector or user of the scaffold to facilitate compliance with the ordinance on industrial health and safety. The details do not, however, serve as absolute requirements. Based on the hazard assessment that the erector or user is required to compile as specified by the applicable ordinance on industrial health and safety, the erector or user is responsible for using his own discretion to implement essential preventive measures. The specifics of each case must always be taken into consideration.

MODEX scaffolds may be assembled, modified and dismantled only by properly trained and qualified personnel. A qualified manager with sufficient technical expertise, appointed by the contractor, has to oversee erection of the scaffold.

A supervisor responsible for occupational safety issues and possessing sufficient knowledge and experience must also oversee erection of the scaffold. This includes briefing employees on relevant hazards, geared towards the specific equipment.

When using personal protective equipment to prevent falling from heights, the supervisor is required to identify suitable anchor points and to verify that the employees use the protective equipment. Within the scope of the respective user guide, and based on our own hazard analysis, we provide the erector and user with the capacity to comply with the applicable ordinance on industrial health and safety in certain installation and usage situations.

Up to a drop height of 2.00 m, the scaffold may be used as a protective scaffold and protective roof scaffold. All planks mentioned in this user guide may be used in protective scaffolds and protective roof scaffolds.

An essential requirement for use of our products is that the respective instructions in the applicable user guide always be followed.

The user guides describe how to set up the standard model. If the scaffold system is erected in a way that deviates from the standard, the construction regulations and the specifications of the German Technical Approval Z-8.22-67 dictate that the deviations be assessed and, in some cases, verified.

Verification is not required, if erection of the scaffold complies with the instructions contained in this or in another user manual applicable to the standard design.

Always ensure that the scaffold is structurally sound.

MODEX scaffolds may be erected, modified and dismantled only as described in this or another applicable user guide. Only the components listed in section 4.0 may be used. Other erection variations are permissible, but only with a specific certificate that can be obtained from the manufacturer.

1.1 Erection preparation

The scaffold must always be inspected by the responsible contractor to verify that it is complete before it is used for the first time, after extended work stoppage, when modifications have been made and when it is has been exposed to extraordinary circumstances. The condition of the components, the structural integrity, and the occupational and operational safety of the equipment have to be verified.

Never use damaged scaffolding material. Only the manufacturer may repair components. The surface on which the scaffold is erected must be flat and capable of bearing the load of the scaffold. If necessary, prepare the surface accordingly.

2 Product features

The MODEX scaffold by HÜNNEBECK is a working, protective and support scaffold, which can be used as an all-purpose modular node scaffold.

The load-bearing vertical posts are made of Ø 48.3 mm tubing, with welded-on Rosettes located at 50 cm intervals. These Rosettes allow for up to eight connections, either in horizontal or diagonal direction.

The horizontal braces vary in length. The scaffolding can be set up such that the footprint contains right angles and/or oblique angles.

The standard lengths of the horizontal braces are: 0.74 m, 0.82 m, 0.90 m, 1.01 m, 1.13 m, 1.25 m, 1.50 m, 1.80 m, 2.00 m, 2.50 m, 3.00 m, 4.00 m.

These standard lengths facilitate the erection of working, protective, birdcage and formwork scaffolds with optimum spacing. The modular concept is ideal for the erection of staircase towers, landings, grandstands, etc.

Both ends of each horizontal brace and diagonals are equipped with special joint connectors with a captive wedge. This makes it easy to quickly and securely connect and lock the Vertical Posts' Rosettes.

Use a 500 g hammer to drive down the wedges until rebound is felt. This creates a connection with high node stiffness. The upper part of the joint does not necessarily have to be located at the post tube (Refer to page 205).

All V-diagonals are designed for storey heights of 1.00 m, 1.50 m and 2.00 m. They are available for all standard lengths.

Standard BOSTA scaffold platforms or commercially available wooden planks (D = 5 cm, German grading class C24, pursuant to EN 388) can be used to build all necessary working platforms.

All steel components of the MODEX scaffold system are galvanised, and all wooden parts are waterproofed. This means that repairs are kept to a minimum and the components are virtually maintenance-free.

NOTE	**Note!** Only flawless materials may be used. Immediately replace damaged components. Use only original HÜNNEBECK parts.

Unless stated otherwise, all dimensions in mm.

The illustrations in this user guide are merely examples.

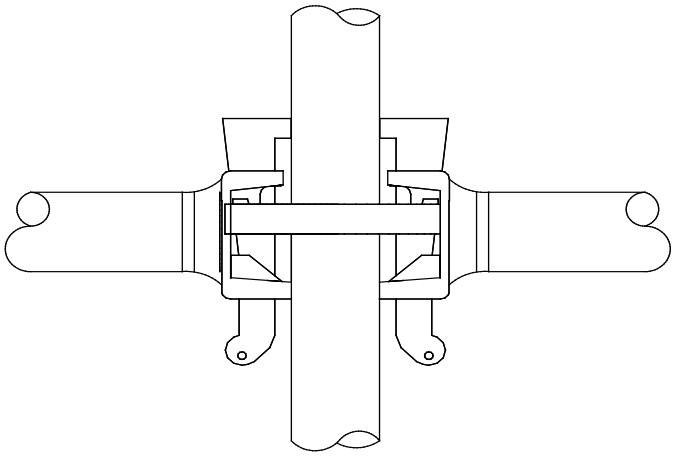
Safety symbols:

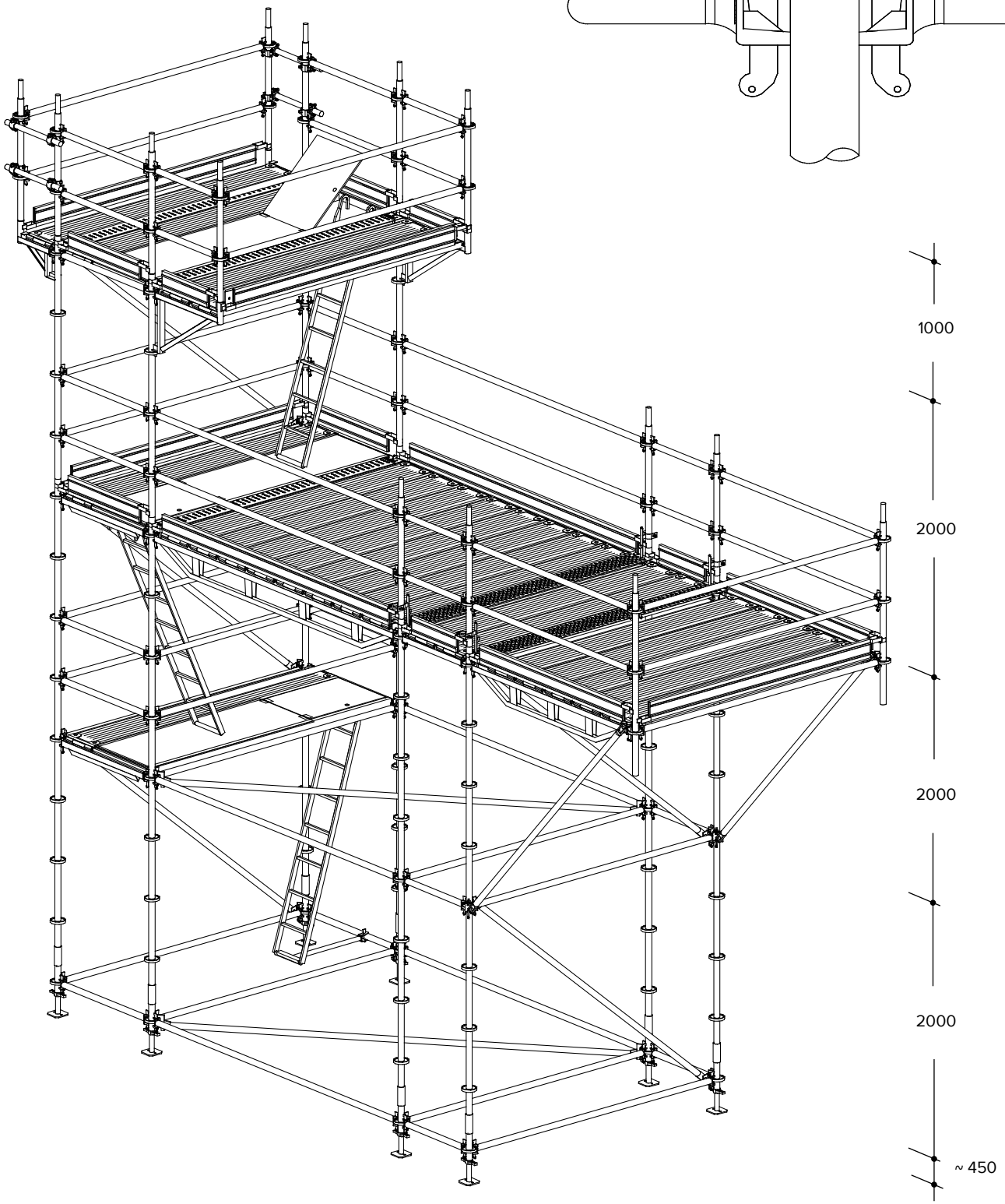
- Observe all general warnings and notes, as well as those indicating that a visual inspection is required.

DANGER	**DANGER!** DANGER indicates a hazardous situation that, if not avoided, will cause death or serious injury.
WARNING	**WARNING!** WARNING indicates a hazardous situation that, if not avoided, can cause death or serious injury.
CAUTION	**CAUTION!** CAUTION indicates a hazardous situation that, if not avoided, can cause minor or moderate injury.
NOTE	**NOTE!** NOTE indicates a hazard that can cause property damage.
VISUAL INSPECTION	VISUAL INSPECTION indicates that an additional inspection is required.
TIP	**TIP!** TIP shares practical experience with the user, e.g. how to more easily or quickly perform a task.

3 Product overview

The MODEX node

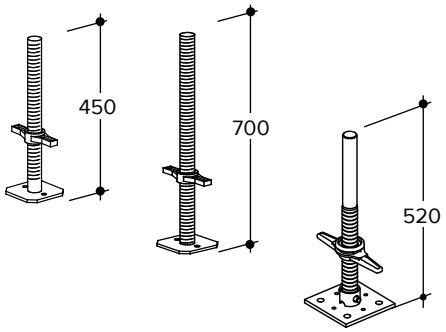
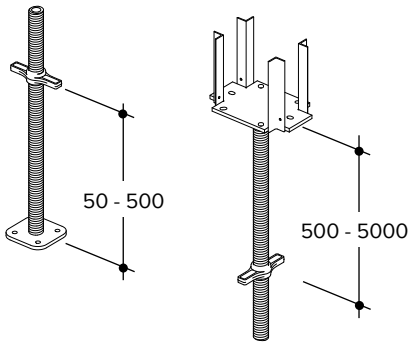
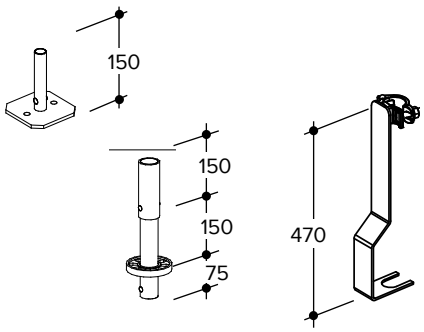




Unless stated otherwise, all dimensions in mm.

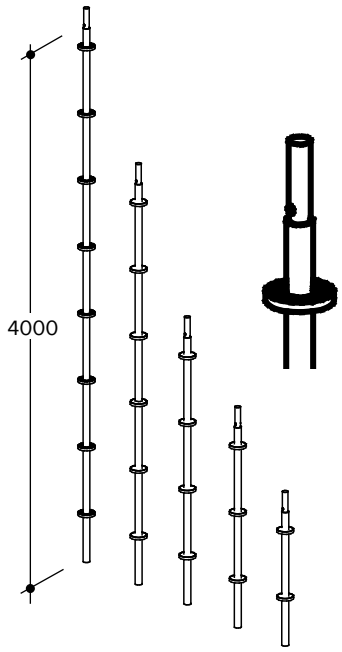
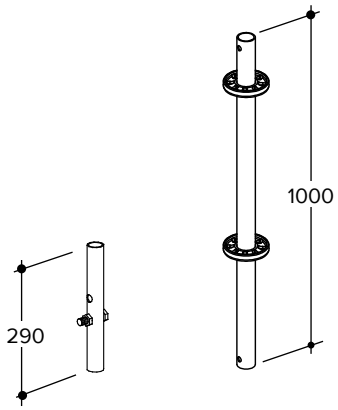
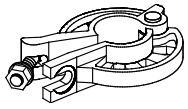
4 Components

4.1 Basic components

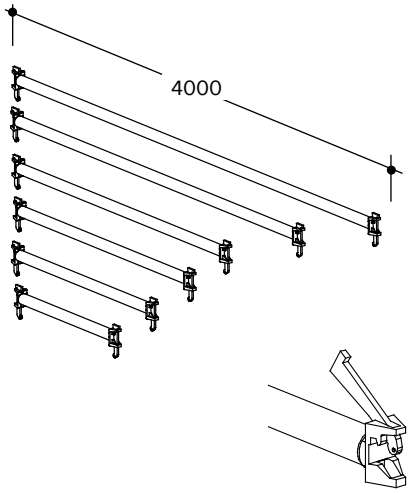
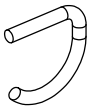
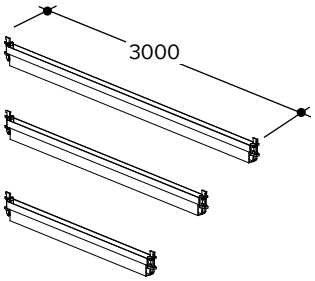
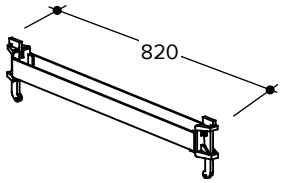
	Component	Part code	Weight [kg]
	**Base Jack 45/3.8**	**551234**	**3.10**
	Base Jack 70/3.8	**540575**	**4.00**
	To compensate for uneven floors/ground. Adjustable (jack extension) from 6.5 to 26.5 cm or 6.5 to 50 cm.		
	ID Base Jack 38/52	**148552**	**8.00**
	To compensate for uneven floors/ground. Adjustable (jack extension) from 9 to 30 cm.		
	**Base Jack 70/3.8x6.3**	**652155**	**5.00**
	Crosshead Jack 70/3.8x6.3	**652184**	**7.50**
	The Base Jack 70/3.8x6.3 and the Crosshead Jack 70/3.8x6.3 are used for MODEX shoring towers.		
	**Rigid Base Plate**	**428533**	**1.20**
	Similar to a Base Jack; serves to conduct the vertical loads into the load-bearing ground/floor.		
	Starting Piece	**470929**	**2.00**
	Makes setting up Vertical Posts easier.		
	Base Jack Securing Device		
	Connects the Jack to the Starting Piece and the Vertical Post.	**651762**	**2.20**

Unless stated otherwise, all dimensions in mm.

Components

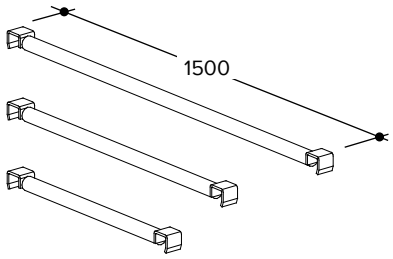
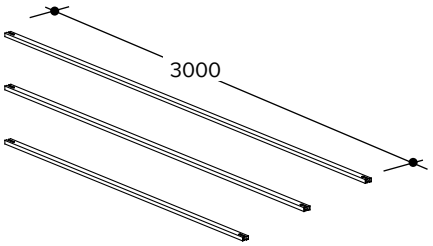
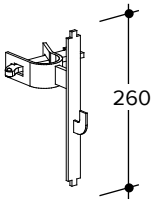
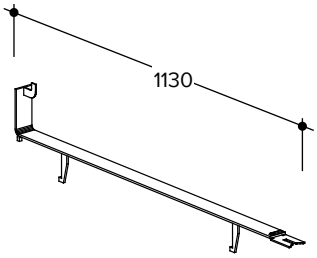
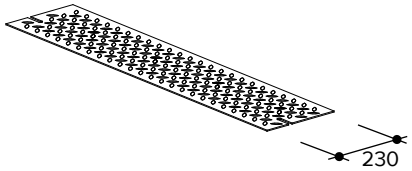
	Component	Part code	Weight [kg]
	**Vertical Post 400**	**470918**	**20.20**
	Vertical Post 300	**470907**	**15.30**
	Vertical Post 200	**470892**	**10.40**
	Vertical Post 150	**470881**	**8.00**
	Vertical Post 100	**470870**	**5.60**
	Steel tube Ø 48.3 mm with a Rosette every 50 cm. Built-in spigots connect the tubes to one another. A Ø 48.3 mm tube with a wall thickness of 3.2 mm can also be connected.		
	**Vertical Post 100 L**	**553645**	**4.90**
	Vertical Post 150 L	**652074**	**7.30**
	Vertical Post 200 L	**652075**	**9.80**
	Connecting Spigot (article number 553667) not included. The Connecting Spigot can be screwed in when needed; it must be obtained separately.		
	Connecting Spigot	**553667**	**0.90**
	Secured in the Vertical Post 100 L with Bolt M12x75 with nut (Bolts included).		
	**Vario Attachment Plate SW 22**	**554694**	**1.40**
	Facilitates cross-member connections at any angle and at any height.		

Unless stated otherwise, all dimensions in mm.

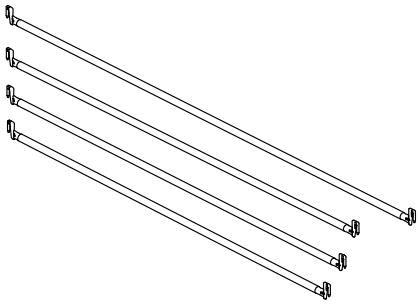
	Component	Part code	Weight [kg]
	**Tube Ledger 400**	**533470**	**15.80**
	Tube Ledger 300	**470951**	**12.00**
	Tube Ledger 250	**470940**	**10.10**
	Tube Ledger 200	**475781**	**8.20**
	Tube Ledger 180 (for TOPEC formwork)	**489260**	**7.50**
	Tube Ledger 168	**651765**	**7.10**
	Tube Ledger 150	**475770**	**6.40**
	Tube Ledger 125	**484739**	**5.40**
	Tube Ledger 113	**475760**	**5.00**
	Tube Ledger 101	**482020**	**4.60**
	Tube Ledger 90 (for TOPEC formwork)	**489250**	**4.10**
	Tube Ledger 82	**470930**	**3.80**
	Tube Ledger 74	**482019**	**3.50**
	Tube Ledger 25	**577863**	**1.70**
	The Tube Ledgers are made of Ø 48.3 mm steel tubing with welded-on joint connectors. The Tube Ledgers serve as horizontal braces and as railing (special lengths available upon request).		
	**Ledger Safety Device**	**496506**	**0.10**
	Use to secure Tube Ledgers that are not connected at a 45° or 90° angle.		
	**Transom 300/12.6 U**	**651774**	**25.90**
	Transom 250/12.6 U	**651572**	**21.60**
	Transom 200/12.6 U	**651571**	**17.20**
	Transom 150/12.6 U	**651570**	**12.90**
	Transom 125/12.6 U	**651775**	**10.70**
	Transom 113/12.6 U	**651776**	**9.70**
	Transom 82/12.6 U	**651777**	**7.00**
	Reinforced Transoms U for greater load capacities and wider spans.		
	**Transom 82U**	**470962**	**4.10**
	Standard planks from the BOSTA scaffold program are placed on top of the Transoms U.		

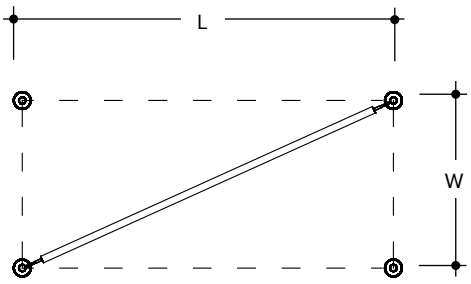
Unless stated otherwise, all dimensions in mm.

Components

	Component	Part code	Weight [kg]
	**Plank Transom 150**	**484750**	**6.50**
	Plank Transom 113	**651561**	**9.70**
	Plank Transom 101	**482041**	**4.60**
	Plank Transom 82	**651560**	**5.10**
	Plank Transom 74	**482030**	**3.60**
	Additional support when using butt-jointed floor boards and commercially available planks.		
	**Lifting Retainer Tube 300**	**651436**	**5.40**
	Lifting Retainer Tube 250	**651435**	**4.50**
	Lifting Retainer Tube 200	**651434**	**3.60**
	Lifting Retainer Tube 150	**651433**	**2.60**
	Lifting Retainer Tube 125	**651432**	**2.20**
	Lifting Retainer Tube 113	**651431**	**2.00**
	Lifting Retainer Tube 82	**651430**	**1.40**
	Plank Retainer for planks placed on top of Transoms U. Secured with the Connection Part (article number 651440), which must be acquired separately.		
	**Connection Part**	**651440**	**0.90**
	Secures the Lifting Retainer Tube.		
	**Lifting Retainer 113**	**479091**	**2.50**
	Lifting Retainer 82	**479047**	**1.80**
	Used to secure standard planks when using Transoms 113U or 82U. They also accommodate Toe Boards from the BOSTA scaffold program.		
	**Gap Plank 300**	**651559**	**10.20**
	Gap Plank 250	**651558**	**15.10**
	Gap Plank 200	**651557**	**12.00**
	Gap Plank 150	**651556**	**8.90**
	Gap Plank 125	**651555**	**7.40**
	Gap Plank 113	**651554**	**6.70**
	Gap Plank 82	**651553**	**4.80**
	Covers the gap between two scaffold bays, between platform surface and bracket surface. Secure only in conjunction with Connection Parts (article number 651440)!		

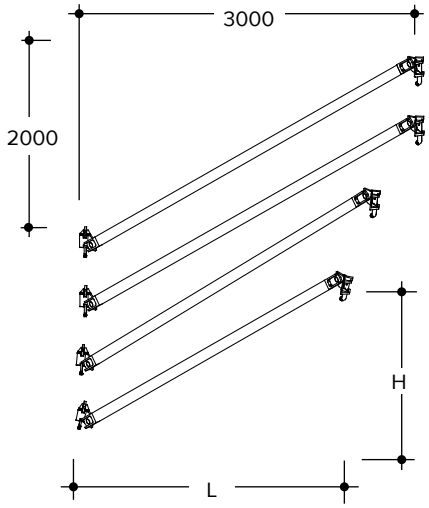
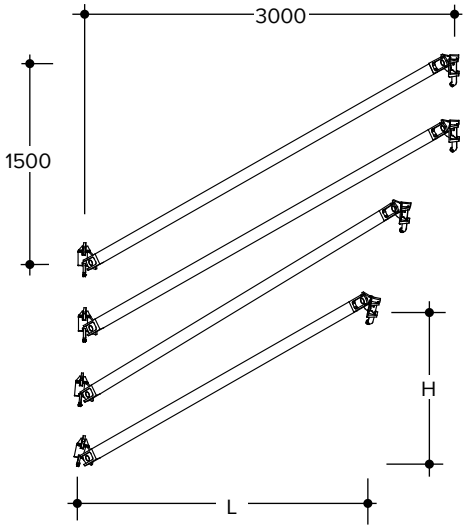
Unless stated otherwise, all dimensions in mm.



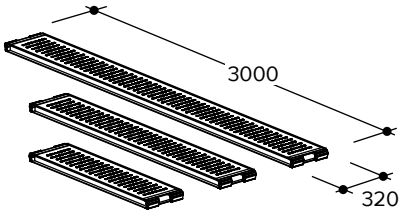
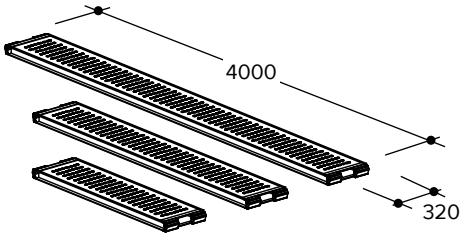
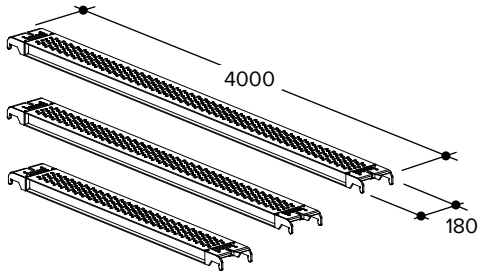


Component	Part code	Weight [kg]
Scaffold bay: length/width		
H-diagonal 300/300	**651635**	**16.30**
H-diagonal 300/250	**651634**	**15.10**
H-diagonal 300/200	**651633**	**13.90**
H-diagonal 300/150	**651632**	**13.00**
H-diagonal 300/125	**651631**	**12.60**
H-diagonal 300/113	**651630**	**12.50**
H-diagonal 300/101	**482085**	**12.40**
H-diagonal 300/82	**651629**	**12.10**
H-diagonal 300/74	**482063**	**12.10**
H-diagonal 250/250	**484810**	**13.70**
H-diagonal 250/200	**484809**	**12.40**
H-diagonal 250/150	**651628**	**11.30**
H-diagonal 250/125	**651627**	**10.90**
H-diagonal 250/113	**478785**	**10.80**
H-diagonal 250/101	**482074**	**10.60**
H-diagonal 250/82	**478763**	**10.40**
H-diagonal 250/74	**482052**	**10.30**
H-diagonal 200/200	**651711**	**11.00**
H-diagonal 200/150	**651626**	**9.80**
H-diagonal 200/125	**651625**	**9.30**
H-diagonal 200/113	**651624**	**9.00**
H-diagonal 200/82	**651623**	**8.50**
H-diagonal 150/150	**651710**	**8.30**
H-diagonal 150/125	**651622**	**7.70**
H-diagonal 150/113	**651621**	**7.40**
H-diagonal 150/82	**651620**	**7.00**
H-diagonal 125/125	**651619**	**6.80**
H-diagonal 125/113	**533506**	**6.70**
H-diagonal 125/82	**533517**	**6.00**
H-diagonal 113/113	**651618**	**6.40**
H-diagonal 113/82	**651617**	**5.60**
H-diagonal 82/82	**651616**	**4.70**
For horizontal bracing.		

Components

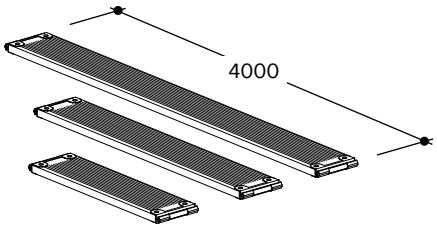
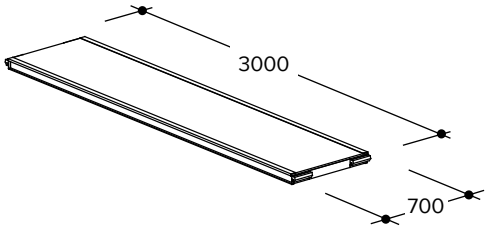
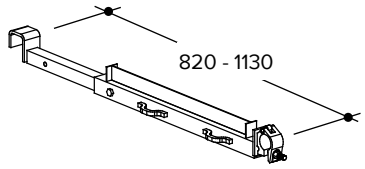
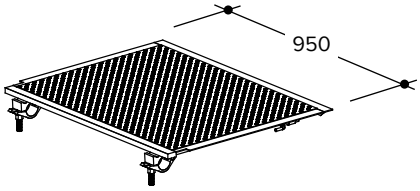
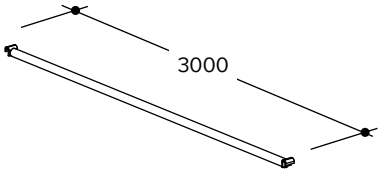
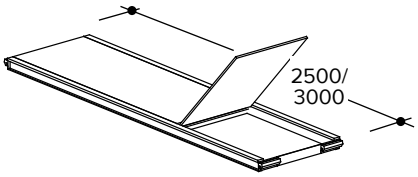
	Component	Part code	Weight [kg]
	Scaffold bay: height/length		
	V-diagonal 200/300	**470984**	**14.90**
	V-diagonal 200/250	**470973**	**13.60**
	V-diagonal 200/200	**475910**	**12.10**
	V-diagonal 200/150	**475900**	**10.90**
	V-diagonal 200/125	**651656**	**10.40**
	V-diagonal 200/113	**557676**	**10.30**
	V-diagonal 200/82	**588511**	**9.80**
	V-diagonal 150/180	**489271**	**10.20**
	V-diagonal 100/300	**651657**	**13.20**
	V-diagonal 100/250	**651658**	**11.40**
	V-diagonal 100/200	**651659**	**9.80**
	V-diagonal 100/150	**651660**	**8.20**
	V-diagonal 100/125	**651661**	**7.40**
	V-diagonal 100/113	**651662**	**7.10**
	V-diagonal 100/82	**651663**	**6.40**
	For vertical bracing.		
	**V-diagonal 150/300**	**652172**	**13.80**
	V-diagonal 150/250	**652173**	**12.20**
	V-diagonal 150/200	**652174**	**10.70**
	V-diagonal 150/150	**652175**	**9.30**
	V-diagonal 150/125	**652176**	**8.70**
	V-diagonal 150/113	**652177**	**8.50**
	V-diagonal 150/90	**652178**	**8.10**
	V-diagonal 150/82	**652179**	**7.90**
	MODEX Vertical Diagonal for support scaffolds.		

Unless stated otherwise, all dimensions in mm.

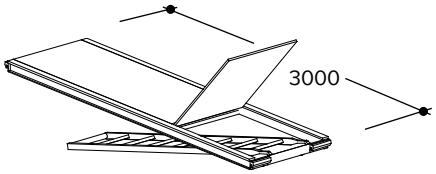
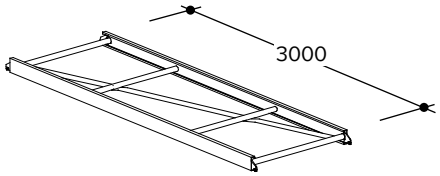
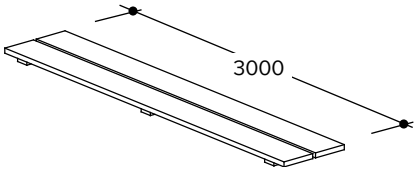
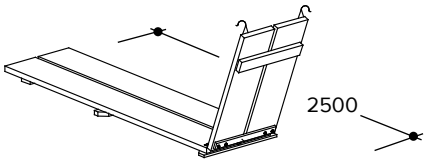
	Component	Part code	Weight [kg]
	**Hollow Box Plank 300/32 (2.0 kN/m² LC 3)**	**531323**	**17.60**
	Hollow Box Plank 250/32 (3.0 kN/m² LC 4)	**531334**	**15.10**
	Hollow Box Plank 200/32 (4.5 kN/m² LC 5)	**531345**	**12.60**
	Hollow Box Plank 150/32 (4.5 kN/m² LC 5)	**531356**	**10.00**
	Hollow Box Plank 125/32 (4.5 kN/m² LC 5)	**531367**	**8.70**
	Hollow Box Plank 74/32 (4.5 kN/m² LC 5)	**531687**	**6.10**
	Steel sheet design with zinc coating, extremely lightweight and sturdy. Corrugated non-slip surface.		
	**Steel Plank 400/32 (2.0 kN/m² LC 3)**	**530307**	**31.50**
	Steel Plank 300/32 (3.0 kN/m² LC 4)	**427984**	**23.00**
	Steel Plank 250/32 (4.5 kN/m² LC 5)	**427973**	**19.40**
	Steel Plank 200/32 (6.0 kN/m² LC 6)	**430279**	**15.80**
	Steel Plank 150/32 (6.0 kN/m² LC 6)	**485858**	**12.20**
	Steel Plank 125/32 (6.0 kN/m² LC 6)	**430280**	**10.40**
	Steel Plank 113/32 (6.0 kN/m² LC 6)	**485869**	**9.60**
	Steel Plank 82/32 (6.0 kN/m² LC 6)	**485870**	**7.30**
	Hot-dip galvanised, sturdy non-slip surface.		
	**Steel Plank 400/18 (3.0 kN/m² LC 4)**	**651595**	**21.80**
	Steel Plank 300/18 (3.0 kN/m² LC 4)	**550744**	**15.30**
	Steel Plank 250/18 (4.5 kN/m² LC 5)	**550733**	**14.30**
	Steel Plank 200/18 (6.0 kN/m² LC 6)	**550722**	**10.80**
	Steel Plank 150/18 (6.0 kN/m² LC 6)	**550711**	**8.50**
	Steel Plank 125/18 (6.0 kN/m² LC 6)	**651594**	**7.30**
	Steel Plank 113/18 (6.0 kN/m² LC 6)	**651593**	**6.60**
	Steel Plank 82/18 (6.0 kN/m² LC 6)	**651592**	**5.00**
	When these 18 cm wide Steel Planks are used along with 32 cm wide Steel Planks, the MODEX scaffold can be set up such that there are no gaps in the platforms.		

Unless stated otherwise, all dimensions in mm.

Components

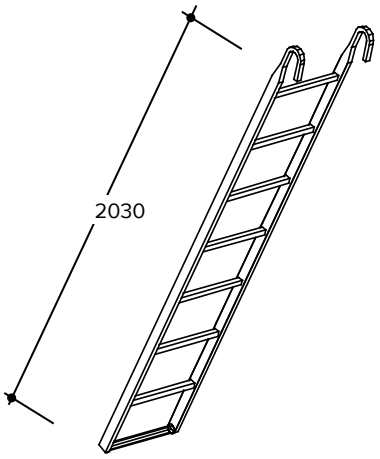
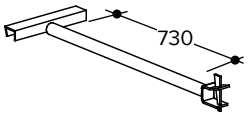
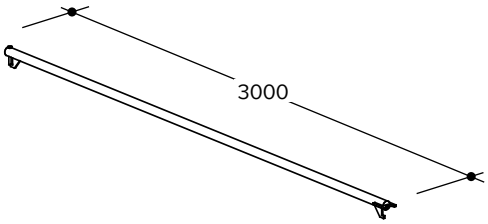
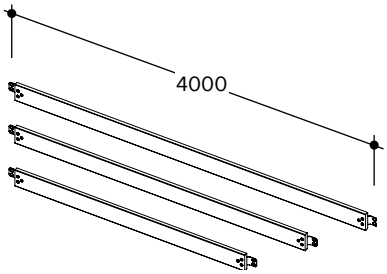
	Component	Part code	Weight [kg]
	**Alu Plank 400/32 (2.0 kN/m² LC 3)**	**525805**	**21.50**
	Alu Plank 300/32 (4.5 kN/m² LC 5)	**479860**	**16.90**
	Alu Plank 250/32 (6.0 kN/m² LC 6)	**479871**	**14.50**
	Alu Plank 200/32 (6.0 kN/m² LC 6)	**479882**	**12.00**
	Alu Plank 150/32 (6.0 kN/m² LC 6)	**479893**	**9.60**
	Alu Plank 125/32 (6.0 kN/m² LC 6)	**479908**	**8.40**
	Symmetrical design (either side can be used). Non-slip surface. Two planks per scaffold bay.		
	**Alu Frame Deck 300/70**	**437476**	**20.10**
	(2.0 kN/m² LC 3)		
	Alu Frame Deck 250/70	**437487**	**17.10**
	(2.0 kN/m² LC 2)		
	Alu Frame Deck 200/70	**437498**	**13.80**
	(2.0 kN/m² LC 2)		
	Extremely lightweight deck with aluminium frame and integrated, changeable veneer plywood board 100G.		
	**Passage Ledger 82-113**	**651521**	**10.60**
	For ladder access and recesses in the platform.		
	**Passage Lid 70/100**	**651780**	**20.80**
	For ladder access.		
	**Bearing Ledger 300**	**651587**	**11.50**
	Bearing Ledger 250	**651265**	**9.70**
	Bearing Ledger 200	**651586**	**7.70**
	Bearing Ledger 150	**651585**	**5.80**
	For ladder passages with a bay width > 113 cm.		
	**Alu Ladder Passage Deck 300/70**	**437502**	**22.50**
	(2.0 kN/m² LC 3)		
	Alu Ladder Passage Deck 250/70	**437513**	**19.60**
	(2.0 kN/m² LC 3)		
	Aluminium-plywood design for the installation of interior staircases (ladder not included). The Ladder 200 A (article number 136318) must be ordered separately.		

Unless stated otherwise, all dimensions in mm.

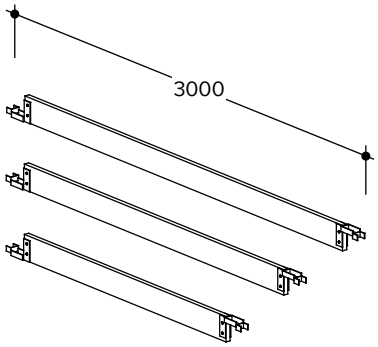
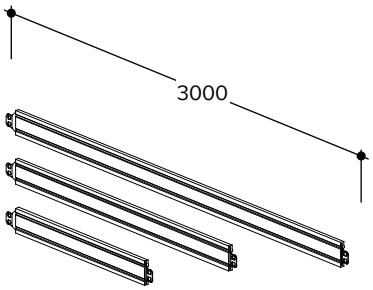
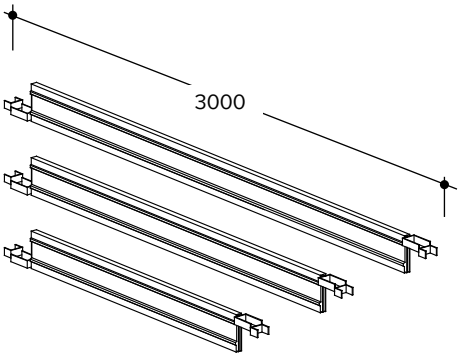
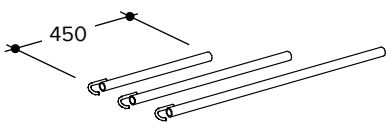
	Component	Part code	Weight [kg]
	**Alu Ladder Passage Deck 300/70 (2.0 kN/m² LC 3)**	**437502**	**22.50**
	Alu Ladder Passage Deck 250/70 (2.0 kN/m² LC 3)	**437513**	**19.60**
	Alu Ladder Passage Deck 300/70 with Ladder (LC 3)	**492910**	**26.80**
	Alu Ladder Passage Deck 250/70 with Ladder (LC 3)	**465031**	**23.70**
	Aluminium-plywood design for the installation of interior staircases, with integrated, pivoting ladder.		
	**Horizontal Frame 300/100-5 (4.5 kN/m² LC 5)**	**560795**	**35.40**
	Horizontal Frame 250/100-6 (6.0 kN/m² LC 6)	**529437**	**29.10**
	Horizontal Frame 125/100 (6.0 kN/m² LC 6)	**138740**	**14.80**
	Placed on top of Transoms U. Used in conjunction with Horizontal Frame Planks.		
	**Horizontal Frame Plank 300**	**132548**	**20.50**
	Horizontal Frame Plank 250	**132537**	**17.30**
	Horizontal Frame Plank 125	**138924**	**8.80**
	Two Horizontal Frame Planks fit into one Horizontal Frame.		
	**Ladder Plank 250**	**143090**	**18.50**
	For interior access when using a Horizontal Frame and Ladder 200 A.		
	**Plank Retainer**	**139620**	**0.25**
	Secures the timber planks to the Horizontal Frames.		

Unless stated otherwise, all dimensions in mm.

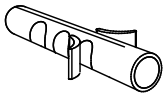
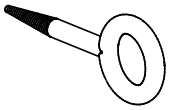
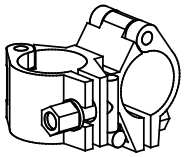
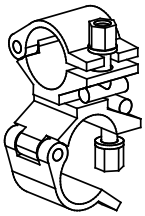
Components

	Component	Part code	Weight [kg]
	**Ladder 200 A** For interior ascent at storey height of 2.00 m.	**136318**	**9.80**
	**Ladder Lock** Use the Ladder Lock to fasten the lowest Ladder 200 A to the lower Tube Ledger.	**422753**	**2.20**
	**Guard Rail 300**	**651471**	**8.70**
	Guard Rail 250	**651472**	**7.30**
	Guard Rail 200	**651473**	**5.90**
	Guard Rail 150	**651474**	**4.50**
	Guard Rail 125	**651475**	**3.80**
	Guard Rail 113	**651476**	**3.40**
	Guard Rail 82	**651477**	**2.60**
	**Toe Board 400/15**	**651979**	**10.90**
	Toe Board 300/15	**651978**	**7.20**
	Toe Board 250/15	**651977**	**6.00**
	Toe Board 200/15	**651976**	**4.90**
	Toe Board 150/15	**651975**	**3.80**
	Toe Board 125/15	**651974**	**3.20**
	Toe Board 113/15	**651973**	**3.00**
	Toe Board 101/15	**651972**	**2.90**
	Toe Board 82/15	**651971**	**2.30**
	Toe Board 74/15	**651970**	**2.10**
	Installed in longitudinal direction. Height 15 cm.		

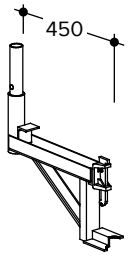
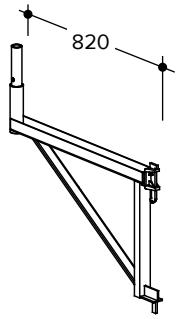
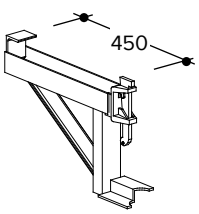
Unless stated otherwise, all dimensions in mm.

	Component	Part code	Weight [kg]
	**Toe Board 300/15 Trans**	**651999**	**7.40**
	Toe Board 250/15 Trans	**651998**	**6.30**
	Toe Board 200/15 Trans	**651997**	**5.20**
	Toe Board 150/15 Trans	**651996**	**4.10**
	Toe Board 125/15 Trans	**651995**	**3.50**
	Toe Board 113/15 Trans	**651994**	**3.30**
	Toe Board 101/15 Trans	**651993**	**3.00**
	Toe Board 82/15 Trans	**651992**	**2.60**
	Toe Board 74/15 TRANS	**651991**	**2.40**
	Installed in transverse direction. Height 15 cm.		
	**Steel Toe Board 300/15**	**531437**	**9.00**
	Steel Toe Board 250/15	**531448**	**6.70**
	Steel Toe Board 200/15	**531459**	**5.50**
	Steel Toe Board 150/15	**531460**	**4.30**
	Steel Toe Board 125/15	**531470**	**3.70**
	Steel Toe Board 113/15	**652017**	**3.60**
	Steel Toe Board 101/15	**652016**	**3.30**
	Steel Toe Board 82/15	**652015**	**2.80**
	Steel Toe Board 74/15	**652014**	**2.60**
	Sheet steel hollow box with zinc coating. 15 cm high by 3 cm thick.		
	**Steel Toe Board 300/15 Trans**	**651736**	**8.70**
	Steel Toe Board 250/15 Trans	**651737**	**6.60**
	Steel Toe Board 200/15 Trans	**651738**	**5.40**
	Steel Toe Board 150/15 Trans	**651739**	**4.20**
	Steel Toe Board 125/15 Trans	**651740**	**3.60**
	Steel Toe Board 113/15 Trans	**651742**	**3.30**
	Steel Toe Board 101/15 Trans	**652003**	**3.00**
	Steel Toe Board 82/15 Trans	**651742**	**2.60**
	Steel Toe Board 74/15 Trans	**652002**	**2.40**
	Height 15 cm.		
	**Scaffold Retainer 350**	**467063**	**15.00**
	Scaffold Retainer 250	**467041**	**10.80**
	Scaffold Retainer 223	**467085**	**8.70**
	Scaffold Retainer 180	**116820**	**7.00**
	Scaffold Retainer 140	**116793**	**5.70**
	Scaffold Retainer 110	**116808**	**4.10**
	Scaffold Retainer 75	**78940**	**2.90**
	Scaffold Retainer 45	**78939**	**1.90**
	Steel tube Ø 48.3 mm with hooks Ø 20 mm. For tying the scaffolds.		

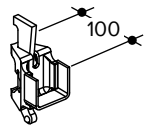
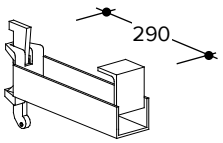
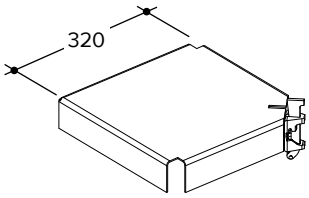
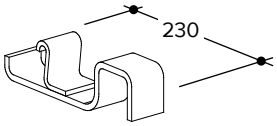
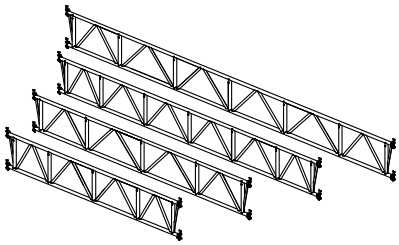
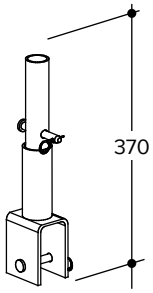
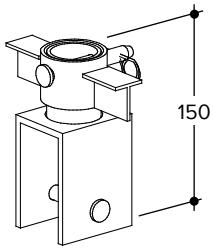
Unless stated otherwise, all dimensions in mm.

	Component	Part code	Weight [kg]
	**25 Plugs S14 ROE-100**	**497842**	**0.20**
	**25 Scaffold Eyelets GS 12 x 120** **25 Scaffold Eyelets GS 12 x 160**	**497864** **497875**	**4.60** **5.00**
	**Rigid Coupler 48/48 w.a.f. 22** To connect Ø 48.3 mm tubes at right angles.	**2514**	**1.20**
	**Swivel Coupler 48/48 w.a.f. 22** To connect tubes at any angle.	**2525**	**1.40**

4.2 Auxiliary equipment

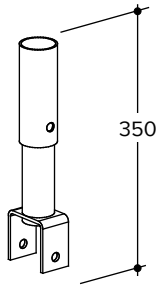
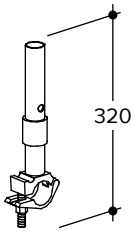
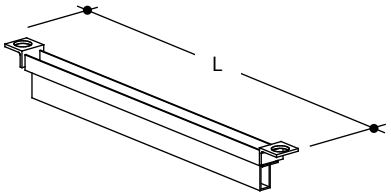
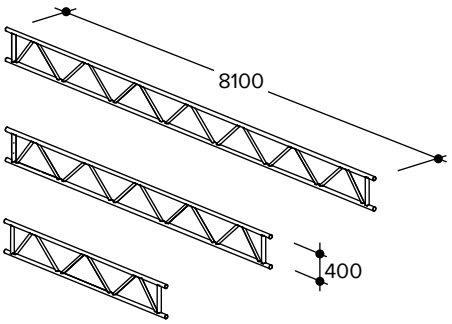
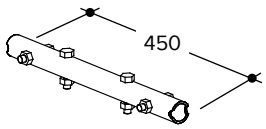
	Component	Part code	Weight [kg]
	**Stage Bracket 32 A** To widen the scaffold deck, using a plank 32 cm wide.	**583416**	**5.60**
	**Stage Bracket 82 A** To widen the scaffold deck, using two planks 32 cm wide.	**583427**	**10.20**
	**Stage Bracket 32 without Starting Piece** To widen the scaffold deck, using a plank 32 cm wide.	**651514**	**4.00**

Unless stated otherwise, all dimensions in mm.

	Component	Part code	Weight [kg]
	**U Bracket S** Used as a Stage Bracket on the outside of the scaffold in conjunction with steel planks, type S.	**651479**	**0.80**
	**Stage Bracket** Used as a Stage Bracket on the outside of the scaffold in conjunction with two steel planks, type S.	**651481**	**1.80**
	**Inner Corner 32**	**651525**	**8.80**
	**Outer Corner Bracket** Connects two bays at a scaffold corner.	**651510**	**1.40**
	**System Lattice Girder 750** **System Lattice Girder 600** **System Lattice Girder 500** **System Lattice Girder 400**	**651535** **651534** **651533** **651532**	**84.40** **72.00** **54.40** **49.10**
	**Starting Piece for Lattice Girder** To connect Vertical Posts to Lattice Girders. To connect Transoms to Lattice Girders with Vertical Post connection.	**651543**	**2.10**
	**Starting Piece for Transom** To connect Transoms to Lattice Girders without a Vertical Post Connection. Secures the Lifting Retainer Tube.	**651792**	**1.60**

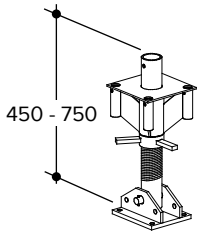
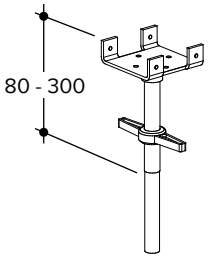
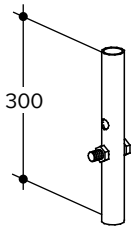
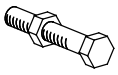
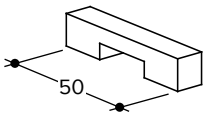
Unless stated otherwise, all dimensions in mm.

Components

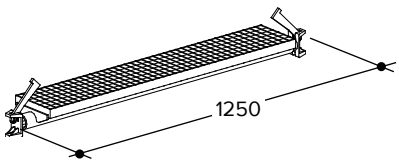
	Component	Part code	Weight [kg]
	**Starting Piece for Transom U** To connect Vertical Posts to a Transom U.	**651261**	**1.70**
	**Starting Piece for Tube Ledger** To connect Vertical Posts to Tube Ledgers.	**651547**	**1.50**
	**Transom 300**	**651847**	**28.90**
	Transom 2500	**651848**	**24.10**
	Transom 200	**651849**	**19.30**
	Transom 150	**651850**	**14.50**
	Transom 125	**651851**	**12.10**
	Transom 113	**651552**	**10.90**
	Transom 82	**651553**	**9.77**
	**Steel Lattice Girder 760**	**575555**	**73.00**
	Steel Lattice Girder 610	**575544**	**58.00**
	Steel Lattice Girder 510	**575533**	**49.00**
	Steel Lattice Girder 410	**575522**	**39.00**
	Steel Lattice Girder 310	**575511**	**30.00**
	Alu Lattice Girder 810	**444251**	**33.60**
	Alu Lattice Girder 610	**444240**	**25.40**
	Alu Lattice Girder 510	**444230**	**21.80**
	Alu Lattice Girder 410	**444229**	**17.30**
	Alu Lattice Girder 310	**444218**	**13.30**
	Commercially available lattice girders, 40 cm high. Upper and lower chord: Ø 48.3 mm tube.		
	**Connection Tube** Used as a butt joint for lattice girders.	**575500**	**1.40**

Unless stated otherwise, all dimensions in mm.

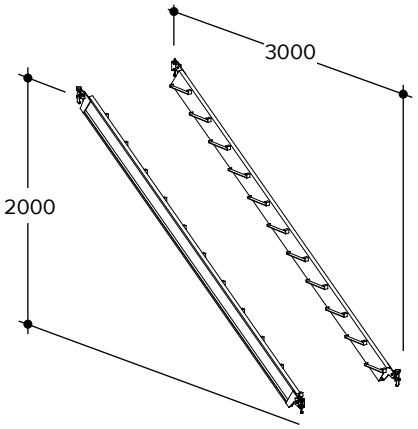
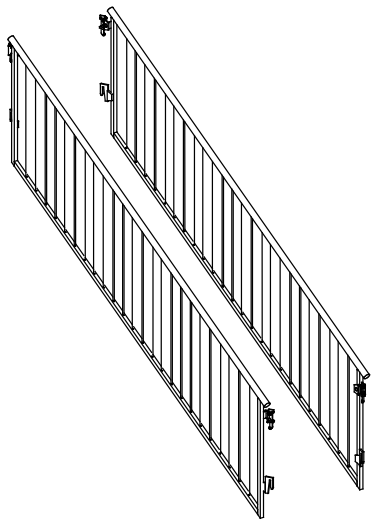
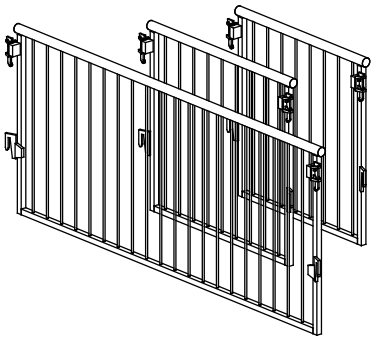
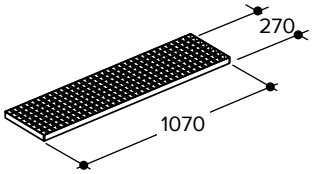
4.3 Heavy-duty shore

	Component	Part code	Weight [kg]
	**MODEX Shore Jack** Height adjustable from 45 to 75 cm. Suitable for use at top or bottom.	**580802**	**61.00**
	**ID Head Jack 38/52** To attach beams. The upper plate can compensate for slopes up to 6%. Adjustable height from 8 cm to 29.8 cm.	**148530**	**8.20**
	**Connecting Spigot** Serves as the connection between the MODEX Shore Jack (Base Plate) and the Vertical Posts.	**553667**	**0.90**
	**M12x75 Joint Securing Bolt 4.6 (with nut)** Connects Vertical Posts to one another.	**554710**	**0.30**
	**Shear Force Securing Device** Inserted into the adapter of Tube Ledger 25 to prevent it from lifting off.	**577988**	**0.40**

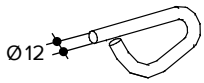
4.4 MODEX Classic staircase

	Component	Part code	Weight [kg]
	**G-bar** Required for the transition between the landing and the flights of the staircase.	**525656**	**11.20**

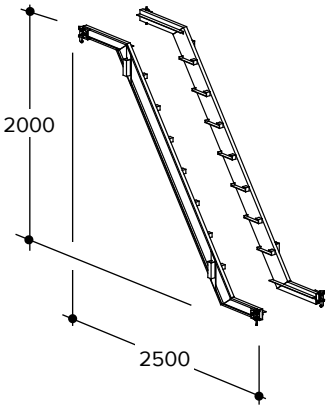
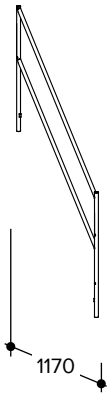
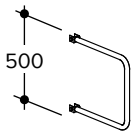
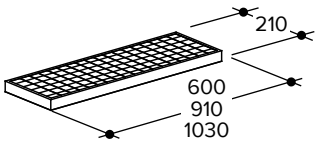
Components

	Component	Part code	Weight [kg]
	**Stringer 200/300 Left**	**526385**	**28.80**
	Stringer 200/300 Right	**526396**	**28.80**
	Left and right staircase stringer for attaching the steps of the staircase (grid).		
	**Diagonal Railing 300/200 L**	**651910**	**41.70**
	Diagonal Railing 300/200 R	**651911**	**41.70**
	Used to secure staircases.		
	**Horizontal Railing 250**	**651902**	**32.20**
	Horizontal Railing 125	**651903**	**18.20**
	Horizontal Railing 113	**651904**	**16.90**
	Used to secure landings.		
	**Grid 27/107**	**525623**	**8.90**
	Used to create the individual steps.		
	**Grid Securing Device**	**525690**	**2.00**
	This bolt M10x45 locks the steps securely into place to prevent unauthorised removal.		
	25 pieces per package.		

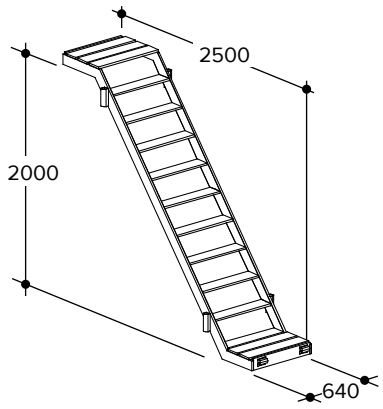
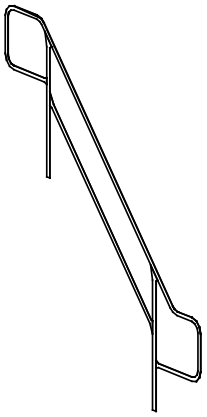
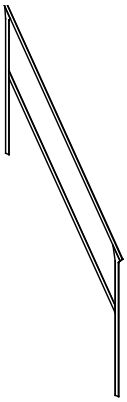
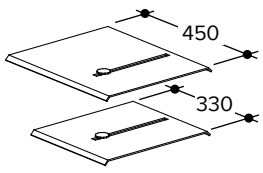
Unless stated otherwise, all dimensions in mm.

	Component	Part code	Weight [kg]
	**Ø 12 Frame Pin** For tension-resistant connection of the Vertical Posts.	**129473**	**0.30**

4.5 MODEX Compact staircase

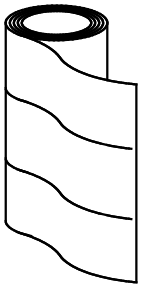
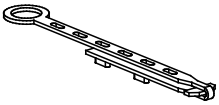
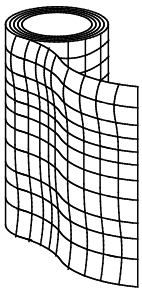
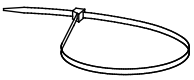
	Component	Part code	Weight [kg]
	**Stringer LEFT 200/250**	**651694**	**29.20**
	Stringer RIGHT 200/250 Left and right staircase stringer for attaching the steps of the staircase (grids).	**651680**	**29.20**
	**Basic Handrail** Hot-dip galvanised steel.	**651698**	**13.10**
	**Platform Handrail** With two bolts.	**651703**	**3.00**
	**Grid 21-60**	**651707**	**3.90**
	Grid 21-91	**651708**	**5.90**
	Grid 21-103 Used for the individual steps.	**651709**	**6.80**

4.6 Alu scaffold staircase

	Component	Part code	Weight [kg]
	**Alu Stairway 250** With landings for external staircase access. Fits all Transoms U. Bay length: 2.50 m Storey height: 2.00 m Stair width: 0.64 m Riser height: 0.20 m	**464633**	**23.60**
	**Exterior Railing** Hot-dip galvanised steel	**464655**	**16.90**
	**Interior Railing** Hot-dip galvanised steel	**464644**	**11.90**
	**Gap Plate Top** **Gap Plate Bottom** To bridge the gaps between the upper and lower staircase landings, and the scaffold planks.	**467670** **467626**	**2.10** **1.60**

Unless stated otherwise, all dimensions in mm.

4.7 Scaffold Tarp and accessories

	Component	Part code	Weight [kg]
	DELTA Scaffold Tarp 2.70 x 20.0 m	543292	15.10
	DELTA Scaffold Tarp 3.25 x 20.0 m	543307	18.20
	DELTA Tie	533024	0.10
	DELTA Toggle Binder, 50 pieces	533609	0.60
	DELTA Toggle Binder, 1 piece	533035	0.10
	Scaffold Netting 2.5 m x 20.0 m	563343	3.0
	Scaffold Netting 3.0 m x 20.0 m	563354	3.6
	Disposable Ties, 100 pieces	588430	0.10

5 Application planning and erection preparation

5.1 Application planning

NOTE

Note!
Verification of structural integrity must be provided every time the scaffold is used.

For certain selected cases (standard design), verification has been provided and is included in this manual (Refer to sections 8 to 13).

Criteria essential to application planning:

- Intended application of the scaffold (i. e. working, protective, birdcage, formwork or support scaffold)
- Dimensions and precise area of planned vertical live loads to be absorbed
- Horizontal load caused by wind

- Number of working levels, along with their width and length
- Determination of planks needed, all of which have their own dead weight as a factor of the material (steel, timber or alu planks, or aluminium frame decks)
- Determination of the suitable lengths for Vertical Posts
- Vertical Posts should be joined in the immediate vicinity of the working levels and horizontal braces
- Arrangement and number of Vertical Diagonals as well as the type of positioning:
  a) Tower arrangement
  b) Intersecting and transverse arrangement (Both arrangements permit a maximum of five scaffold bays per Vertical Diagonal)
- Quantity and position of Scaffold Retainers
- Potential use of commercially available planks, requiring the additional installation of H-diagonals (at least every 5th scaffold bay per scaffold storey)
- Beginning erection at the base **with** or **without** Starting Piece (When Starting Pieces are used, one person can set up the scaffold alone)
- Always comply with the maximum load capacities specified in this user guide.

5.2 Erection preparation

Follow these instructions to make erection easier and to facilitate quick and safe assembly of the scaffold:

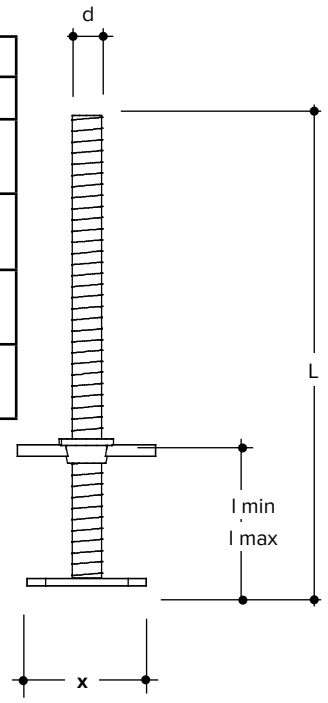
- Both the erection area and the surface on which the scaffold is to be erected must be able to bear the anticipated vertical loads transmitted through the Vertical Posts; if necessary, load-distributing planks should be placed under the Base Jacks
- Store all components properly and check that they are complete
- Never use damaged scaffold material
- Leave adequate clearance between the scaffold and the building/structure; take into consideration any obstructions (protrusions, ledges, etc.)
- Set up the Base Jacks and adjust the height as specified in the applicable drawing
- Completely assembly and align the base. Insert the posts and then install, brace and interlock them properly
- Install the diagonal braces and scaffold ties as the scaffold is being erected
- Secure working platforms and/or other platforms with guard rails (Tube Ledgers) and Toe Boards..

NOTE	**Note!** In certain circumstances, additional components such as steel tubes (Ø 48.3 mm, which must be connected with couplers pursuant to EN 74-1) as well as scaffold boards and planks (complying with DIN 4420, Part 1 and Part 3, EN 74-1 and EN 12 811) may be added to the scaffold.

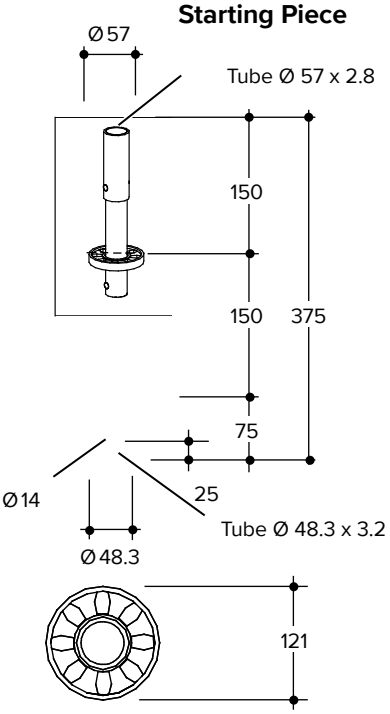
5.3 Design features

Table 5.1

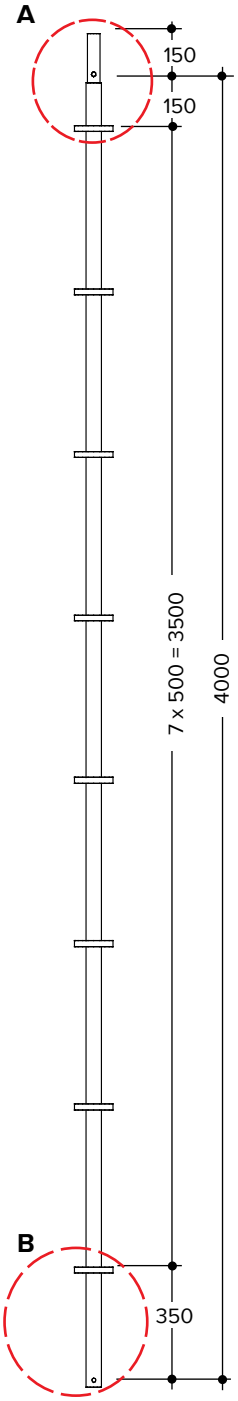
Jack dimensions					
Jack type	L	l min	l max	x	d
Jack type 45/3.8	450	65	265	130	38
Base Jack 70/3.8	700	65	500	130	38
ID 15 Base Jack 38/52	520	87	300	170	38
For information on the jack load capacities, refer to Diagrams 5.1 to 5.22, page 44 - 54					



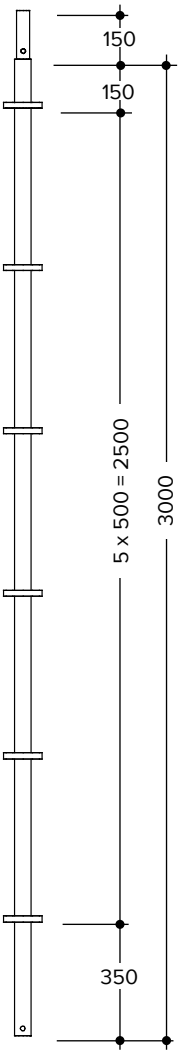
Starting Piece



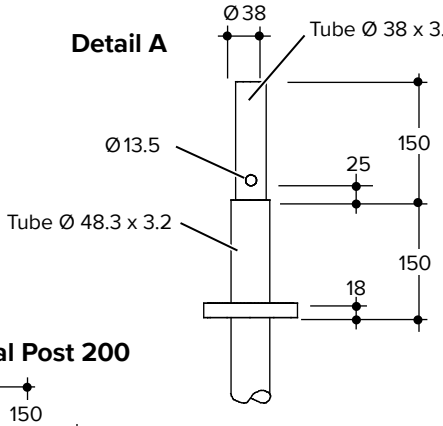
Vertical Post 400



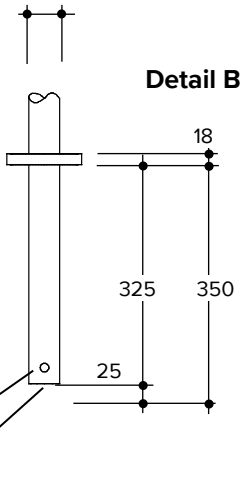
Vertical Post 300



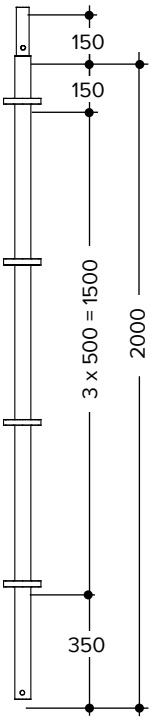
Detail A



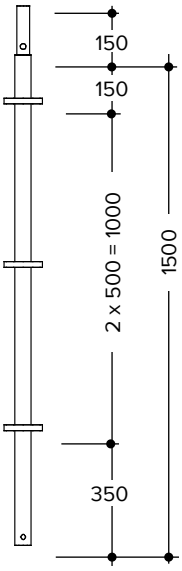
Detail B



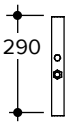
Vertical Post 200



Vertical Post 150

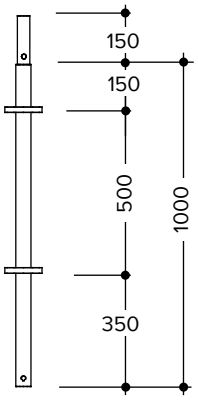


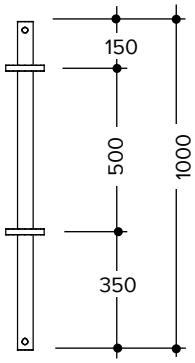
Vertical Post 100 L, 150 L, 200 L
and Connecting Spigot



The spigot can be ordered as needed. The Bolt M12x75 needed for fastening is included.

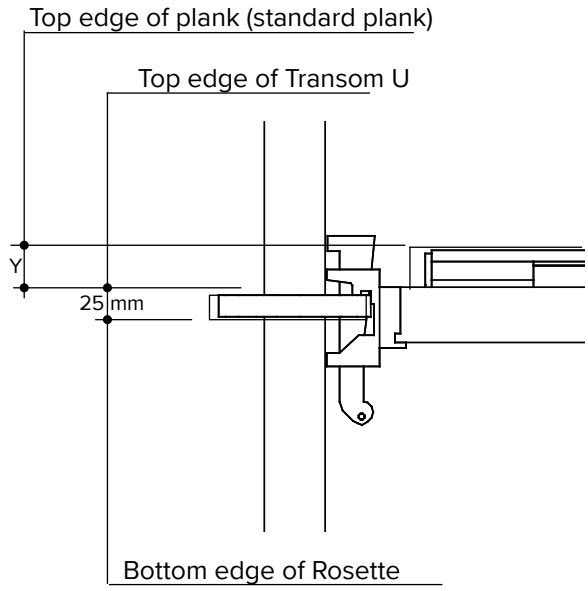
Vertical Post 100



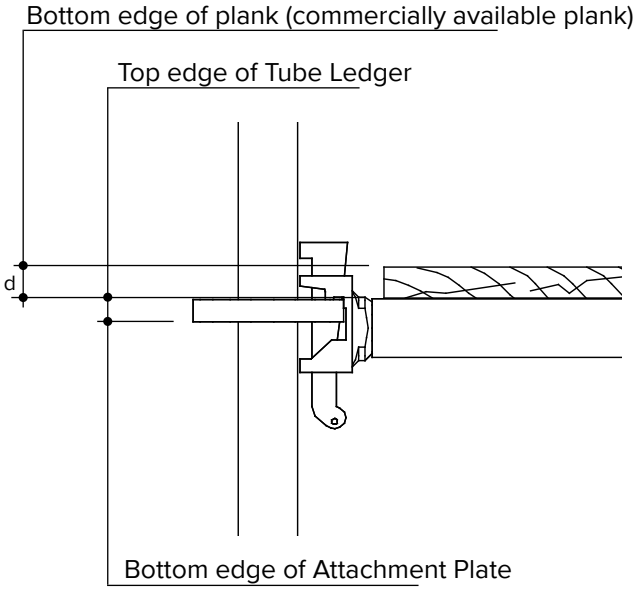


Unless stated otherwise, all dimensions in mm.

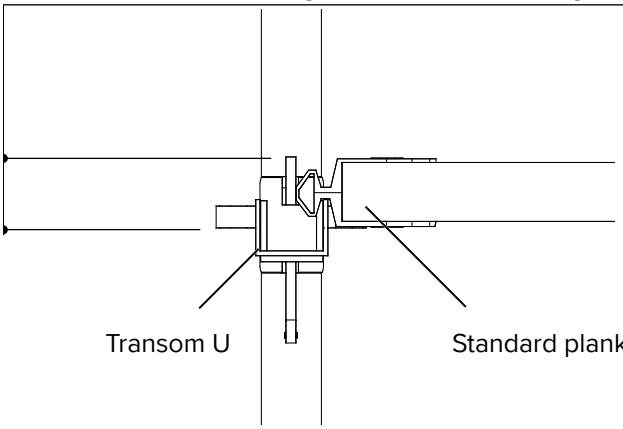
Use of Transoms U with standard planks



Use of Tube Ledgers with commercially available planks

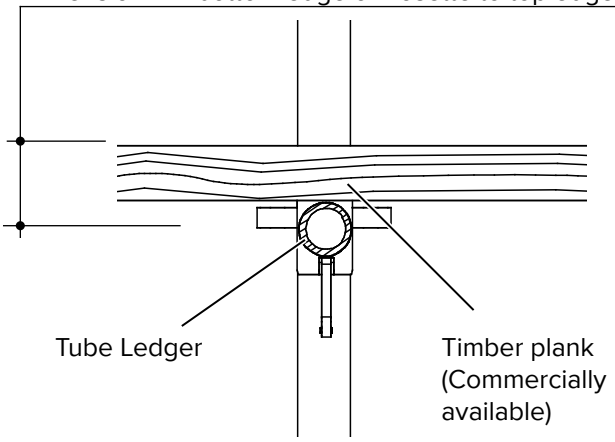


Dimension X = bottom edge of Rosette to top edge of plank



Dimension X = Y + 25 mm
With different standard planks

Dimension X = bottom edge of Rosette to top edge of plank



Dimension X = plank thickness + 25 mm

Timber plank, 32 cm wide	55 mm
Steel Plank	65 mm
Alu Plank, 32 cm wide	55 mm
Alu plank, 50 cm wide	90 mm
Alu Frame Deck	60 mm
Alu Ladder Passage Deck	60 mm
Hollow Box Plank	55 mm
Horizontal Frame with Horizontal Frame Plank	90 mm

Plank d = 50 mm	75 mm
Plank d = 45 mm	70 mm
Plank d = 40 mm	65 mm
Plank d = 35 mm	60 mm
Plank d = 30 mm	55 mm

NOTE

Note!

The installation dimensions specified above enable the exact measurements of the scaffold to be determined or specified from any given elevation.

Unless stated otherwise, all dimensions in mm.

5.4 Overview of suitable planks and their load classification (LC) pursuant to EN 12811-1

Table 5.2

Type of plank	Width	Assignment to load class by span in cm							
		82	113	125	150	200	250	300	400
Timber plank	32			6	6	5	4	3	
Hollow Box Plank	32			6	6	5	4	3	
Steel Plank	32	6	6	6	6	6	5	4	3
Steel Plank S	18				6	6	5	4	
Alu Plank	32			6	6	6	6	5	3
Alu Plank	50			6		6	6	5	
Alu Frame Deck	70					3	3	3	
Alu Ladder Passage Deck	70						3	3	
Horizontal Frame	100			6			6	5	

Live loads pursuant to EN 12811-1 (edition March 2004)

Table 5.3

Load class LC	Specific nominal load p [kN/m²]	Concentrated load [1] P_1 [kN]	P_2	Partial area load P_c [kN/m²]	Partial area A_c
1	0.75[2]	1.5	1.0	–	–
2	1.50	1.5	1.0	–	–
3	2.00	1.5	1.0	–	–
4	3.00	3.0	1.0	5.0	0.4 x A_P
5	4.50	3.0	1.0	7.5	0.4 x A_P
6	6.00	3.0	1.0	10.0	0.5 x A_P

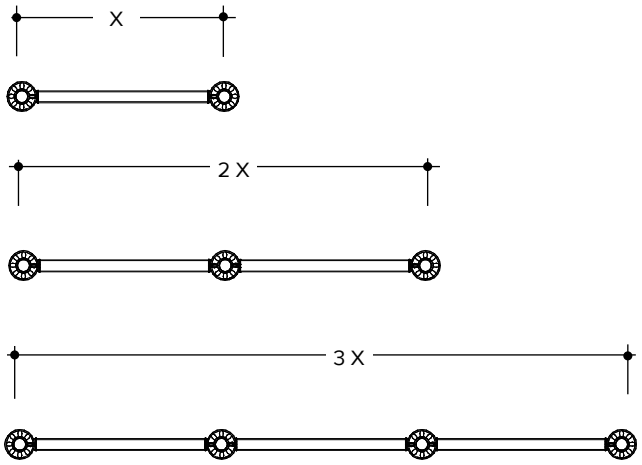
[1] P_1 Load area 0.5 m x 0.5 m, but at least 1.5 kN per plank

P_2 Load area 0.2 m x 0.2 m

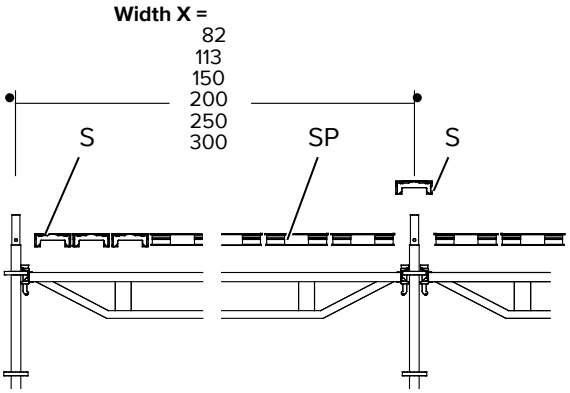
[2] For planks p = 1.50 kN/m²

A_P = Load area complies with the partial area factor specified by EN 12811-1

5.5 Number of planks required for birdcage scaffolds, taking into consideration scaffold bay width



SP = steel plank, 32 cm wide
S = steel plank S, 18 cm wide



Basic configurations:

Various lengths of steel planks (32 cm wide). Steel plank S as filler planks (18 cm wide). Transom U S used as a U Bracket S on the outside of the scaffold (Refer to example below).

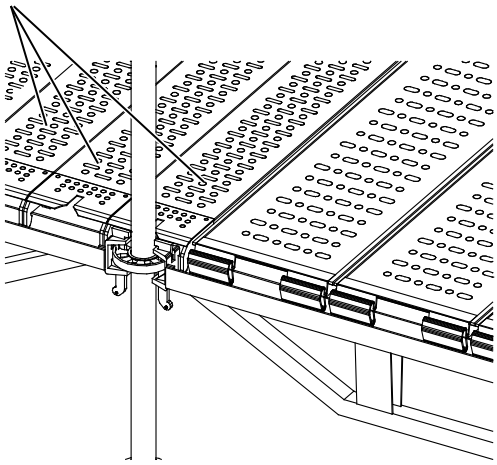
X = Single bay (2 posts)
2 X = Double bay (3 posts)
3 X = Triple bay (4 posts)
SP = Steel Plank
S = Steel Plank 18

Table 5.4

Transom U (length)	No. and type of planks		
	Width X	Width 2 X	Width 3 X
82	2no. SP	4no. SP + 1no. S	6no. SP + 2no. S
113	3no. SP	6no. SP + 1no. S	9no. SP + 2no. S
150	3no. SP + 2no. S	6no. SP + 5no. S	9no. SP + 8no. S
200	4no. SP + 3no. S	8no. SP + 7no. S	12no. SP + 11no. S
250	5no. SP + 4no. S	10no. SP + 9no, S	15no. SP + 14no. S
300	6no. SP + 5no. S	12no. SP + 11no. S	18no. SP + 17no. S

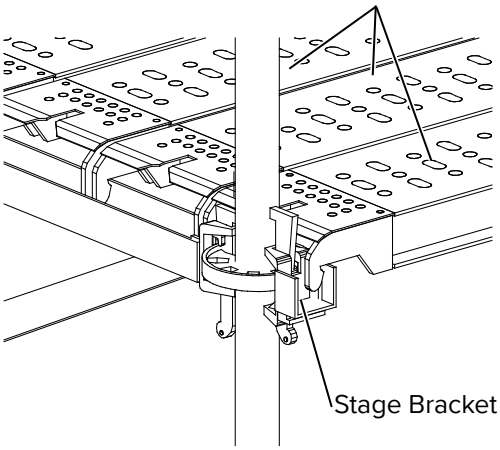
Unless stated otherwise, all dimensions in mm.

Steel Plank S



Steel Plank S also closes the gap in the area of the scaffold joint.

Steel Plank S



The working platform can be widened by 18 cm when the Stage Bracket is used to attach Steel Plank S.

5.6 Technical data MODEX nodes

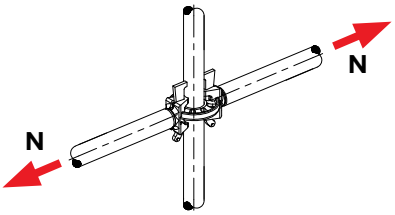
The following MODEX connection specifications are indicated by the German Technical Approval issued by the Deutsches Institut für Bautechnik, Berlin (Z-8.22-67).

Load capacity of MODEX nodes when subjected to...

Normal force

... tensile and compressive forces (along the longitudinal axis of the horizontal braces)

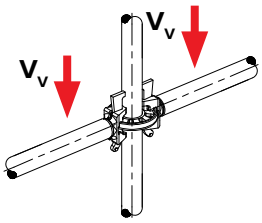
Normal force
$N_{perm.} = \pm 18.9$ kN



Shear force (vertical)

... vertical forces perpendicular to the longitudinal axis of the horizontal braces

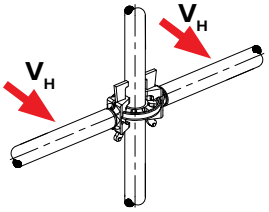
Shear force (vertical)
$V_{V\ perm} = +15$ kN / -1.8 kN
$\Sigma V_{V\ max.} = +49.3$ kN



Shear force (horizontal)

... horizontal forces on the axis of the Vertical Diagonals

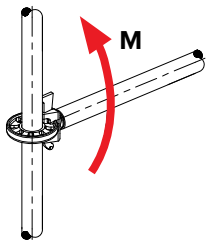
Shear force (horizontal)
$V_{H\ perm.} = \pm 22.6$ kN



Bending moment

.... bending loads around the axis perpendicular to the longitudinal axis of the horizontal braces

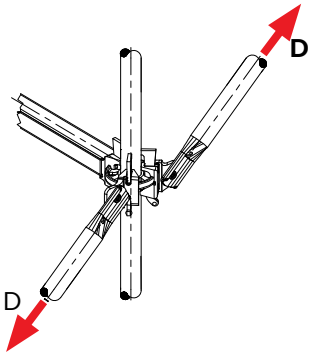
Bending moment
$M_{perm.}$ = ± 56.8 kN cm
Corresponding stiffness of transom connection: C_{φ} , m ~ 8000 kN cm/rad



Diagonal force

.... tensile and compressive force on the axis of the Vertical Diagonals

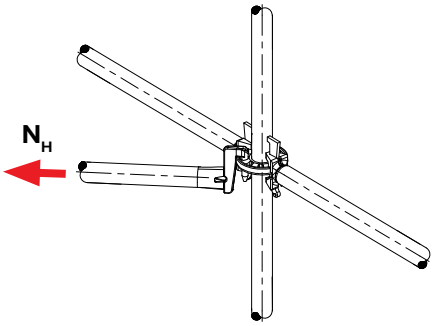
Diagonal force
$D_{perm.}$ = ± 12.4 kN
(For all angles between 20° and 60°)



Horizontal diagonal force

... tensile and compressive force on the axis of the Horizontal Diagonals

Horizontal Diagonal
$A_{H\ perm.}$ = ± 17.3 kN



5.7 Technical data Transoms U and Tube Ledgers

Table Transoms U

Table 5.5

Load class (LC) per EN 12811-1:2004-03 permissible line load (p_s).							
Transom U (PTU)	Max. transom load p_S [kN/m]	Plank length l [cm]					
		125	150	200	250	300	400
PTU 82	11.5	6	5	5	4	4	3
PTU 113	11.7	6	5	5	4	4	3
PTU 150	16.0	6	6	6	5	5	4
PTU 200	12.0	6	6	5	4	4	3
PTU 250	7.2	5	4	4	3	3	2
PTU 300	4.9	4	3	3	2	1	1
PTU 82/12.6	34.6	6	6	6	6	6	6
PTU 113/12.6	22.5	6	6	6	6	5	5
PTU 125/12.6	20.3	6	6	6	6	5	5
PTU 150/12.6	16.7	6	6	6	5	5	4
PTU 200/12.6	12.0	6	6	5	4	4	3
PTU 250/12.6	7.2	5	4	4	3	3	2
PTU 300/12.6	4.9	4	3	3	2	2	1

Table Tube Ledgers

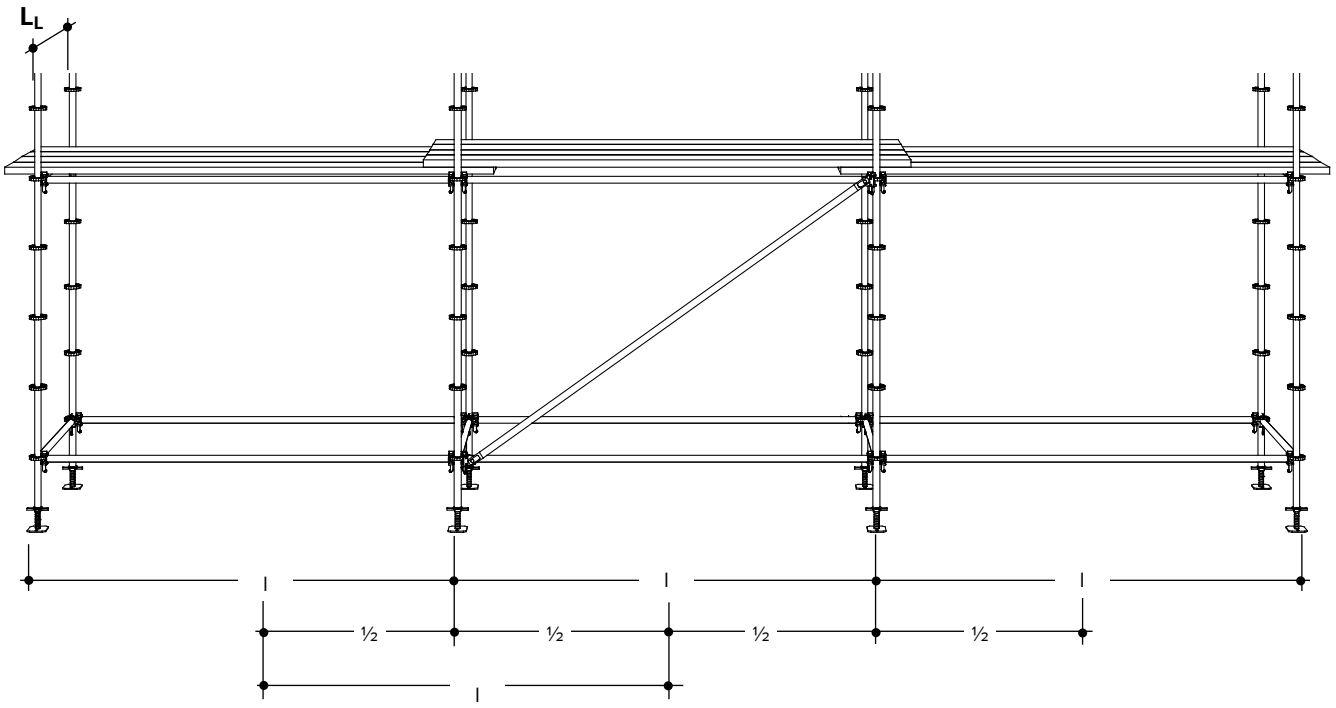
Table 5.6

Load class (LC) per EN 12811-1:2004-03 permissible line load (p_s).							
Tube Ledger (TL)	Max. ledger load p_S [kN/m]	Plank length l [cm]					
		125	150	200	250	300	400
TL 74	24.6	6	6	6	6	6	5
TL 101	12.2	6	6	5	4	4	3
TL 150	5.1	4	3	3	2	1	1

Drawing of scaffolding

L_L Length of loaded ledger/transom (Transom U or Tube Ledger)

l = Length of standard planks or commercially available timber planks (direction of support)
Also: Length affecting the proportional load applied to ledger/transom



Unless stated otherwise, all dimensions in mm.

5.8 Technical data H-diagonals and Stage Brackets

Table H-diagonals

Table 5.7

Scaffold part	Concentrated load [kN]
H-diagonal 101/101	10.4
H-diagonal 101/150	
H-diagonal 101/200	
H-diagonal 101/250	
H-diagonal 101/300	8.5
H-diagonal 150/082	10.4
H-diagonal 150/101	
H-diagonal 150/113	
H-diagonal 150/150	
H-diagonal 150/200	
H-diagonal 150/250	9.4
H-diagonal 150/300	8.0
H-diagonal 200/082	10.4
H-diagonal 200/101	
H-diagonal 200/113	
H-diagonal 200/150	
H-diagonal 200/200	9.7
H-diagonal 200/250	8.4
H-diagonal 200/300	7.3
H-diagonal 250/082	10.4
H-diagonal 250/101	9.5
H-diagonal 250/113	10.0
H-diagonal 250/150	9.4
H-diagonal 250/200	8.4
H-diagonal 250/300	7.5
H-diagonal 300/082	6.6
H-diagonal 300/101	8.7
H-diagonal 300/115	8.5
H-diagonal 300/150	8.4
H-diagonal 300/200	8.0
H-diagonal 300/250	7.3
H-diagonal 300/250	6.6
H-diagonal 300/300	5.8

Table Stage Brackets

Table 5.7a

Bay length [m]	Load classes (LC) per EN 12811-1:2004-03	
	Enlargement Bracket 32A	Enlargement Bracket 82A
1.25	6	4
1.50	6	4
2.00	6	3
2.50	6	3
3.00	6	3
4.00	5	3

WARNING

Safety note:

Load only from the plank; no simultaneous concentrated load permissible. Additional reinforcement may be required to accommodate the lower connecting forces: provide separate certification.

perm. P [kN]	perm. p_s [kN/m]	
	Enlargement Bracket 32A	Enlargement Bracket 82A
0.00	28.80	8.64
2.50	19.50	
3.00	–	8.00
4.50	–	6.47
5.00	9.90	–
7.53	0.00	–
7.90	–	0.00

WARNING

Safety note:

Simultaneous line load **pS** and vertical concentrated load **P** at the tubular joint. Additional reinforcement may be required to accommodate the lower connecting forces: provide separate certification.

5.9 Technical data System Lattice Girders

The lattice girders are held in place at a distance of “a” at the top chord by a horizontal bracing assembly. The horizontal bracing assembly can be made up of Tube Ledgers, Transoms U and H-diagonals. An alternative is to use a horizontal bracing assembly consisting of tubes and couplers.

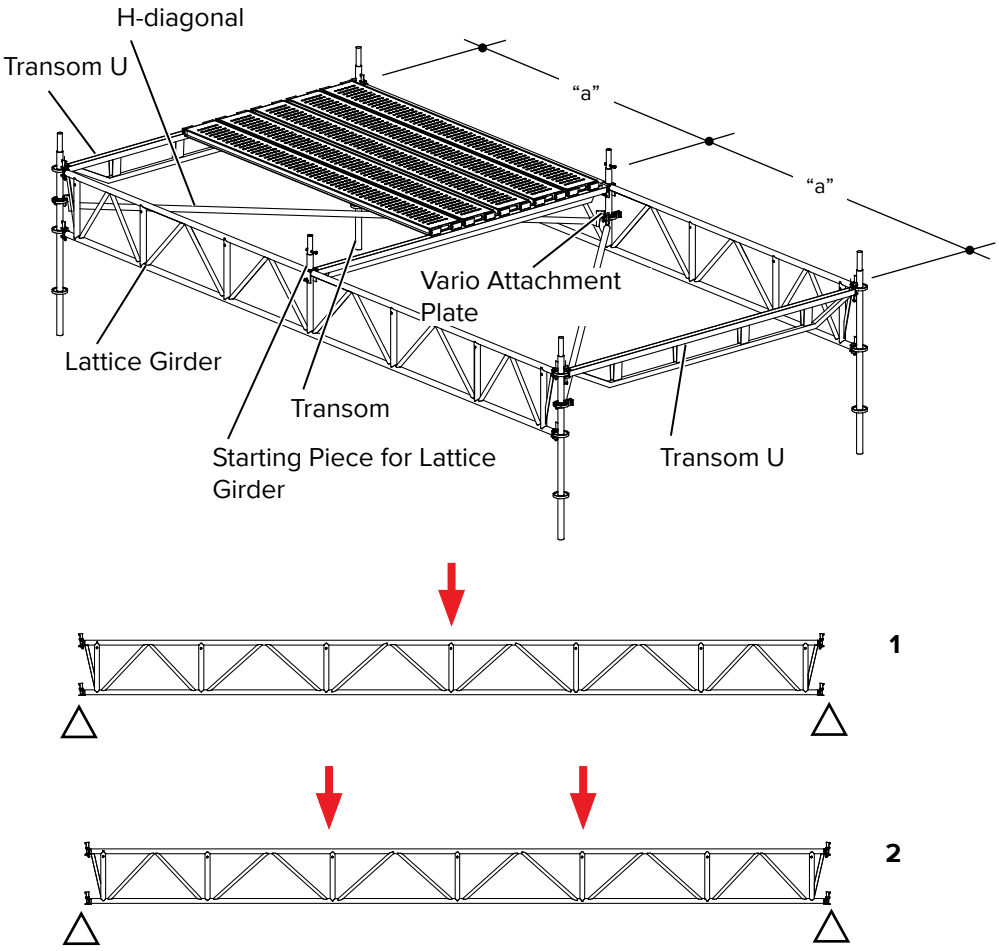
The load passes through a MODEX transom into the Vertical Posts of the Lattice Girders.

MODEX Lattice Girders 400:
Load at centre of bay: ①
a = 2.00 m $P_{perm.}$ = 26.50 kN
a = 4.00 m $P_{perm.}$ = 16.50 kN

MODEX Lattice Girders 600:
Load at centre of bay: ①
a = 3.00 m $P_{perm.}$ = 13.50 kN
a = 6.00 m $P_{perm.}$ = 5.60 kN
Load at third of width: ②
a = 2.00 m $P_{perm.}$ = 14.25 kN
a = 6.00 m $P_{perm.}$ = 3.20 kN

MODEX Lattice Girders 500:
Load at centre of bay: ①
a = 2.50 m $P_{perm.}$ = 20.50 kN
a = 5.00 m $P_{perm.}$ = 9.10 kN

MODEX Lattice Girders 750:
Load at centre of bay: ①
a = 3.75 m $P_{perm.}$ = 7,50 kN
Load at third of width: ②
a = 2.50 m $P_{perm.}$ = 8.40 kN
a = 7.50 m $P_{perm.}$ = 1.40 kN



At a shaft distance of e = 5.5 cm, the load is transferred along the edges of the node. The torque V × e must be considered when providing proof that the MODEX scaffold posts are structurally sound (V equals the current load to which the Lattice Girders are subjected).

Unless stated otherwise, all dimensions in mm.

5.10 Measuring aids

The following tables and diagrams are intended to assist in determining the actual and permissible forces acting upon the vertical posts in either the general area or the lower area of the MODEX scaffold.

These measuring aids include both the stress analysis pursuant to DIN 18800 Part 1 and the proof of structural stability of the individual posts as required by DIN 18800 Part 2. The proof for the general area was determined with the assistance of the equivalent member method, and the proof for the lower area of the scaffold was determined applying the second order theory. The adverse horizontal forces acting on the lower part of the scaffold, the eccentric application of diagonal forces and the positive effect of the transoms connected with torsion springs are all taken into account.

WARNING

Safety note:

In addition to providing evidence of the suitability of the individual posts as described above, the horizontal stiffness of the entire scaffold must be verified.

It is generally sufficient if all posts are secured at each node in both orthogonal horizontal directions by using an assembly comprised of transoms, Vertical Diagonals and/or Horizontal Diagonals.

Calculation

First calculate the following loads:

- Maximum post load
  - Using dead weight; refer to Table 5.8
  - Using live load; refer to Table 5.3
- Maximum wind load per (section) plane for each level; refer to Table 5.9
- Calculation of force to which the Vertical Posts are subjected N [kN] as a result of direct load and of bracing. The values are specified separately for the posts on the edges or in the centre of the scaffold.
- Calculation of maximum horizontal loads H [kN] along the base of the scaffold

Next determine the forces permitted to act upon the Vertical Posts $N_{perm.}$ [kN]:

- Determination of the rigidity of the transom connections (separately for posts on the edges and in the centre); refer to Table 5.10
- According to the specified stiffness, the Base Jack type and the Jack Extension Diagrams 5.1 to 5.20 show the safe working load (SWL) for the corresponding horizontal forces. Diagrams 5.21 and 5.22 apply to the general area. Linear interpolation can be applied to calculate the values between lines of different rigidities of transom connections.
- Proof of forces acting on posts: $N \leq N_{perm.}$

5.11 Tables related to application planning and erection preparation

Table 5.8 **Dead weight [kg] of scaffold components**

Bay width	[cm]	74	82	101	113	125	150	200	250	300	400
Jack	45/3.8	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	70/3.8	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	ID 15	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Posts	200	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
	150	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
	100	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
V-diagonal			9.8		10.3		10.9	12.1	13.6	14.9	
H-brace R		3.5	3.8	4.6	5.0	5.4	6.4	8.2	10.1	12.0	15.8
H-diagonal	125		6.0		6.7						
	250		10.3	10.4	10.6	10.8		12.4	13.7		
	300	12.1		12.4							
Transom U			4.1		7.1		11.1	15.0	17.1	22.0	
Toe Board		3.4	3.6	4.0	4.3	4.6	5.1	6.2	7.4	8.5	
Steel Plank S	18							10.8	14.3	15.3	
Hollow Box Plank	32	6.1				8.7	8.5	12.6	15.1	17.6	
Timber plank	32					11.6	10.0	17.3	21.1	24.9	
Steel Plank	32		7.3		9.6	10.4	13.5	15.8	19.4	23.0	31.5
Alu Plank 32	32					8.4	12.2	12.0	14.4	16.8	21.4
Alu Plank 50	50					12.3	9.6	17.6	21.2	24.7	
Horizontal Frame	50					8.8			17.3	20.5	
Alu Frame Deck	70							13.8	17.1	20.1	
Horizontal Frame	100					14.8			29.1	35.4	
Quantity n	18		0.5		0.5		2.5	3.5	4.5	5.5	
	32		2		3		3	4	5	8	
	50				2						
	70		1								
	100				1						

Refer to Table 5.4 for number of planks - **Width 2 X**

Unless stated otherwise, all dimensions in mm.

Table 5.9 Wind load on MODEX components per EN 12810-1:2004:03 $W = c_l \times c_f \times X \times q \times d \times L$ [kN]

H [m]			**0.50**	**2.50**	**4.50**	**6.50**	**8.50**	**10.50**	**12.50**	**14.50**	**16.50**	**18.50**	**20.50**
Dynamic wind pressure	q [kN/m^2]		0.87	0.89	0.91	0.93	0.95	0.97	0.99	1.01	1.03	1.05	1.07
Serviceable life factor	k_{si}		0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Shape coefficient	c_f		1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
Position coefficient	c_l		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Component	L	d											
Posts	2.00	0.048	0.076	0.077	0.079	0.081	0.083	0.084	0.086	0.088	0.090	0.091	0.093
	1.50	0.048	0.057	0.058	0.059	0.061	0.062	0.063	0.065	0.066	0.067	0.068	0.070
	1.00	0.048	0.038	0.039	0.040	0.040	0.041	0.042	0.043	0.044	0.045	0.046	0.047
V-diag. 200/82	2.16	0.048	0.082	0.083	0.085	0.087	0.089	0.091	0.093	0.095	0.097	0.099	0.100
V-diag. 200/113	2.30	0.048	0.087	0.089	0.091	0.093	0.095	0.097	0.099	0.101	0.103	0.105	0.107
V-diag. 200/125	2.36	0.048	0.089	0.091	0.093	0.095	0.097	0.099	0.102	0.104	0.106	0.108	0.110
V-diag. 200/150	2.50	0.048	0.094	0.097	0.099	0.101	0.103	0.105	0.108	0.110	0.112	0.114	0.116
V-diag. 200/200	2.83	0.048	0.107	0.109	0.112	0.114	0.117	0.119	0.122	0.124	0.127	0.129	0.132
V-diag. 200/250	3.20	0.048	0.121	0.124	0.126	0.129	0.132	0.135	0.138	0.140	0.143	0.146	0.149
V-diag. 200/300	3.60	0.048	0.136	0.139	0.142	0.145	0.149	0.152	0.155	0.158	0.161	0.164	0.167
H-brace R /	0.74	0.048	0.028	0.029	0.029	0.030	0.031	0.031	0.032	0.032	0.033	0.034	0.034
H-diagonals	0.82	0.048	0.031	0.032	0.032	0.033	0.034	0.035	0.035	0.036	0.037	0.037	0.038
	1.01	0.048	0.038	0.039	0.040	0.041	0.042	0.043	0.043	0.044	0.045	0.046	0.047
	1.13	0.048	0.043	0.044	0.045	0.046	0.047	0.048	0.049	0.050	0.051	0.052	0.053
	1.25	0.048	0.047	0.048	0.049	0.051	0.052	0.053	0.054	0.055	0.056	0.057	0.058
	1.50	0.048	0.057	0.058	0.059	0.061	0.062	0.063	0.065	0.066	0.067	0.068	0.070
	2.00	0.048	0.076	0.077	0.079	0.081	0.083	0.084	0.086	0.088	0.090	0.091	0.093
	2.50	0.048	0.094	0.097	0.099	0.101	0.103	0.105	0.108	0.110	0.112	0.114	0.116
	3.00	0.048	0.113	0.116	0.119	0.121	0.124	0.126	0.129	0.132	0.134	0.137	0.140
	4.00	0.048	0.151	0.155	0.158	0.162	0.165	0.169	0.172	0.176	0.179	0.183	0.186
H-transom U	0.82	0.046	0.030	0.030	0.031	0.032	0.032	0.033	0.034	0.034	0.035	0.036	0.037
	1.13	0.075	0.067	0.068	0.070	0.071	0.073	0.074	0.076	0.078	0.079	0.081	0.082
	1.50	0.092	0.109	0.111	0.114	0.116	0.119	0.121	0.124	0.126	0.129	0.131	0.134
	2.00	0.092	0.145	0.148	0.152	0.155	0.158	0.162	0.165	0.168	0.172	0.175	0.178
	2.50	0.092	0.181	0.185	0.189	0.194	0.198	0.202	0.206	0.210	0.215	0.219	0.223
	3.00	0.092	0.217	0.222	0.227	0.232	0.237	0.242	0.247	0.252	0.257	0.262	0.267
Toe Board	0.74	0.150	0.087	0.089	0.091	0.093	0.095	0.097	0.099	0.102	0.104	0.106	0.108
	0.82	0.150	0.097	0.099	0.101	0.104	0.106	0.108	0.110	0.112	0.115	0.117	0.119
	1.01	0.150	0.119	0.122	0.125	0.128	0.130	0.133	0.136	0.139	0.141	0.144	0.147
	1.13	0.150	0.133	0.137	0.140	0.143	0.146	0.149	0.152	0.155	0.158	0.161	0.164
	1.25	0.150	0.148	0.151	0.154	0.158	0.161	0.165	0.168	0.171	0.175	0.178	0.182
	1.50	0.150	0.177	0.181	0.185	0.189	0.193	0.198	0.202	0.206	0.210	0.214	0.218
	2.00	0.150	0.236	0.242	0.247	0.253	0.258	0.263	0.269	0.274	0.280	0.285	0.291
	2.50	0.150	0.295	0.302	0.309	0.316	0.322	0.329	0.336	0.343	0.350	0.357	0.363
	3.00	0.150	0.354	0.362	0.371	0.379	0.387	0.395	0.403	0.412	0.420	0.428	0.436
	4.00	0.150	0.472	0.483	0.494	0.505	0.516	0.527	0.538	0.549	0.560	0.571	0.581
Hollow Box Plank /	0.74	0.030	0.017	0.018	0.018	0.019	0.019	0.019	0.020	0.020	0.021	0.021	0.022
timber plank /	1.25	0.030	0.030	0.030	0.031	0.032	0.032	0.033	0.034	0.034	0.035	0.036	0.036
Alu Plank 32 *)	1.50	0.030	0.035	0.036	0.037	0.038	0.039	0.040	0.040	0.041	0.042	0.043	0.044
	2.00	0.030	0.047	0.048	0.049	0.051	0.052	0.053	0.054	0.055	0.056	0.057	0.058
	2.50	0.030	0.059	0.060	0.062	0.063	0.064	0.066	0.067	0.069	0.070	0.071	0.073
	3.00	0.030	0.071	0.072	0.074	0.076	0.077	0.079	0.081	0.082	0.084	0.086	0.087
Steel Plank *)	0.82	0.040	0.026	0.026	0.027	0.028	0.028	0.029	0.029	0.030	0.031	0.031	0.032
	1.13	0.040	0.036	0.036	0.037	0.038	0.039	0.040	0.041	0.041	0.042	0.043	0.044
	1.25	0.040	0.039	0.040	0.041	0.042	0.043	0.044	0.045	0.046	0.047	0.048	0.048
	1.50	0.040	0.047	0.048	0.049	0.051	0.052	0.053	0.054	0.055	0.056	0.057	0.058
	2.00	0.040	0.063	0.064	0.066	0.067	0.069	0.070	0.072	0.073	0.075	0.076	0.078
	2.50	0.040	0.079	0.081	0.082	0.084	0.086	0.088	0.090	0.091	0.093	0.095	0.097
	3.00	0.040	0.094	0.097	0.099	0.101	0.103	0.105	0.108	0.110	0.112	0.114	0.116
	4.00	0.040	0.126	0.129	0.132	0.135	0.138	0.141	0.143	0.146	0.149	0.152	0.155
Alu Frame Deck *)	2.00	0.035	0.055	0.056	0.058	0.059	0.060	0.061	0.063	0.064	0.065	0.067	0.068
	2.50	0.035	0.069	0.070	0.072	0.074	0.075	0.077	0.078	0.080	0.082	0.083	0.085
	3.00	0.035	0.083	0.085	0.086	0.088	0.090	0.092	0.094	0.096	0.098	0.100	0.102
Horizontal Frame /	1.25	0.065	0.064	0.065	0.067	0.068	0.070	0.071	0.073	0.074	0.076	0.077	0.079
Alu Plank 50 *)	2.50	0.065	0.128	0.131	0.134	0.137	0.140	0.143	0.146	0.149	0.152	0.155	0.157
	3.00	0.065	0.153	0.157	0.161	0.164	0.168	0.171	0.175	0.178	0.182	0.185	0.189

*) d = Y = Protruding height of plank per Table 5.

Table 5.10 MODEX - typical stiffness of transom connections

MODEX typical stiffness of transom connection

– Centre post $c\varphi_{M,K} = c_{total}$

– Edge post $\varphi_{R,K} = 1/2\ c_{total}$

Torsional stiffness of node

Calculated stiffness per certificate			**Typical stiffness**	
Average	$c_{an,D}$ = 4040 kNcm/rad	g_M = 1.1	$c_{an,K} = c_{an,D} \cdot g_M$ =	4444 kNcm/rad
Minimum	2056 kNcm/rad	g_M = 1.0		2056 kNcm/rad
Reduced	2316 kNcm/rad	g_M = 1.1		2548 kNcm/rad

Torsional stiffness resulting from transom stiffness $c_{r,K}$ [kNcm/rad] = 4 • E • IR/LR

Total torsional stiffness $\varphi_{r,K}$ [kNcm/rad] = 2 • $c_{r,K}$ • $c_{an,K}$/(2 • $c_{an,K}$ + $c_{r,K}$)

E-modulus E [kN/cm²] = 21000

			Node stiffness	Average		Minimum		Reduced	
			$c_{an,K}$ [kNcm/rad]	4444	4444	2056	2056	2548	2548
				Centre post	Edge post	Centre post	Edge post	Centre post	Edge post
Transom type	**L_R [cm]**	**I_R [cm⁴]**	**$c_{R,K}$ [kNcm]**	**$c\varphi_{M,K}$**	**$c\varphi_{R,K}$**	**$c\varphi_{M,K}$**	**$c\varphi_{R,K}$**	**$c\varphi_{M,K}$**	**$c\varphi_{R,K}$**
74 R	74	11.59	13156	5304	2652	3133	1566	3673	1837
82 R	82	11.59	11873	5083	2541	3054	1527	3566	1783
101 R	101	11.59	9639	4624	2312	2882	1441	3334	1667
113 R	113	11.59	8616	4375	2187	2784	1392	3202	1601
125 R	125	11.59	7788	4151	2075	2691	1346	3080	1540
150 R	150	11.59	6490	3751	1876	2517	1259	2855	1427
200 R	200	11.59	4868	3145	1573	2229	1115	2490	1245
250 R	250	11.59	3894	2708	1354	2000	1000	2207	1104
300 R	300	11.59	3245	2377	1189	1814	907	1983	991
400 R	400	11.59	2434	1911	955	1529	764	1647	824
82 U	82	10.53	10787	4873	2436	2977	1489	3461	1730
113 U	113	24.51	18220	5974	2987	3355	1677	3982	1991
150 U	150	14.26	7986	4206	2103	2714	1357	3111	1555
200 U	200	18.87	7925	4190	2095	2707	1354	3102	1551
250 U	250	23.39	7859	4171	2085	2700	1350	3091	1546
300 U	300	27.85	7798	4154	2077	2692	1346	3082	1541

Unless stated otherwise, all dimensions in mm.

Table 5.11 Permissible post loads in the lower part of the scaffold

Permissible post loads in the lower part of the scaffold, depending on H-loads and transom stiffness			
Jack type	Extension [mm]	Bay width [cm]	Diagram
45/3.8	65	250 300	5.1 5.2
	150	250 300	5.3 5.4
	265	250 300	5.5 5.6
70/3.8	65	250 300	5.7 5.8
	150	250 300	5.9 5.10
	265	250 300	5.11 5.12
	500	250 300	5.13 5.14
ID 15	65	250 300	5.15 5.16
	150	250 300	5.17 5.18
	265	250 300	5.19 5.20

Table 5.11s Permissible normal forces in the lower part of the scaffold

Normal forces [kN] permissible in lower part of scaffold (certificate for individual parts, jack extension = 15 cm)				
Actual values / Jack type	Torsional stiffness C_{total} [kNcm/rad]	Actual H load [kN] at Base Jack		
		H = 0.25	H = 0.75	H = 1.25
Base Jack 45/3.8	1000 7000	24.5 32.0	22.0 27.5	19.0 23.5
Base Jack 70/3.8	1000 7000	26.0 37.0	23.0 32.0	20.0 27.0
ID 15 Base Jack 38/52	1000 7000	27.5 40.5	26.5 37.0	25.0 33.5
Ask about the permissible loads of other jack lengths (l_{SP}).				

Diagram 5.1

Jack 45/3.8 - extension 65 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

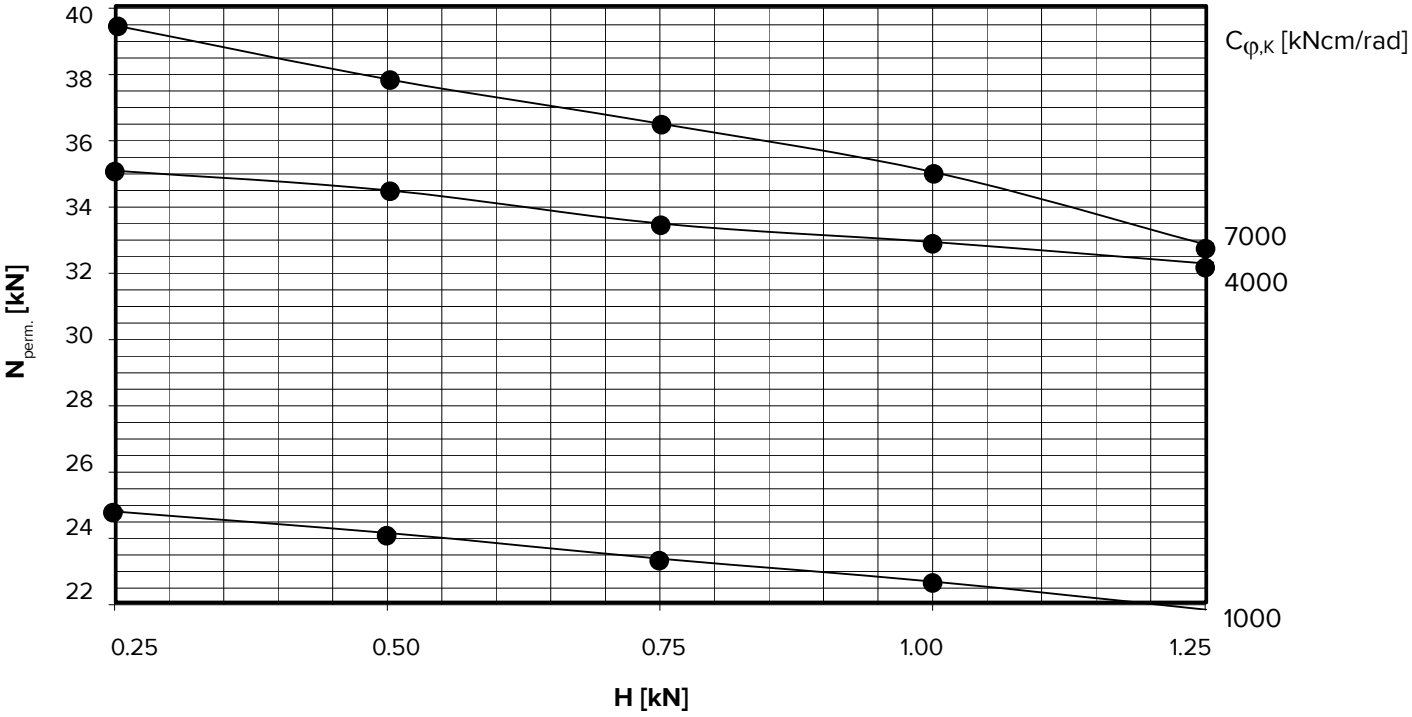
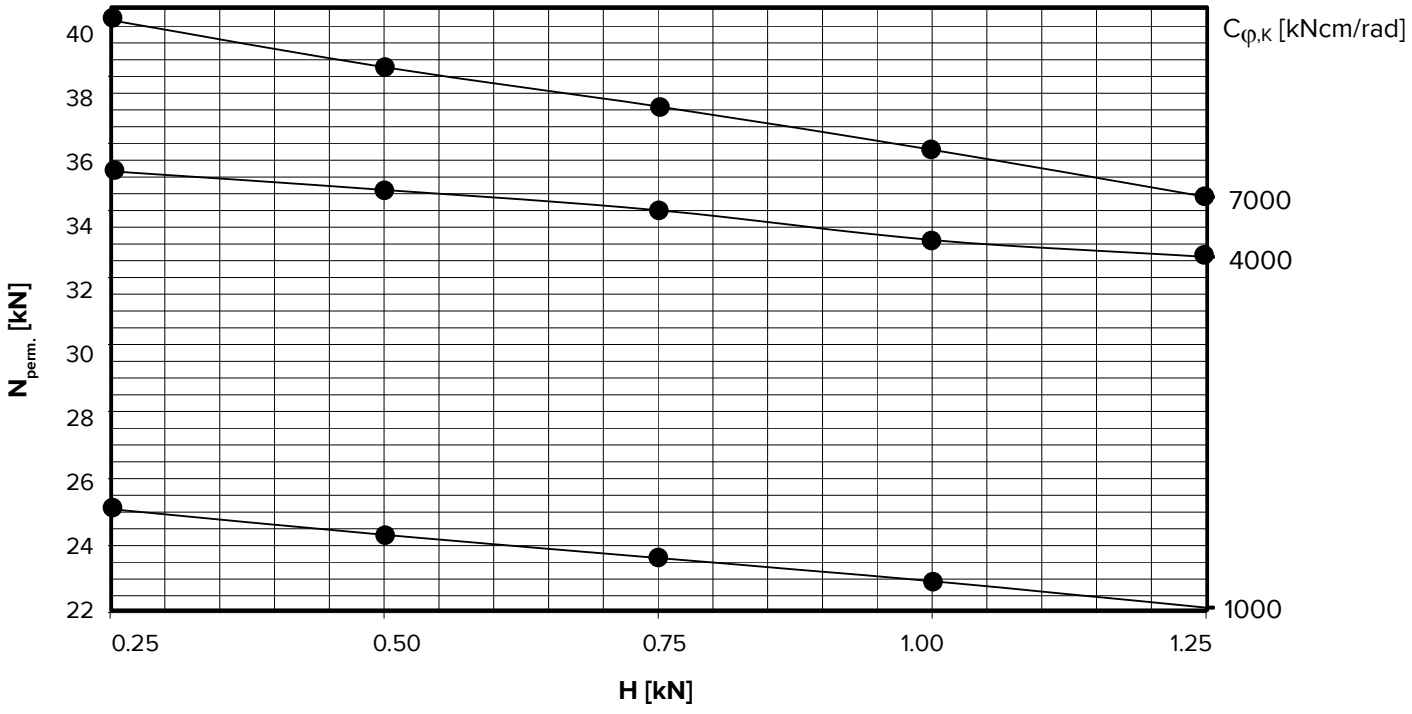


Diagram 5.2

Jack 45/3.8 - extension 65 mm - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]



Unless stated otherwise, all dimensions in mm.

Diagram 5.3

Jack 45/3.8 - extension 150 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

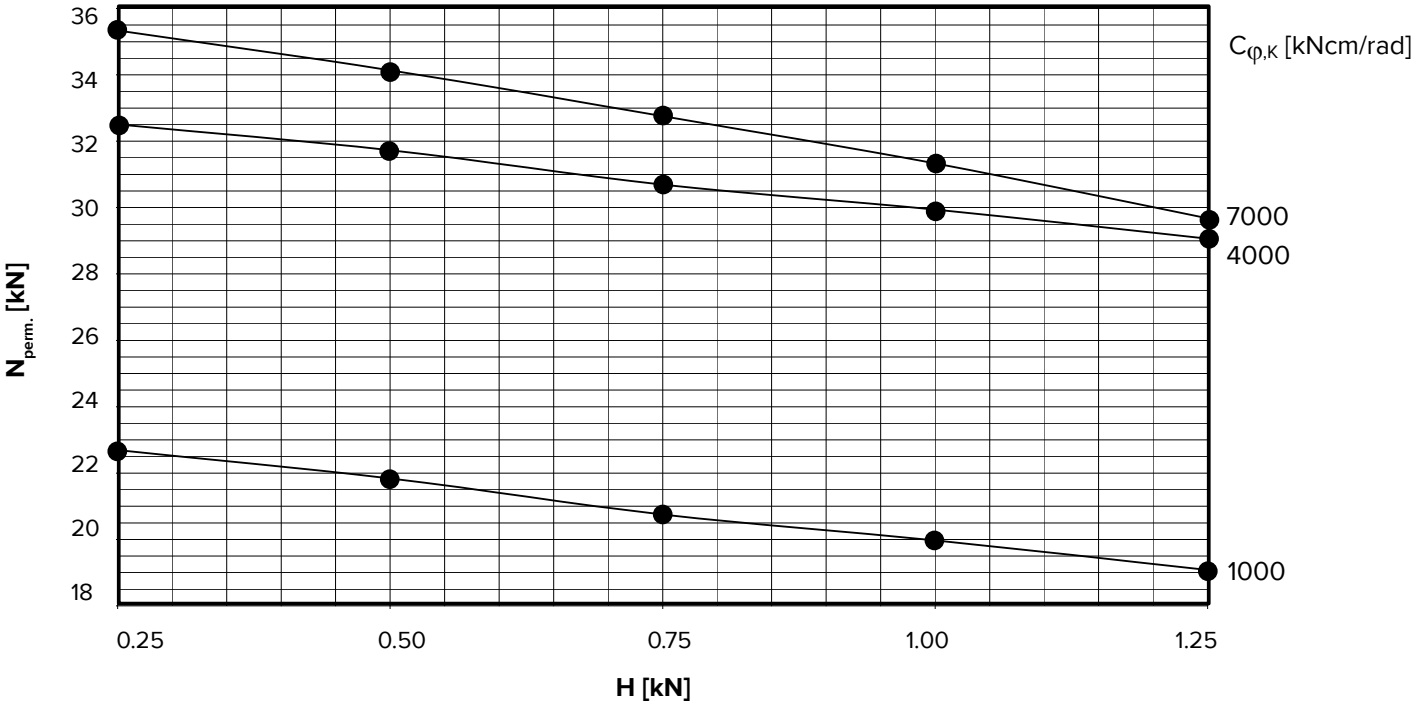


Diagram 5.4

Jack 45/3.8 - extension 150 mm - bay width 300 cm

Permissable post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

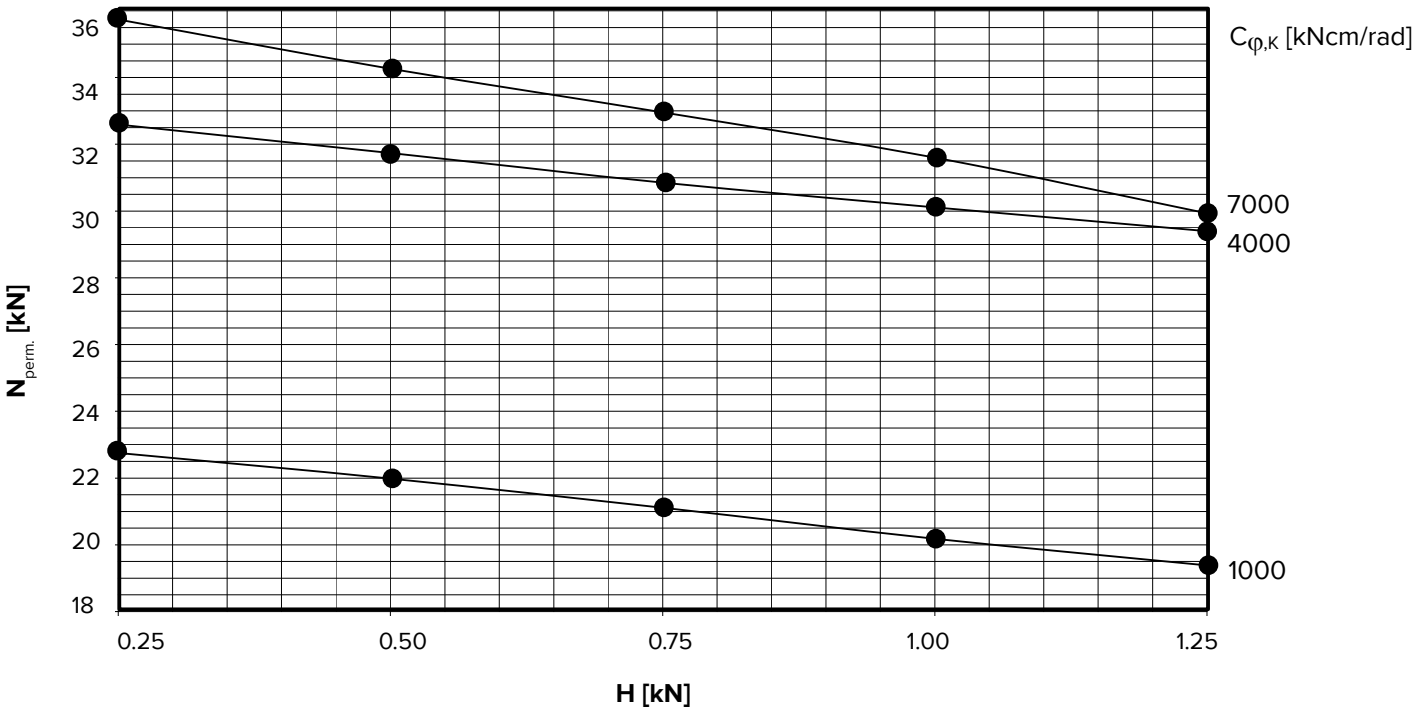


Diagram 5.5

Jack 45/3.8 - extension 265 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

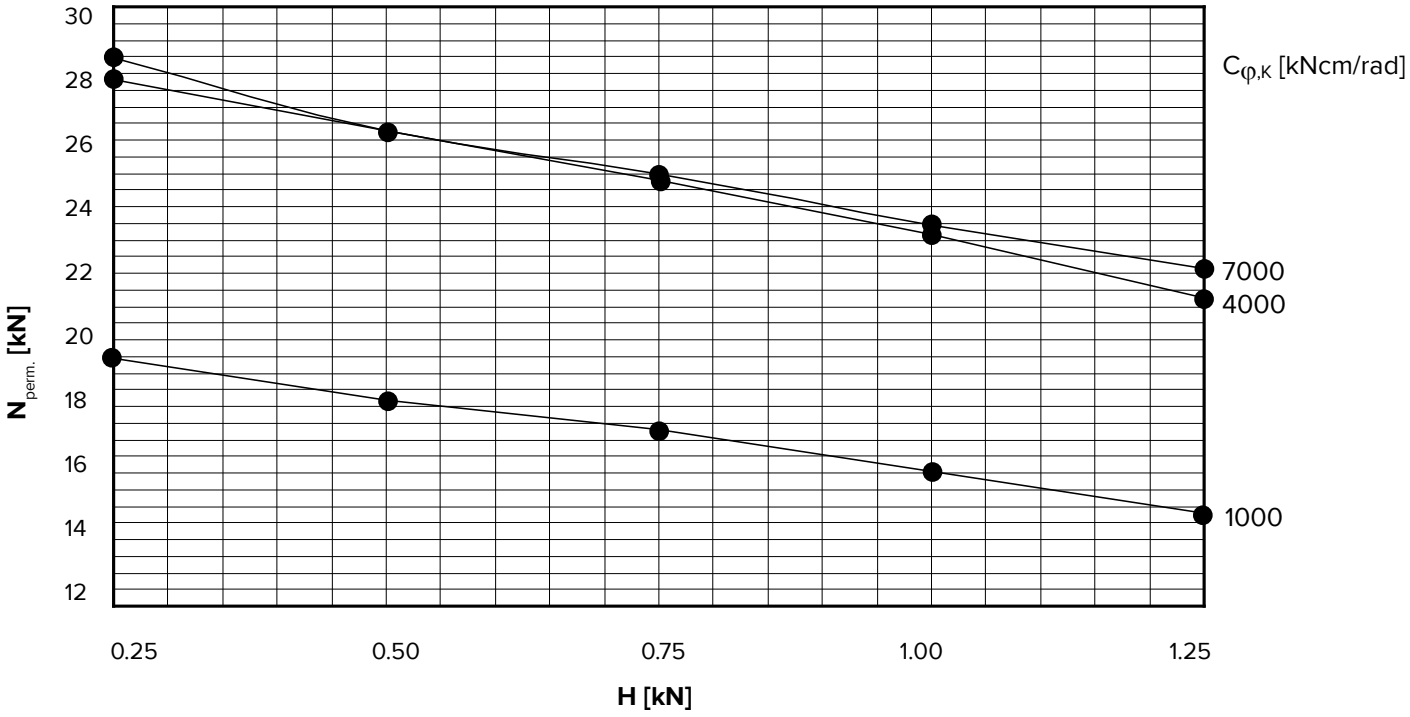
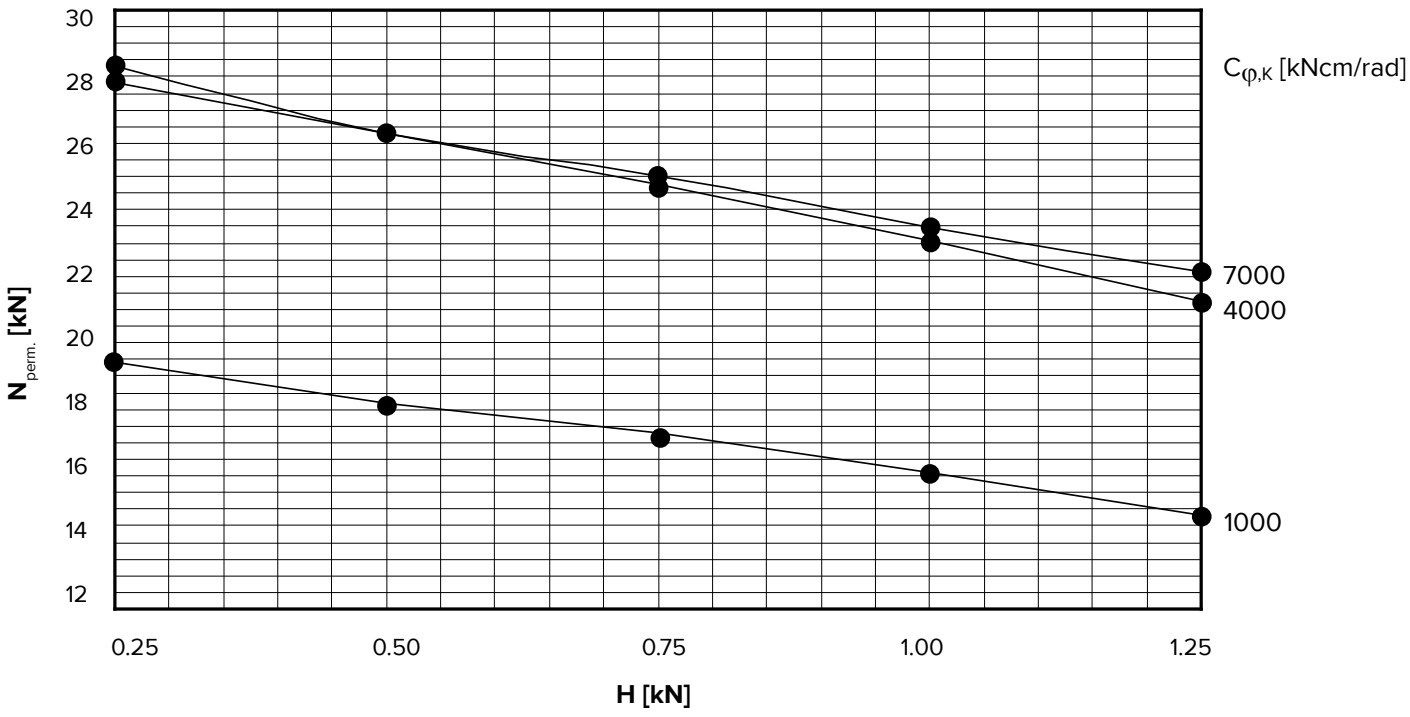


Diagram 5.6

Jack 45/3.8 - extension 265 mm - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]



Unless stated otherwise, all dimensions in mm.

Diagram 5.7

Jack 70/3.8 - extension 65 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

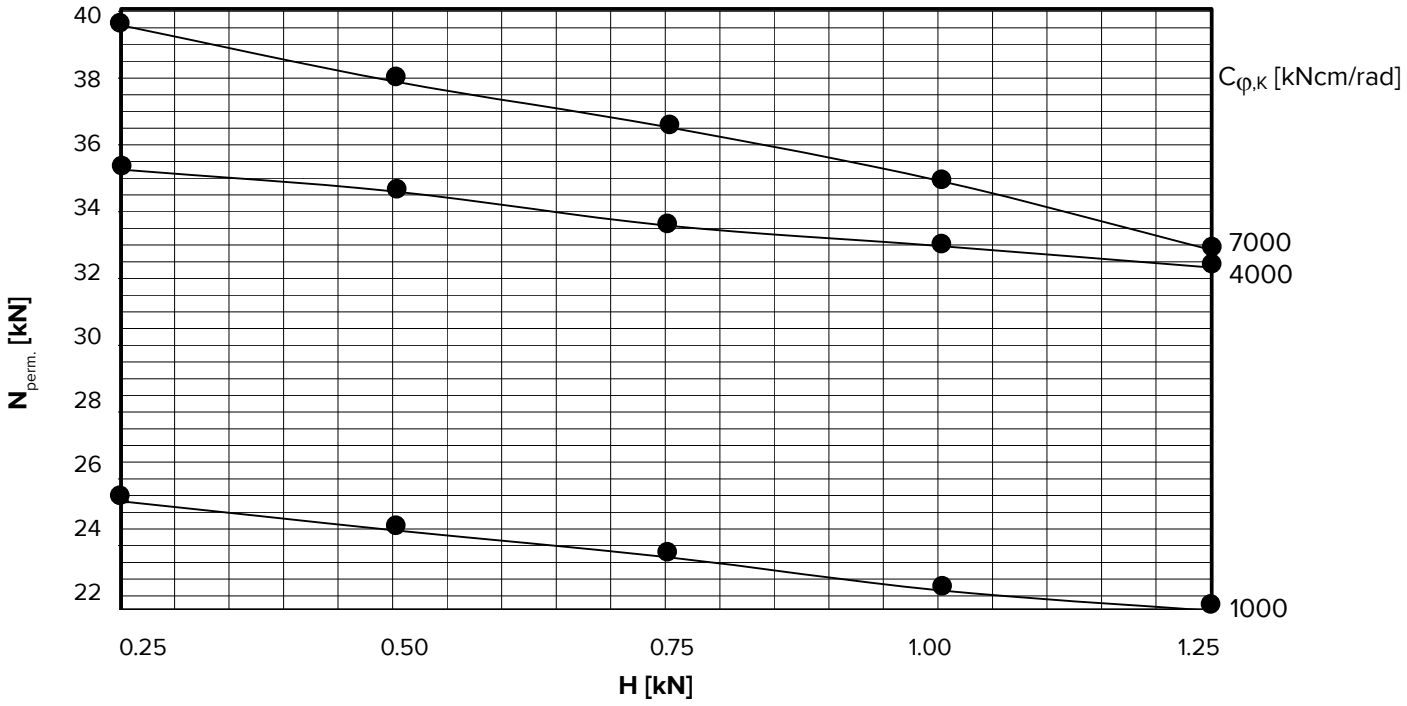


Diagram 5.8

Jack 70/3.8 - extension 65 mm - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

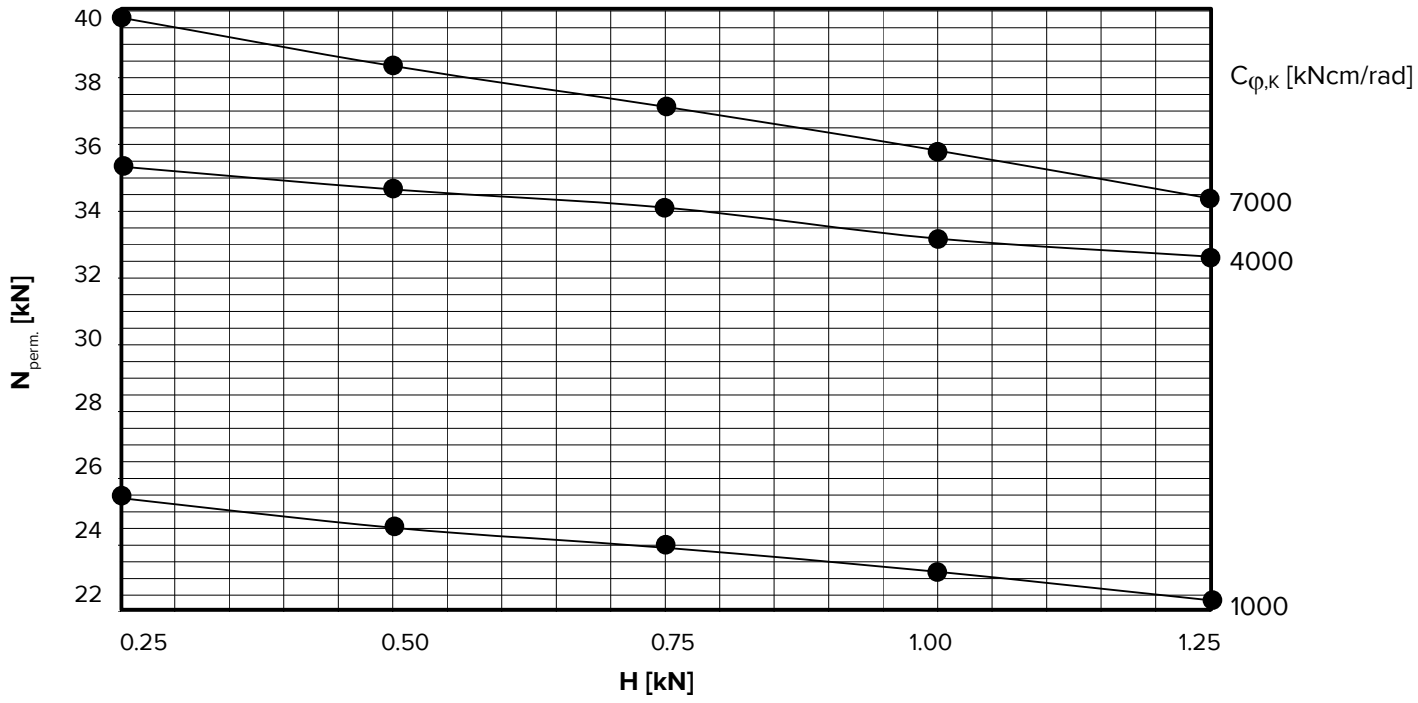


Diagram 5.9

Jack 70/3.8 - extension 150 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

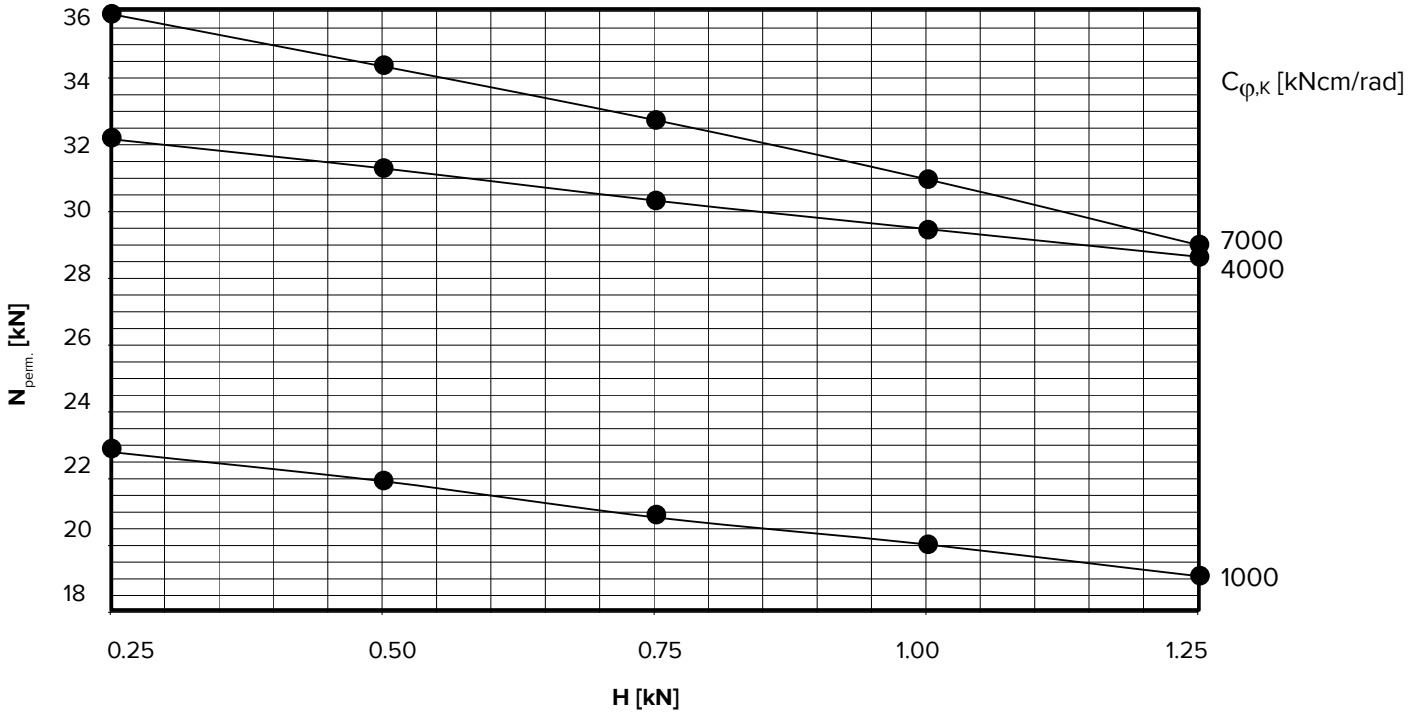
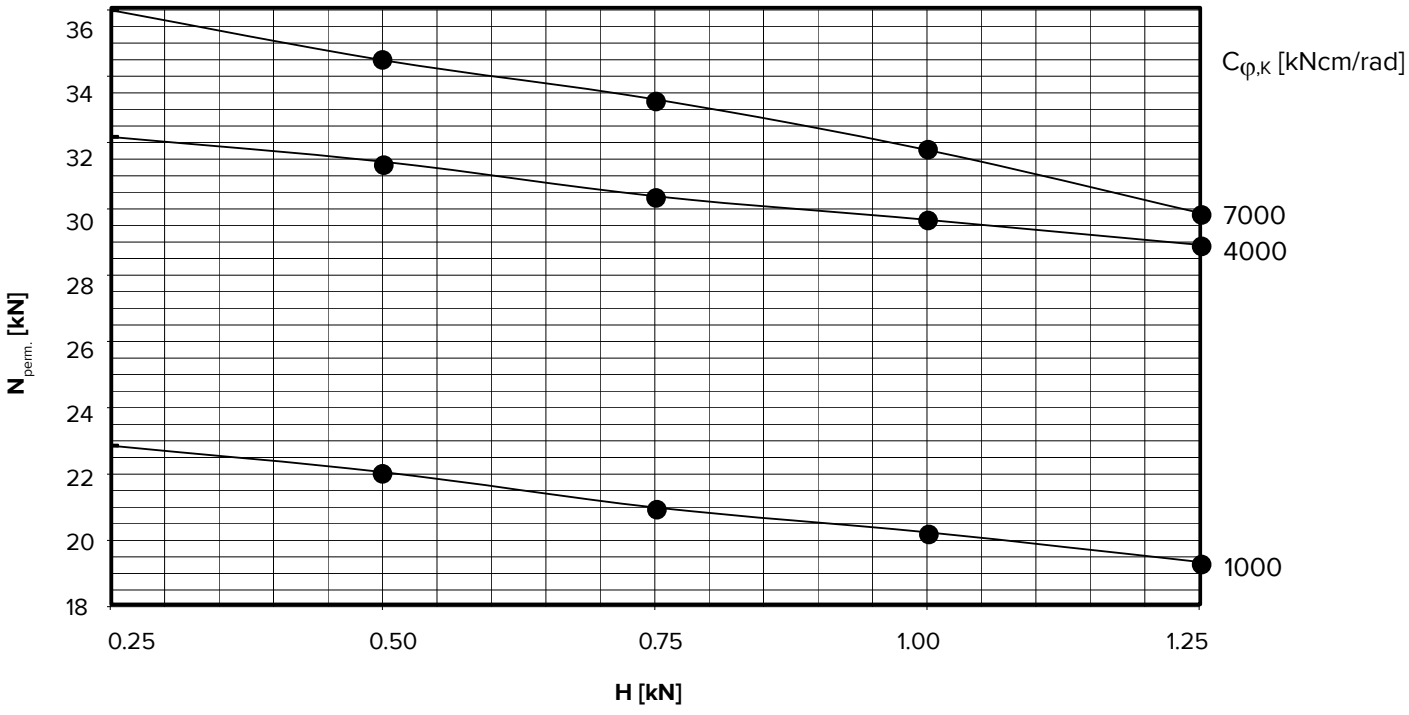


Diagram 5.10

Jack 70/3.8 - extension 150 mm - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]



Unless stated otherwise, all dimensions in mm.

Diagram 5.11

Jack 70/3.8 - extension 265 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

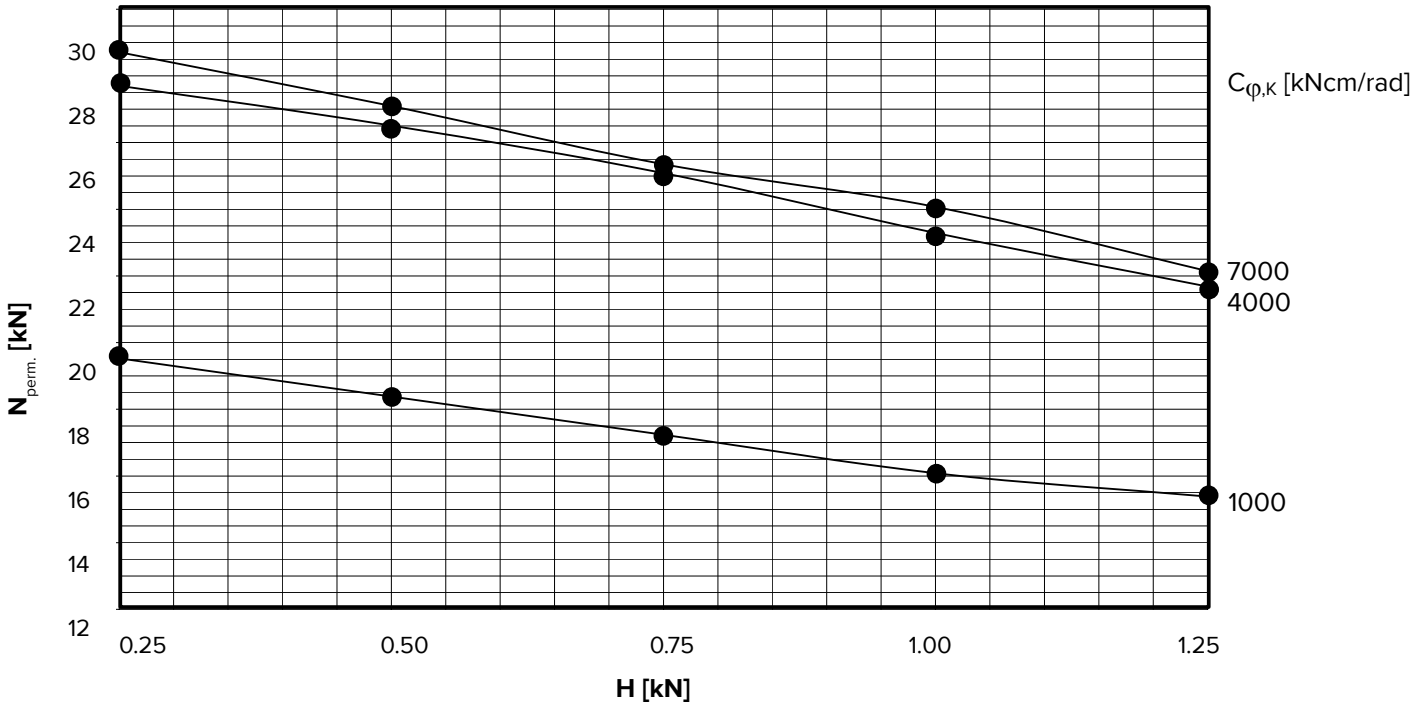


Diagram 5.12

Jack 70/3.8 - extension 265 mm - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

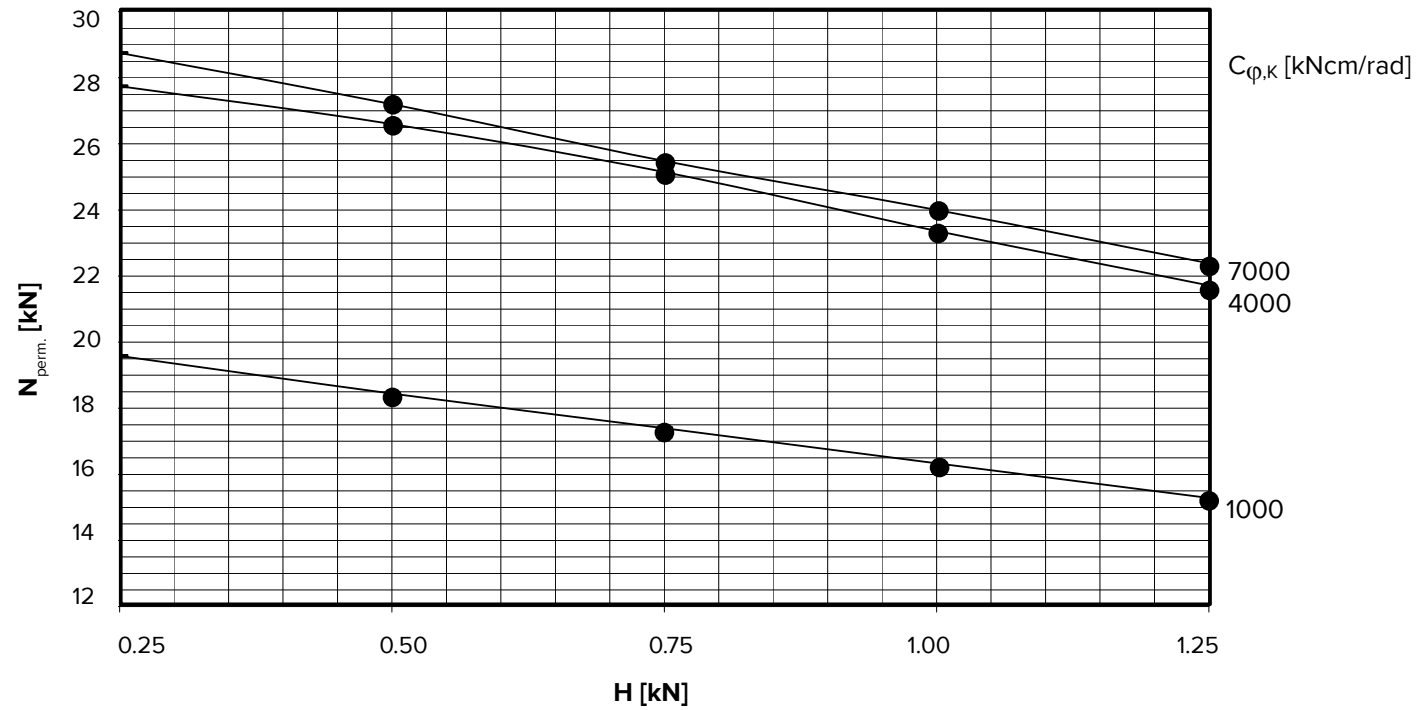


Diagram 5.13

Jack 70/3.8 - extension 500 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

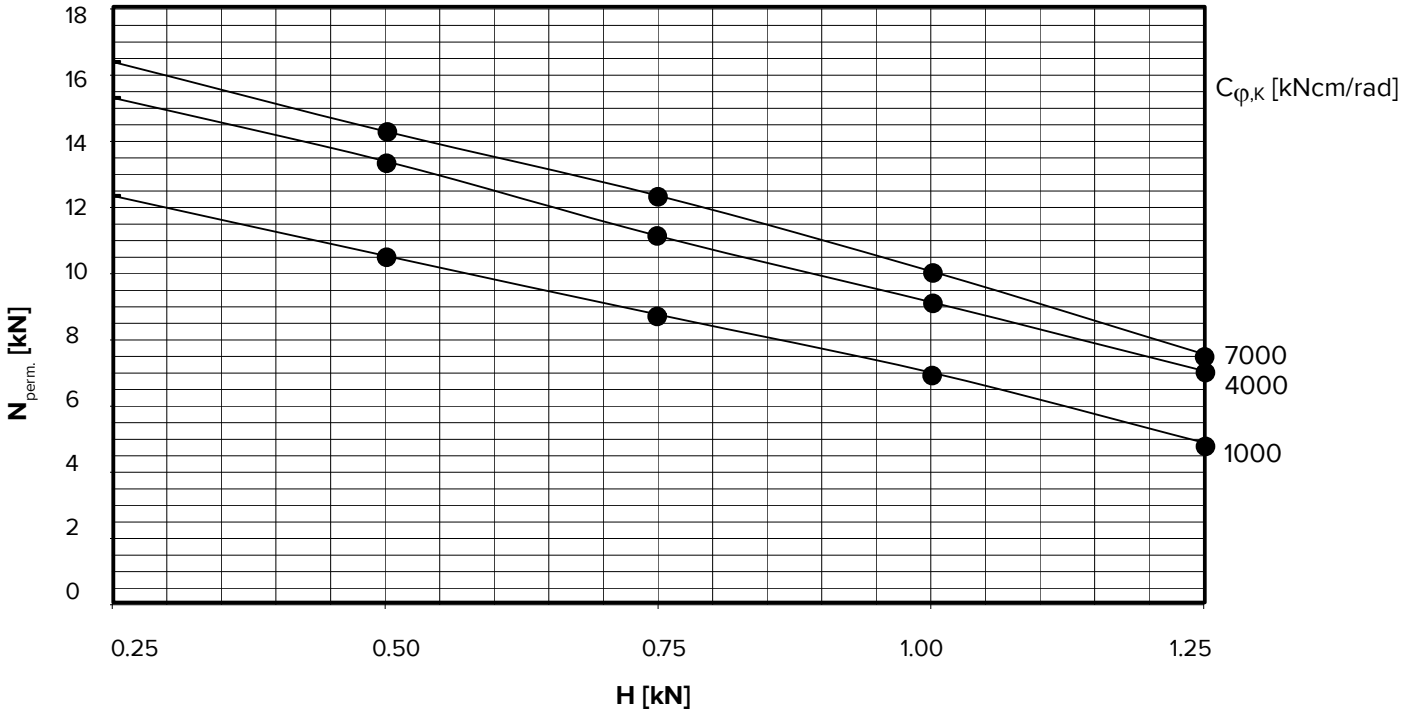
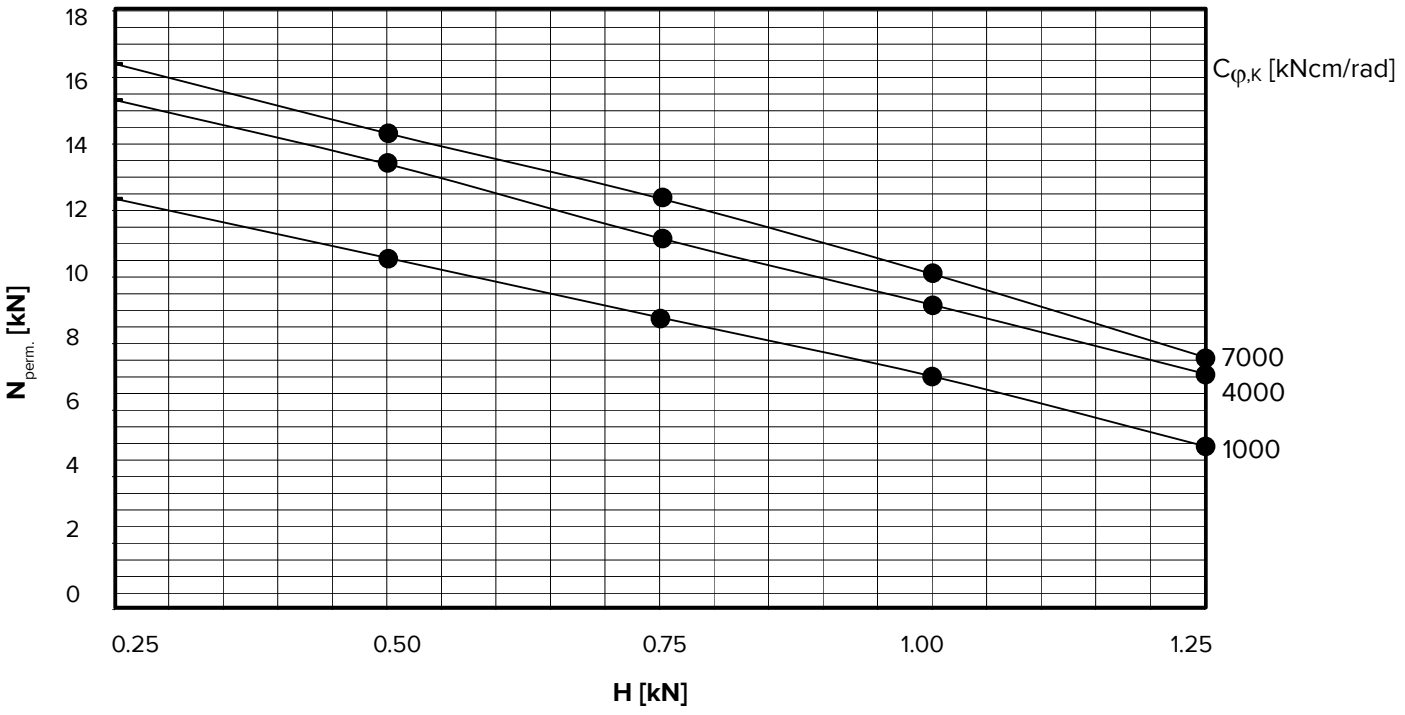


Diagram 5.14

Jack 70/3.8 - extension 500 mm - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]



Unless stated otherwise, all dimensions in mm.

Diagram 5.15

ID 15 Jack - extension 87 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

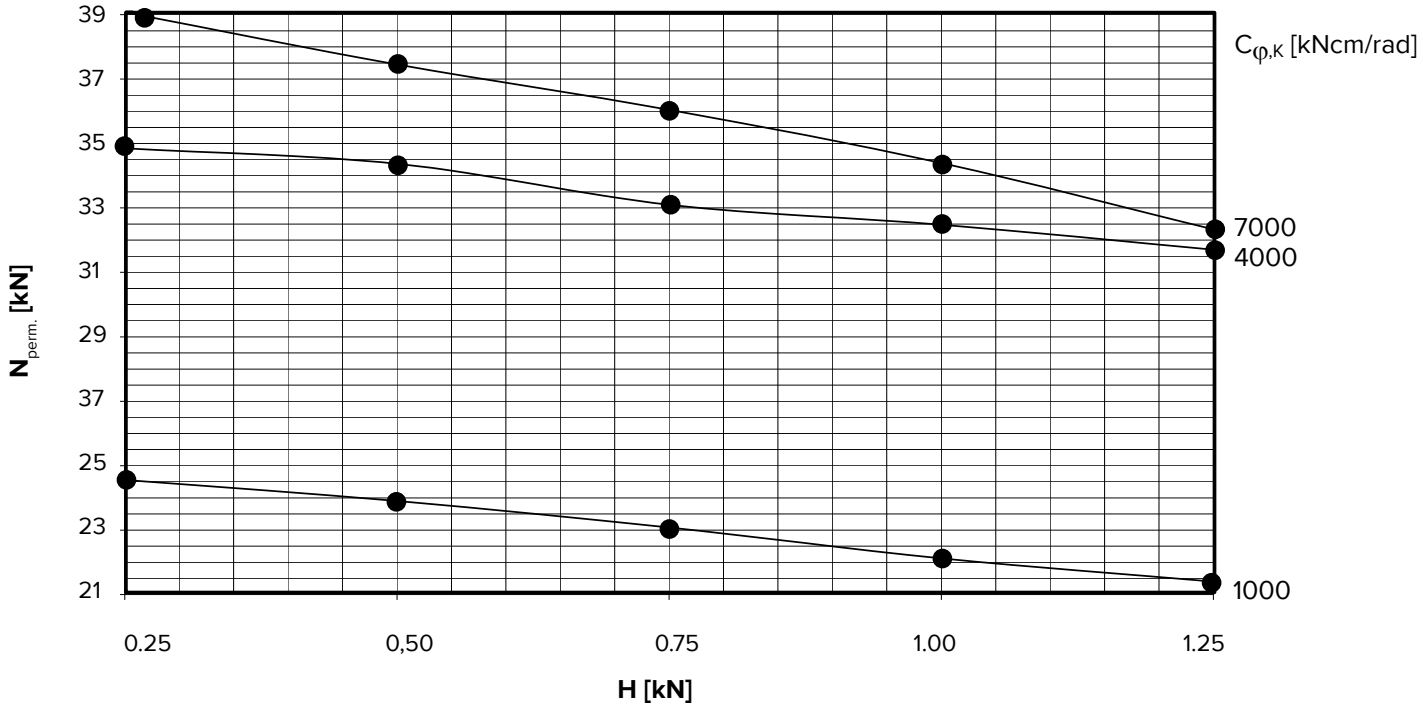


Diagram 5.16

ID 15 Jack - extension 87 mm - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

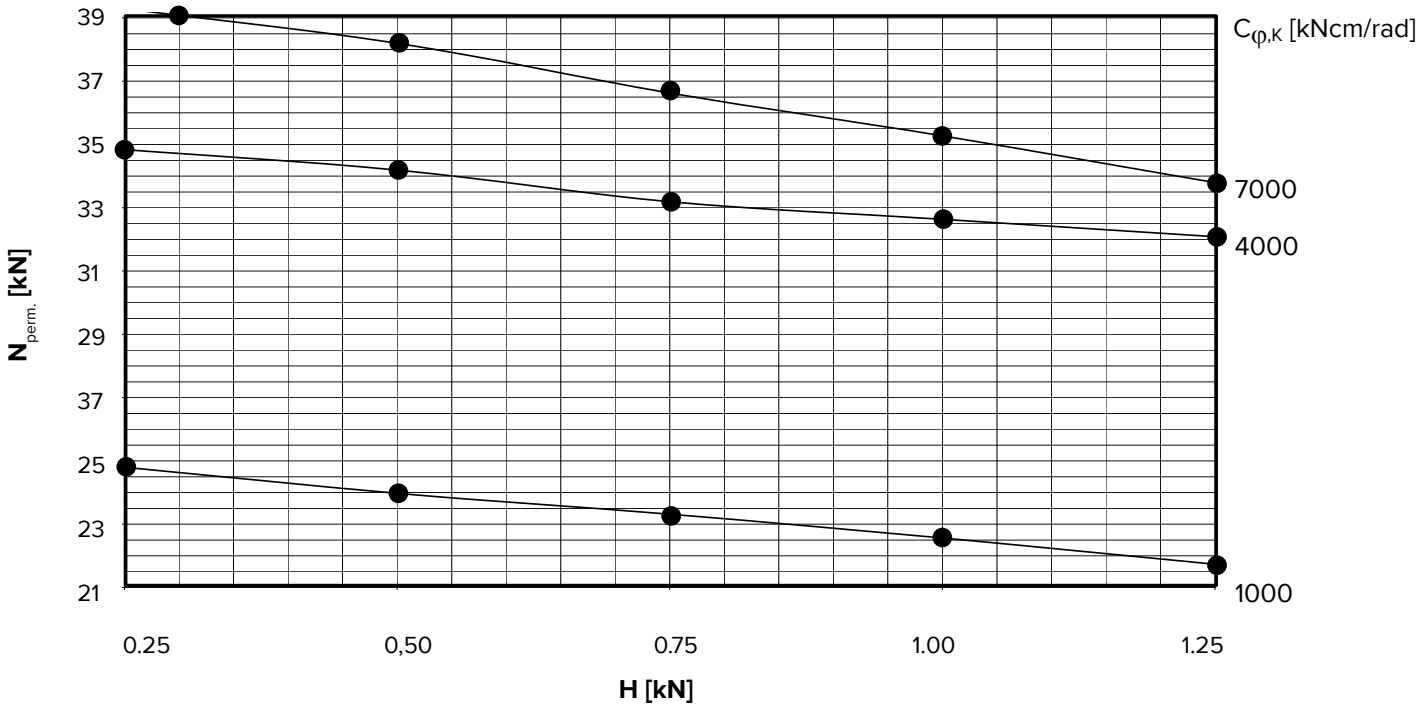


Diagram 5.17

ID 15 Jack - extension 200 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

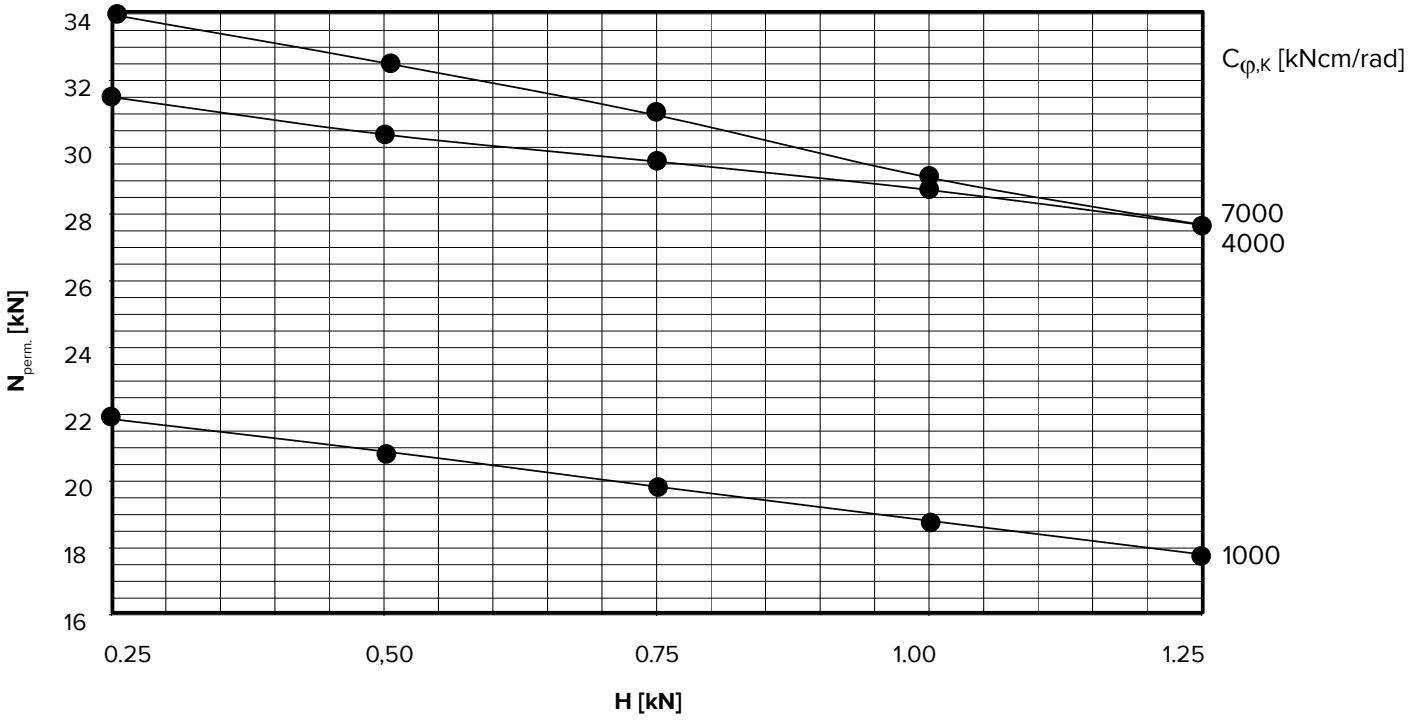
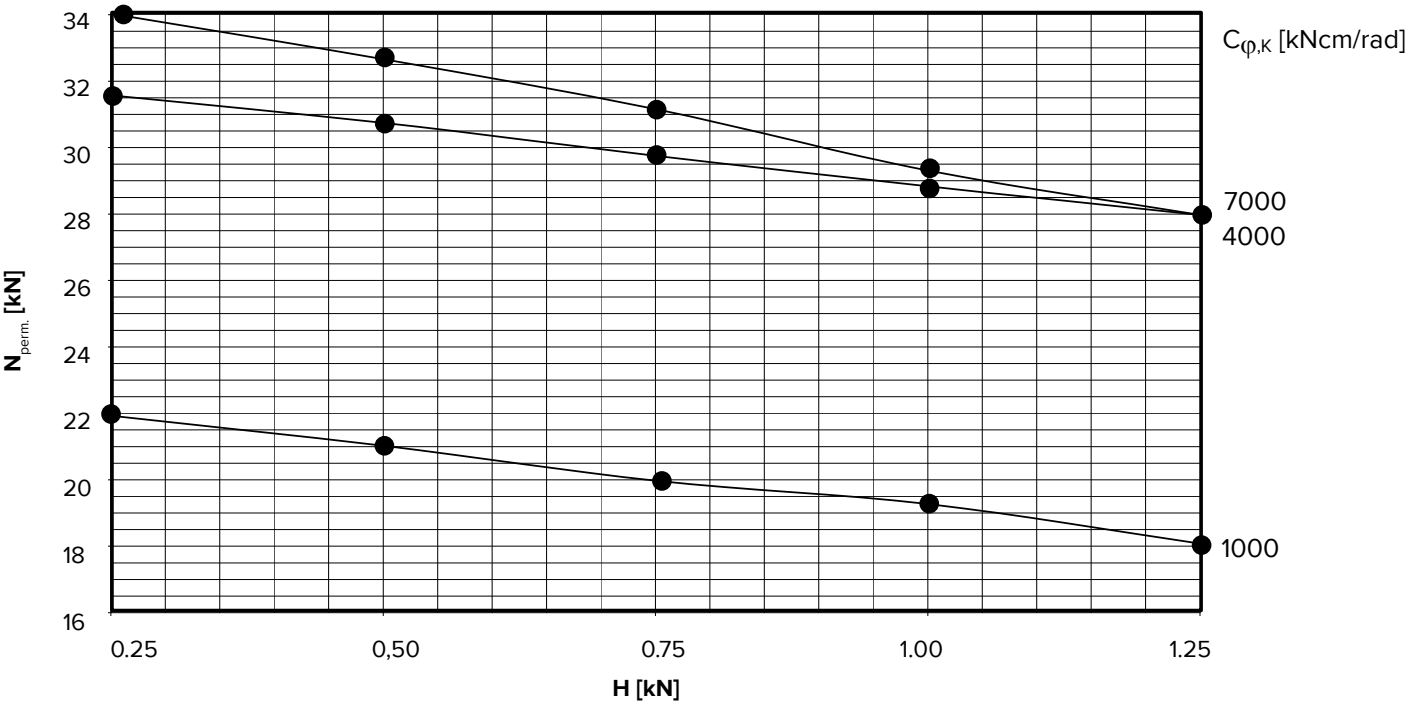


Diagram 5.18

ID 15 Jack - extension 200 mm - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]



Unless stated otherwise, all dimensions in mm.

Diagram 5.19

ID 15 Jack - extension 300 mm - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

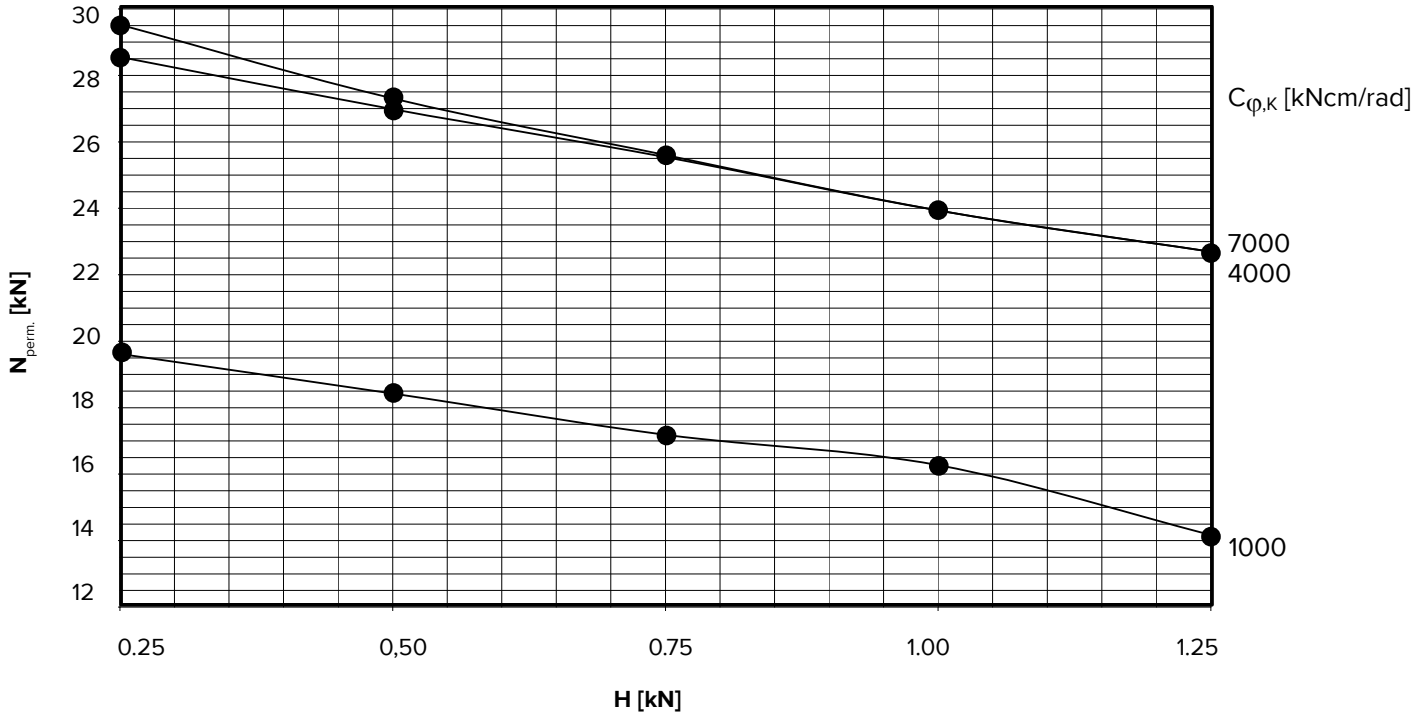
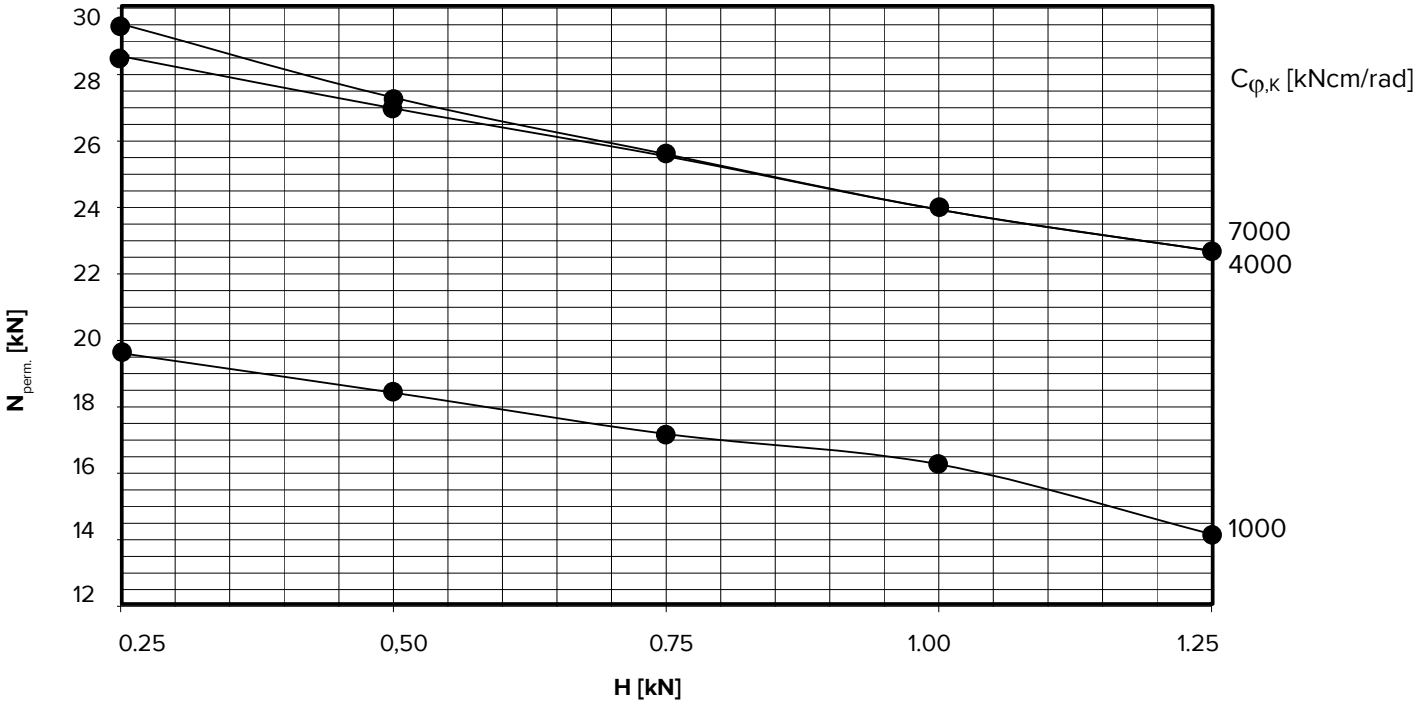


Diagram 5.20

ID 15 Jack - extension 300 mm - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]



Permissible post loads in general area depending on shear forces and stiffness of transom connections

Diagram 5.21

Permitted post load - bay width 250 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

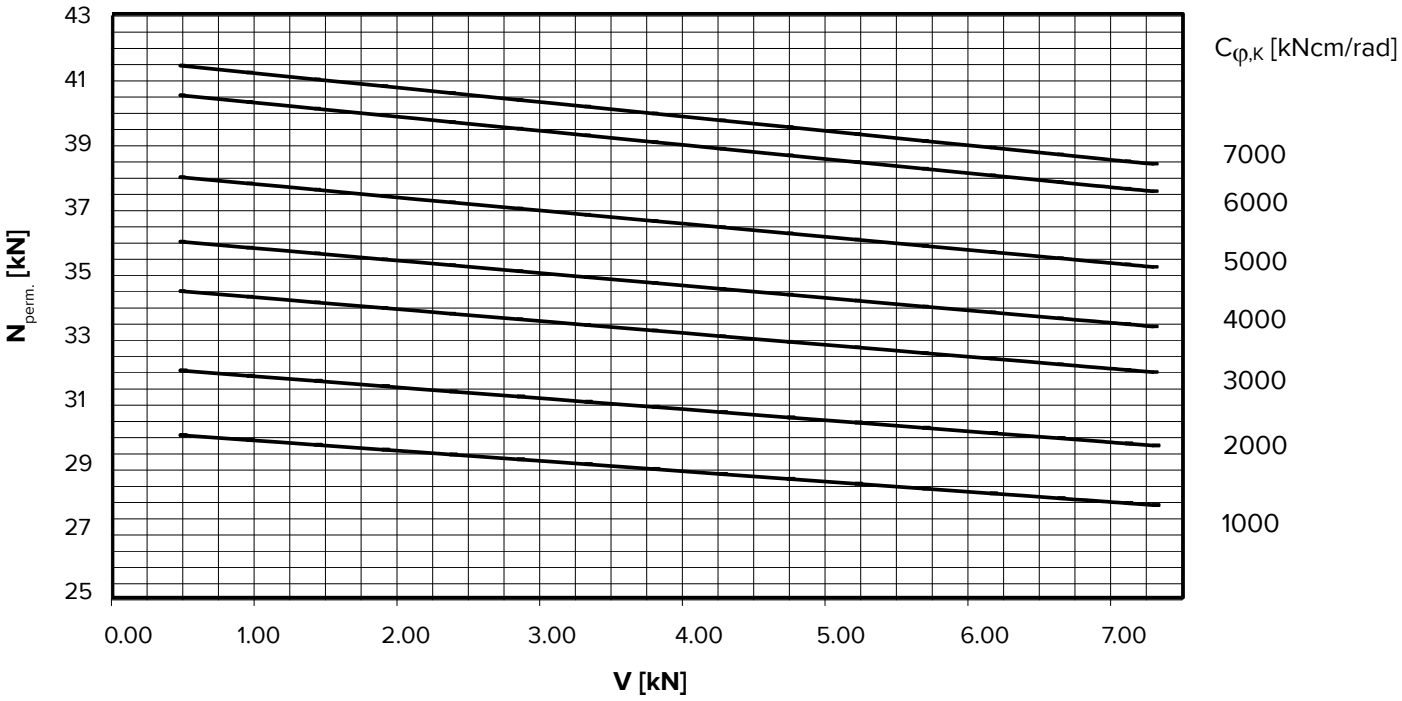
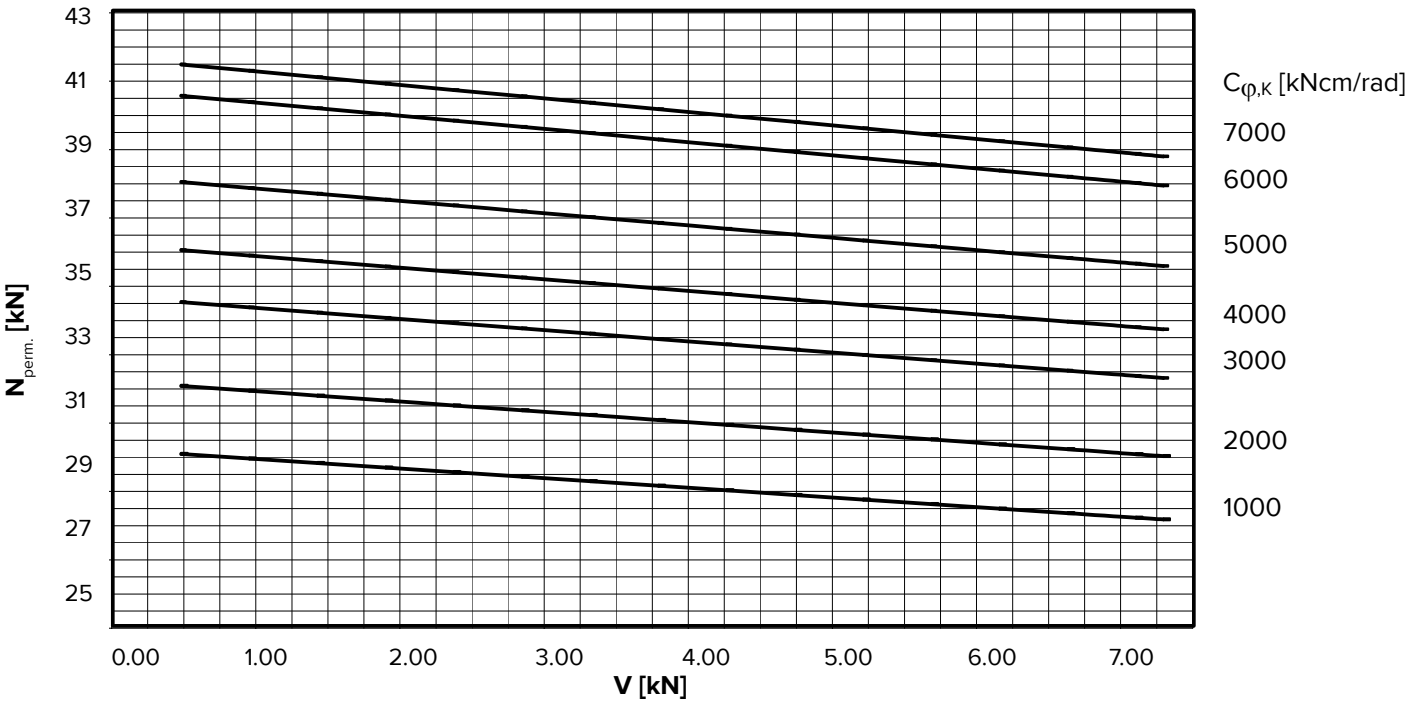


Diagram 5.22

Permissible post load - bay width 300 cm

Permissible post load N_{perm} [kN] depending on H [kN] and $C_{\varphi,K}$ [kNcm/rad]

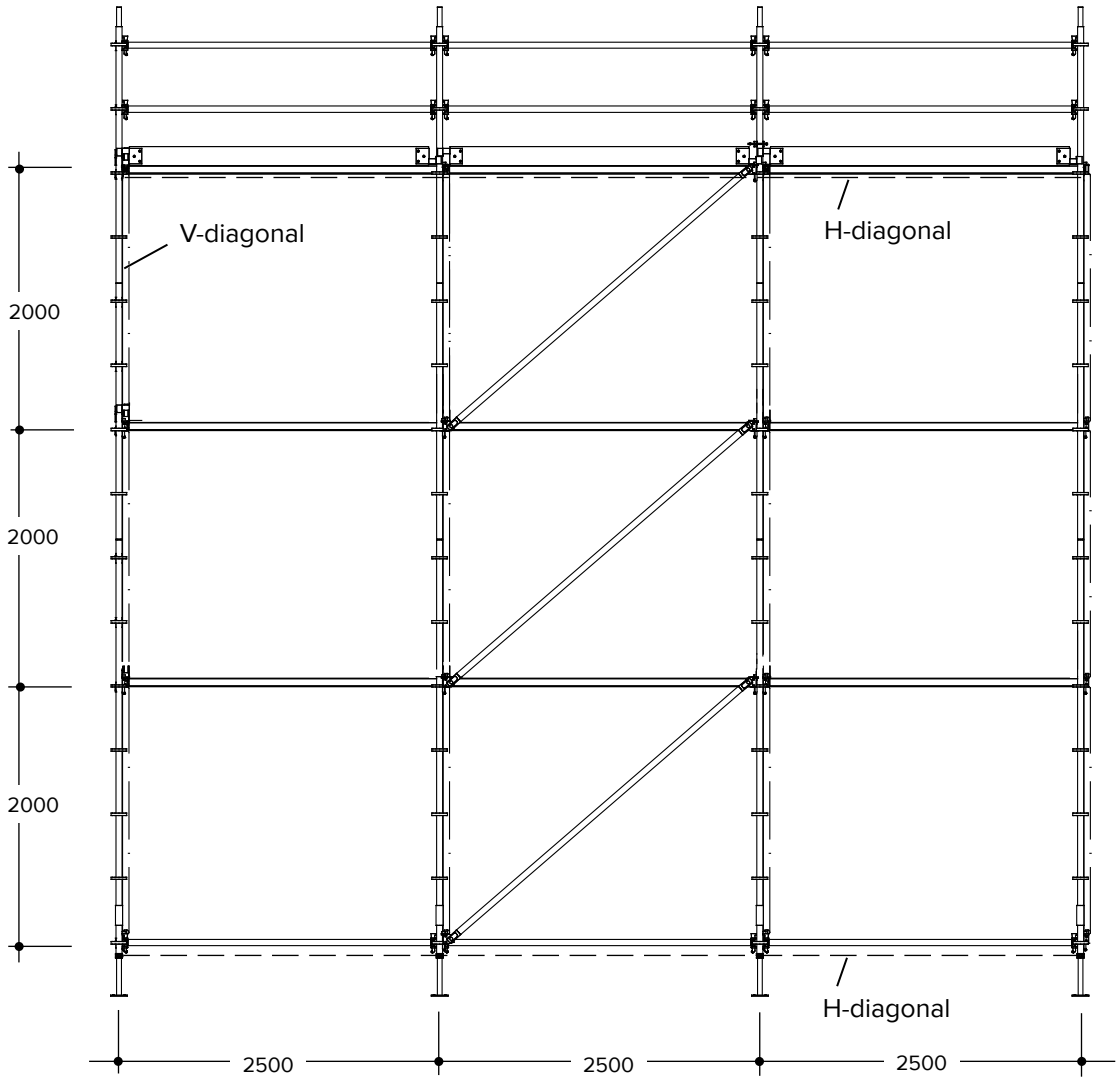


Unless stated otherwise, all dimensions in mm.

5.12 MODEX as birdcage scaffold: Example 1

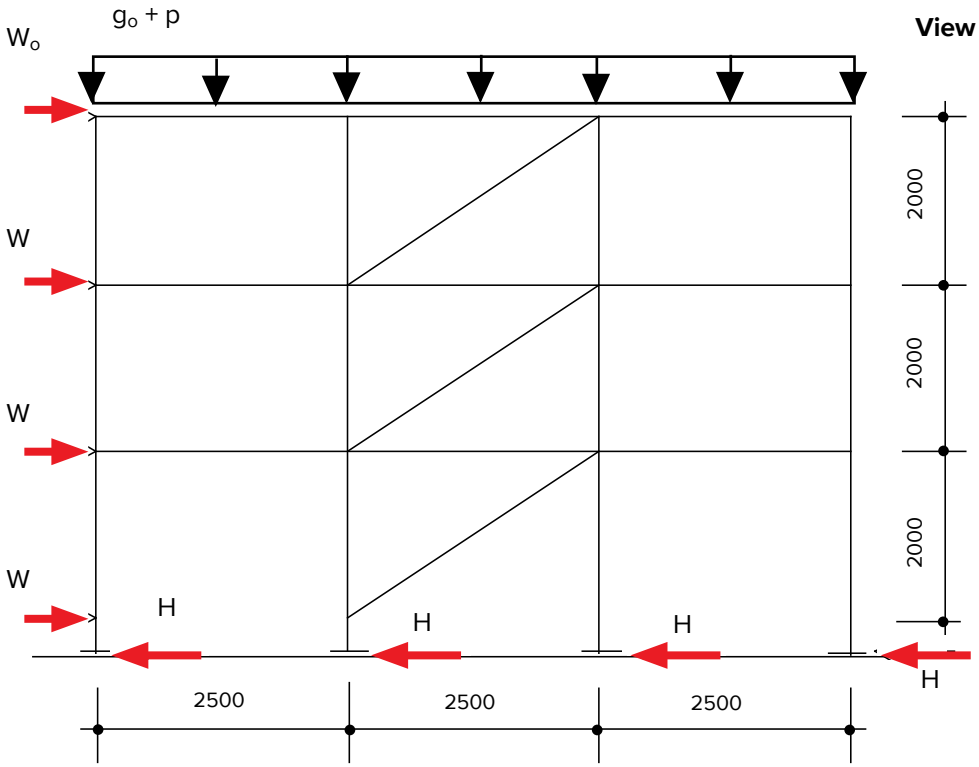
5.12.1 Design

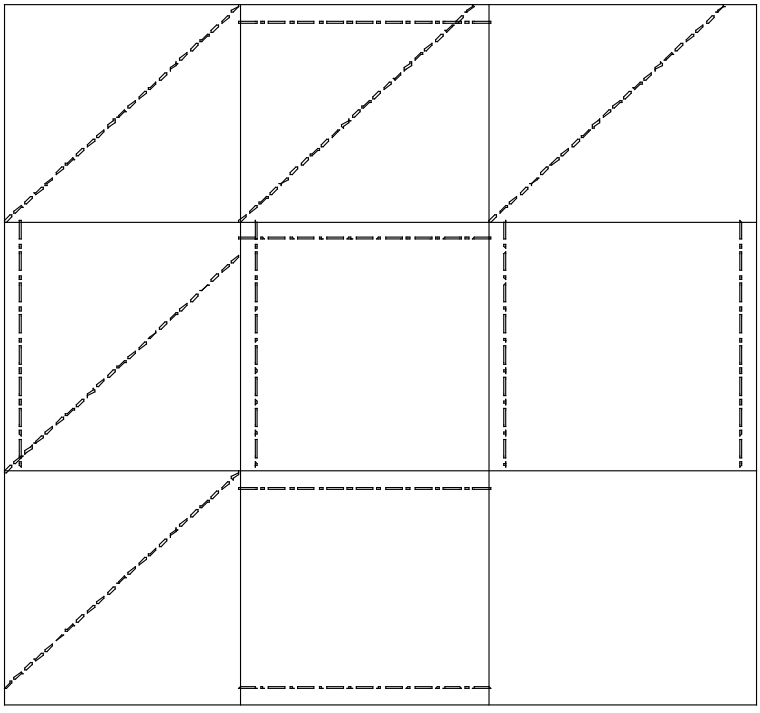
Three-storey, free-standing
Load class 2 pursuant to EN 12 811-1:2004-03
Jack ID 15 - extendible to 30 cm
Steel Plank
Tube Ledgers 250
Transoms 250U
V-diagonals 200/250
H-diagonals 250/250



5.12.2 System and load

3 x 3 bays, three-storey, not tied on top
Bay width L = 250 x 250 cm, storey height h = 2.00 m
Jack ID 15, extendible to 30 cm
Load class 2 pursuant to EN 12 811-1:2004-03
Upper scaffold platform with Steel Planks, other levels without planks
Longitudinal and transverse horizontal bracing on upper and lower scaffold level
Longitudinal and transverse vertical bracing at all scaffold levels





Unless stated otherwise, all dimensions in mm.

5.12.3 Load calculation

Dead weight (Refer to Table 5.8)

Top interior plane:
1 x Post 200, 2 x 1/2 x Tube Ledger 250, 2 x 1/2 x Transom 250 U, 5 x Steel Plank 250/32, 4.5 x Steel Plank 250S, 1/2 x H-diagonal, 1/2 x V-diagonal

g_o = (10.4 + 10.1 + 17.1 + 5 x 19.4 + 4.5 x 14.3 + 13.7 / 2 + 13.6 / 2) / 100 / 2.50 **~ 0.85 kN/m**

Bottom interior plane:
1 x Post 200. 2 x 1/2 x Tube Ledger 250, 2 x 1/2 x Transom 250 U, 1/2 x V-diagonal, 1/2 x H-diagonal

g = (10.4 + 10.1 + 17.1 + 13,6 / 2 + 13.7 / 2) / 100 / 2.50 **~ 0.20 kN/m**

Top edge plane:
1 x Post 200, 1/2 x Tube Ledger 250, 2 x 1/2 x Transom 250 U, 5 / 2 x Steel Plank 250/32, 4.5 / x Steel Plank 250S, 2 x Toe Board 250, 4 x Tube Ledger 250, 1/2 x V-diagonal, 1/2 x H-diagonal

$g_{o,r}$ = (10.4 + 10.1 / 2 + 17.1 + 5 / 2 x 19.4 + 4.5 / 2 x 14.3 + 2 x 7.4 x 4 x 10.1 + 13.6 / 2 + 13.7 / 2) / 100 / 2.50 = 0.73 **~ 0.75 kN/m**

Bottom edge plane: 1 x Post 200. 1/2 x Tube Ledger 250, 2 x 1/2 x Transom 250 U, 1/2 x V-diagonal, 1/2 x H-diagonal

$g_{U,r}$ = (10,4 + 10.1/2 + 17.1 + 13.6 / 2 + 13.7 / 2) / 100 / 2.50 = 0.18 **~ 0.20 kN/m**

Live load (load class 2): **p = 1.50 kN/m²**

Interior plane: p = 1.50 x 2.5 **= 3.75 kN/m**
Edge plane: $p_{,r}$ = 1.50 x 2.5 / 2 **= 1.88 kN/m**

Wind load: (Refer to Table 5.9)
To simplify calculations. a height of H = 6.50 m is used for all levels.

Top interior plane:
4 x Post 200, 4 x H-brace (handrail), 2 x Toe Board, Steel Plank, 4 x H-brace, 4 x 1/2 x H-diagonal, 4 x 1/2 x V-diagonal transverse, 1/2 x V-diagonal longitudinal

W_o = 4 x 0.081 + 4 x 0.101 + 2 x 0.316 + 0.084 + 4 x 0.101 + 2 x 0.101 + 4 x 0.129 / 2 + 0.081 / 2 **= 2.35 kN**

Bottom interior plane:
4 x Post 200, 4 x H-brace, 4 x 1/2 x H-diagonal, 4 x 1/2 x V-diagonal transverse, 2 x 1/2 x V-diagonal longitudinal

W = 4 x 0.081 + 4 x 0.101 + 2 x 0.101 + 2 x 0.129 + 0.081 **= 1.27 kN**

Top edge plane:
4 x Post 200, 4 x H-brace (handrail), 2 x 1/2 Toe Board, 1/2 x Steel Plank, 4 x 1/2 x H-brace, 3 x 1/2 x H-diagonal, 2 x 1/2 x V-diagonal longitudinal

W_o = 4 x 0.081 + 2 x 0.101 + 2 x 0.316 + 0.084 / 2 + 0.101 + 1.5 x 0.101 + 40.081 **= 1.32 kN**

Bottom edge plate:
4 x Post 200, 4 x 1/2 x H-brace, 3 x 1/2 x H-diagonal, 2 x 1/2 x V-diagonal longitudinal

$W_{u,r}$ = 4 x 0.081 + 2 x 0.101 + 1.5 x 0.101 + 0.081 **= 0.76 kN**

Working wind:
W_w = W x 0.2 / (0.93 x 0.7) **= 0.31 W**

5.12.4 Calculation and proof

Inner posts:

Average node stiffness - L_R = L = 250 cm - $C\varphi_{M,K}$ = 4171 ~ 4000 kNcm/rad (Table 5.10)

It is assumed that the total of all horizontal loads is evenly distributed amongst the H-connections at the scaffold top and amongst the Base Jacks at the scaffold bottom!

LF dead weight + live load + working wind

H = (2 x W_o + 6 x W + 2 x $W_{o,r}$ + 6 x W_r) / 16 x 0.31
= (2 x 2.35 + 6 x 1.27 + 2 x 1.32 + 6 x 0.76) / 16 x 0.31 = 0.38 **~ 0.40 kN**

N = (g_o + 3 x g + p) x L + (W_o x 3 x h + W x 2 x h + W x h) / L x 0.31
= (0.85 + 3 x 0.20 + 3.75) x 2,5 + (2.35 x 6 + 1.27 x 4 + 1.27 x 2) / 2.5 x 0.31
= 13.0 + 2.69 = 15.69 **~ 16.00 kN**

Refer to Diagram 5.19

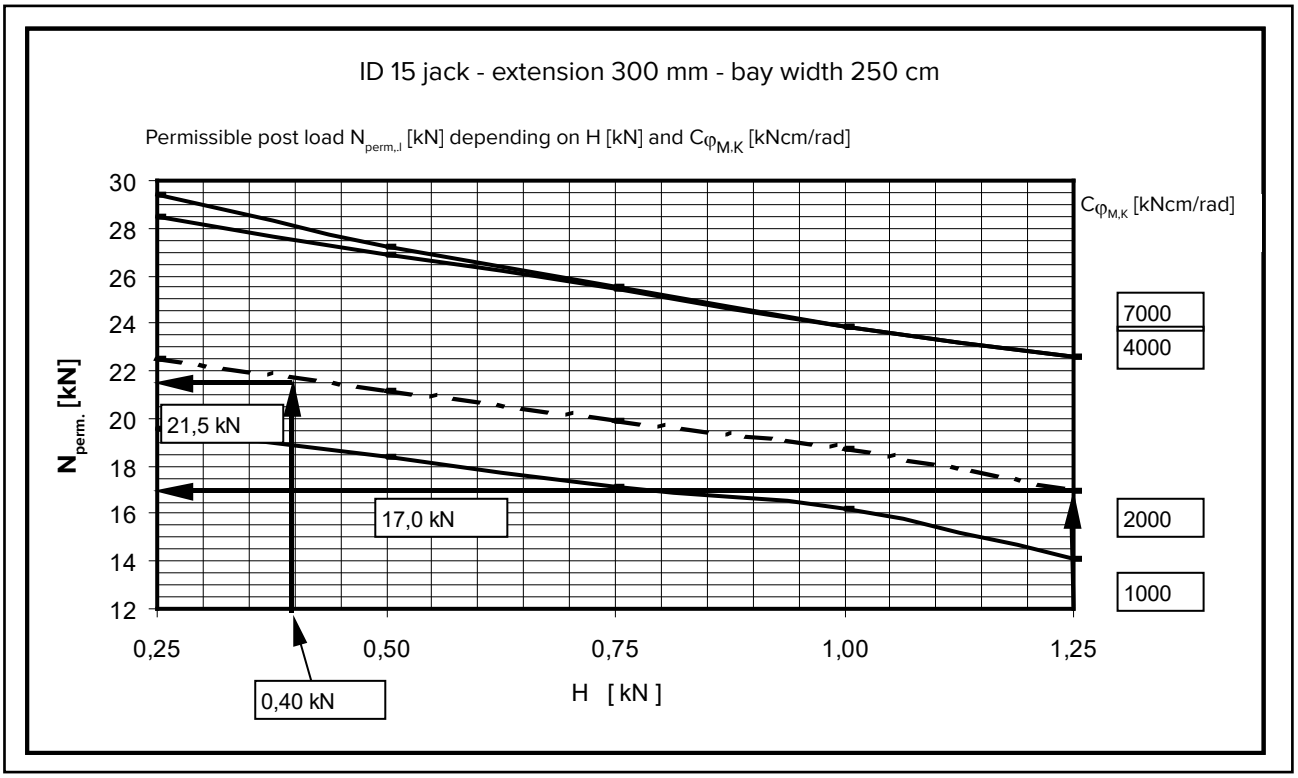
H = 0.40 kN - $C\varphi_M$,m = 4000 kNcm/rad **N_{perm} = 27.50 kN > N = 16.00 kN**

LF dead weight + wind

H = (2 x W_o + 6 x W + 2 x $W_{o,r}$ + 6 x W_r) / 16
= (2 x 2.35 + 6 x 1.27 + 2 x 1.32 + 6 x 0.76) / 16 = 1.23 **~ 1.25 kN**

N = (g_o + 3 x g) x L + (W_o x 3 x h + W x 2 x h + W x h) / L
= (0.85 + 3 x 0.20) x 2.5 + (2.35 x 6 + 1.27 x 4 + 1.27 x 2) / 2.5
= 3.63 + 8.69 = 12.3 **~ 13.00 kN**

Refer to Diagram 5.19
H = 1.25 kN - $C\varphi_{M,K}$ = 4000 kNcm/rad **N_{perm} = 22.5 kN > N = 13.00 kN**



Unless stated otherwise, all dimensions in mm.

5.12.5 Edge posts

Average node stiffness - L_R = 250 cm - $C\varphi R_{,K}$ = 2085 ~ 2000 kNcm/rad (Table 5.10)

LF dead weight + live load + working wind

H = $(2 \times W_o + 6 \times W + 2 \times W_{o,r} + 6 \times W_r)/16 \times 0.31$
= $(2 \times 2.35 + 6 \times 1.27 + 2 \times 1.32 + 6 \times 0.76) / 16 \times 0.31 = 0.38$ **~ 0.40 kN**

N = $(g_{o,r} + 3 \times g_{,r} + p_{,r}) \times L$
= $(0.75 + 3 \times 0.20 + 1.88) \times 2.5 = 8.08$ **~ 8.00 kN**

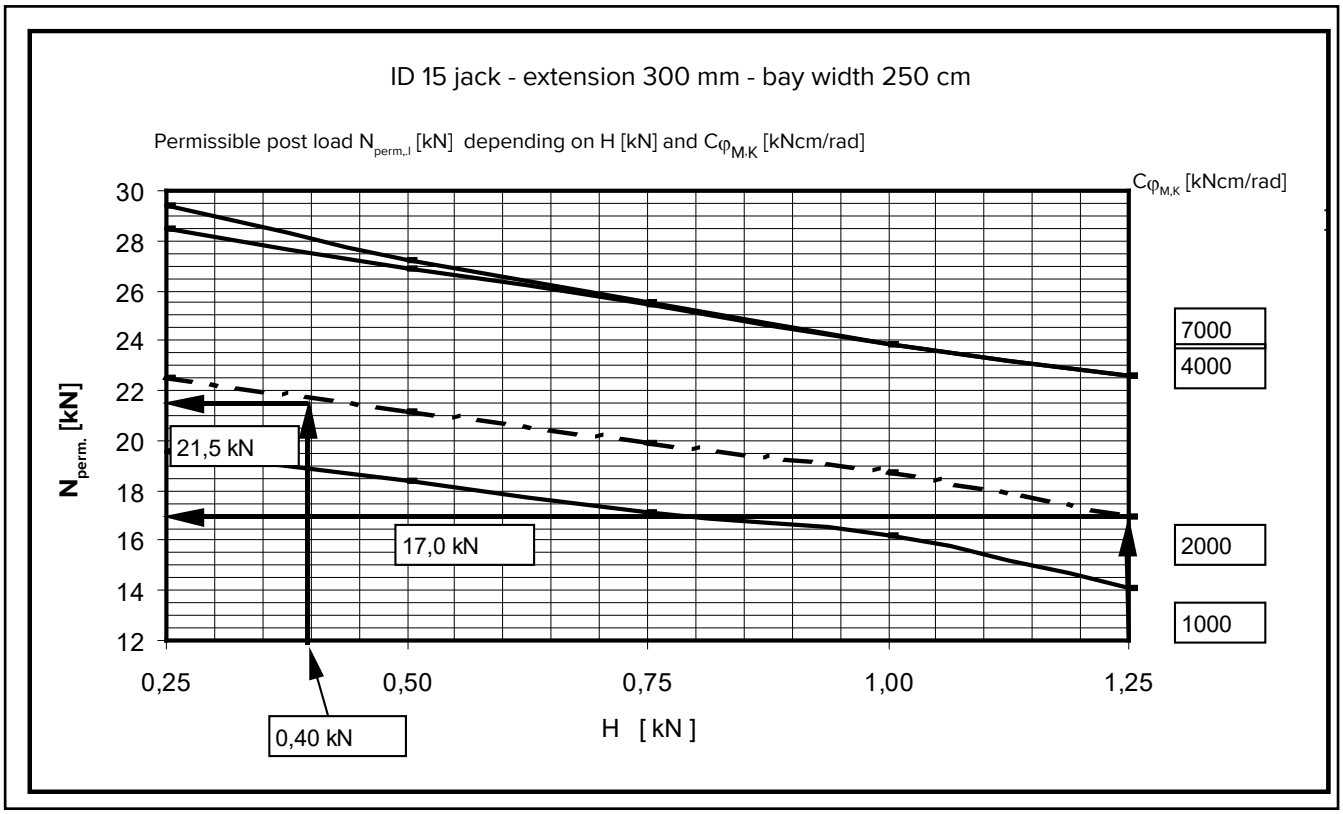
Refer to Diagram 5.19:
H = 0.40 kN - $C\varphi_{R,K}$ = 2000 kNcm/rad **N_{perm} = 21.5 kN > N = 8.00 kN**

LF dead weight + wind

H = $(2 \times 2.35 + 6 \times 1\text{-}27 + 2 \times 1.32 + 6 \times 0.76) / 16 = 1.22$ **~1.25 kN**

N = $(2 \times g + 2 \times g_u) \times L$
= $(0.75 + 3 \times 0.20) \times 2.5 = 3.38$ **~4.00 kN**

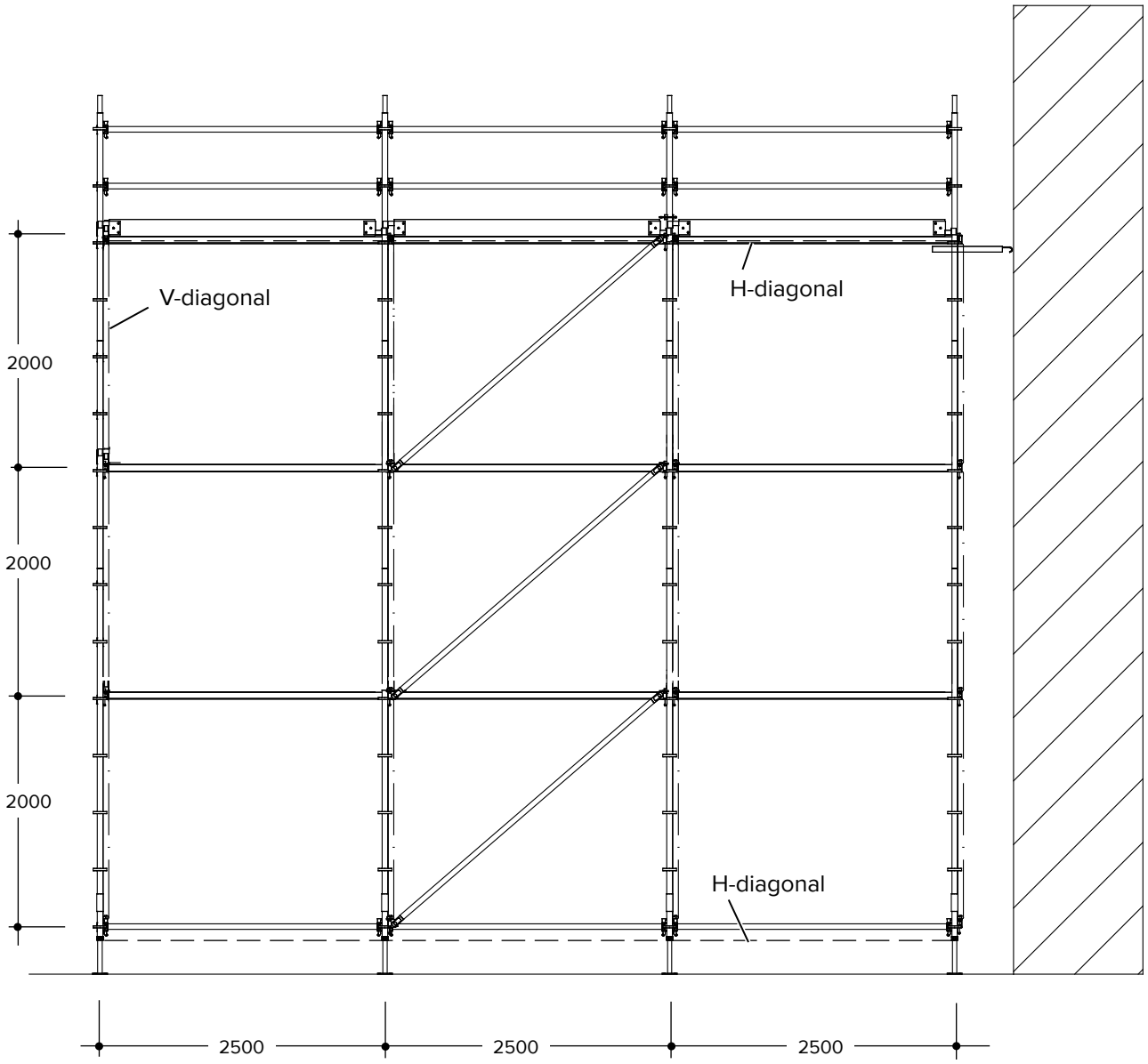
Refer to Diagram 5.19:
H = 1.25kN - $C\varphi_{R,K}$ = 2000 kNcm/rad **Nperm = 17.00 kN > N = 4.00 kN**



5.13 MODEX as birdcage scaffold: Example 2

5.13.1 Design

Four-storey, braced at top
Load class 3 pursuant to EN 12 811-1:2004-03
Jack 45/3.8 - extendible to 15 cm
Steel plank
Tube ledgers 250
Transoms 250U
V-diagonals 200/250
H-diagonals 250/250



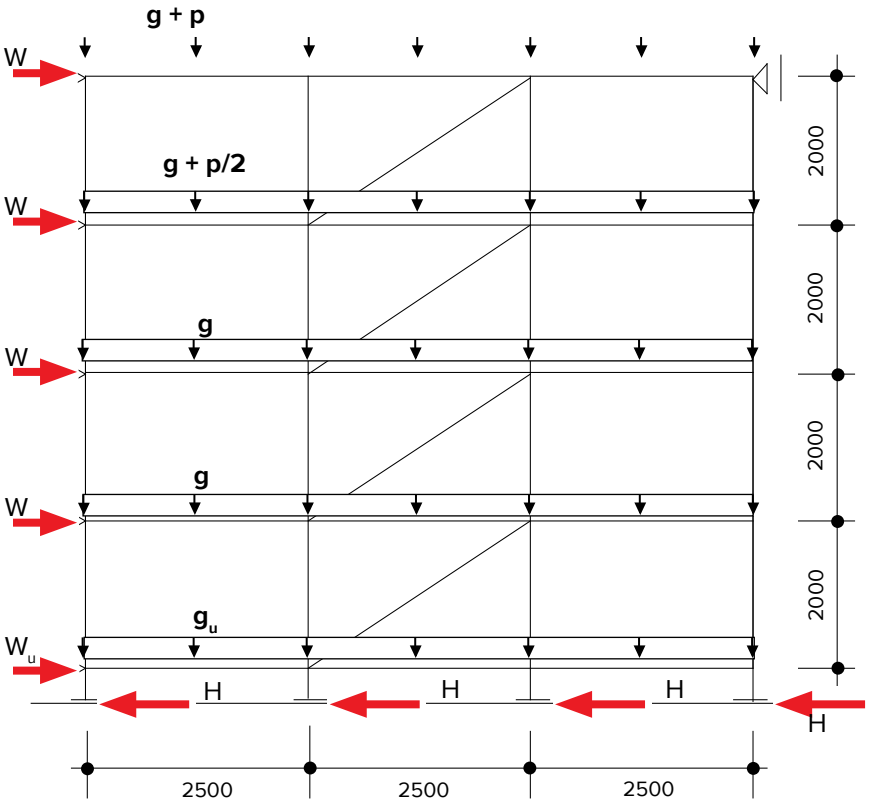
Unless stated otherwise, all dimensions in mm.

5.13.2 System and load

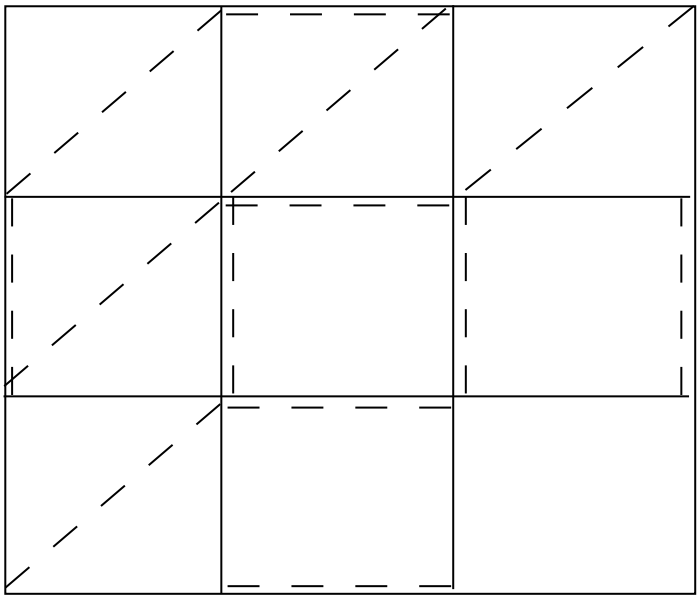
3 x 3 bays, four-storey, tied on top
Bay width L = 250 x 250 cm, storey height h = 2.00 m
Jack 45/3.8, extendible to 15 cm
Load class 3 pursuant to EN 12 811-1:2004-03

All scaffold platforms with Steel Planks, longitudinal and transverse horizontal bracing on upper and lower scaffold level, longitudinal and transverse vertical bracing at all scaffold levels,

View



Top view



5.13.3 Load calculation

Dead weight (Refer to Table 5.8)

Top interior plane:
1 x Post 200, 2 x 1/2 x Tube Ledger 250, 2 x 1/2 x Transom 250 U, 5 x Steel Plank 250/32, 4.5 x Steel Plank 250S, 1/2 x H-diagonal, 1/2 x V-diagonal

g = (10.4 + 10.1 + 17.1 + 5 x 19.4 + 4.5 x 14.3 + 13.7 / 2 + 13. 6 / 2) / 100 / 2.50 **~ 0.85 kN/m**

Bottom interior plane:
1 x Post 200. 2 x 1/2 x Tube Ledger 250, 2 x 1/2 x Transom 250 U, 1/2 x V-diagonal, 1/2 x H-diagonal

g_u = (10.4 + 10.1 + 17.1 + 13.6 / 2 + 13.7 / 2) / 100 / 2.50 **~ 0.20 kN/m**

Top edge plane:
1 x Post 200, 1/2 x Tube Ledger 250, 2 x 1/2 x Transom 250 U, 5 / 2 x Steel Plank 250/32, 4.5 / x Steel Plank 250S, 2 x Toe Board 250, 4 x Tube Ledger 250, 1/2 x V-diagonal, 1/2 x H-diagonal

g_r = (10.4 + 10.1 / 2 + 17.1 + 5 / 2 x 19.4 + 4.5 / 2 x 14.3 + 2 x 7.4 + 4 x 10.1 + 13.6 / 2 + 13.7 / 2) / 100 /2.50 = 0.73 **~ 0.75 kN/m²**

Bottom edge plane:
1 x Post 200. 1/2 x Tube Ledger 250, 2 x 1/2 x Transom 250 U, 1/2 x V-diagonal, 1/2 x H-diagonal

$g_{u,r}$ = (10.4 + 10.1 / 2 + 17.1 + 13.6 / 2 + 13.7 / 2) / 100 / 2.50 = 0.18 **~ 0.20 kN/m**

Live load (load class 2): **p = 2.0 kN/m²**
Interior plane: p = 2.0 x 2.5 **= 5.00 kN/m**
Edge plane: $p_{,r}$ = 2.0 x 2.5 / 2 **= 2.50 kN/m**

Wind load: (Refer to Table 5.9)
To simplify calculations, a height of H = 8.50 m is used for all levels.

Top interior plane:

4 x Post 200, 4 x H-brace (handrail), 2 x Toe Board, Steel Plank, 4 x H-brace, 4 x 1/2 x H-diagonal, 4 x 1/2 x V-diagonal transverse, 1/2 x V-diagonal longitudinal

W = 4 x 0.083 + 4 x 0.103 + 2 x 0.322 + 0.086 + 4 x 0.103 + 2 x 0.103 + 4 x 0.132/2 + 0.083/2 **= 2.40 kN**

Bottom interior plar **V [kN]**
4 x Post 200, 4 x H-brace, 4 x 1/2 x H-diagonal, 4 x 1/2 x V-diagonal transverse, 2 x 1/2 x V-diagonal longitudinal

W_u = 4 x 0.083 + 4 x 0.103 + 2 x 0.103 + 2 x 0.132 + 0.083 **= 1.30 kN**

Top edge plane:
4 x Post 200, 4 x H-transom (handrail), 2 x 1/2 Toe Board, 1/2 x Steel Plank, 4 x 1/2 x H-diagonal, 3 x 1/2 x H-diagonal, 2 x 1/2 x V-diagonal longitudinal

$W_{o,r}$ = 4 x 0.083 + 2 x 0.103 + 0.322 + 0.086 / 2 + 2 x 0.103 + 1.5 x 0.103 + 0.083 **= 1.35 kN**

Bottom edge plane:
4 x Post 200, 4 x 1/2 x H-brace, 3 x 1/2 x H-diagonal, 2 x 1/2 x V-diagonal longitudinal

$W_{u,r}$ = 4 x 0.083 + 2 x 0.103 + 1.5 x 0.103 + 0.083 **= 0.78 kN**

Working wind:

W_A = W x 0.2 / (0.95 x 0.7) **= 0.30 W**

5.13.4 Calculation and proof

Interior posts in the lower part of the scaffold

Average node stiffness - L_R = L = 250 cm - $C_{\varphi M,K}$ = 4171 ~ 4000 kNcm/rad (Table 5.10)

It is assumed that the horizontal loads are evenly distributed by the H-connections amongst the Base Jacks at the scaffold's bottom!

LF dead weight + live load + working wind

H = $((2 \times W + 2 \times W_{,r}) \times (6.5 + 4.5 + 2.5) + (2 \times W_u + 2 \times W_{u,r}) \times 8) / 8.5 / 16 \times 0.30$
= $((2 \times 2.40 + 2 \times 1.35) \times 13.5 + (2 \times 1.30 + 2 \times 0.78) \times 8) / 8.5 / 16 \times 0.30 = 0.297$
~ 0.30 kN

N = $(4 \times g + g_o + p + p/2) \times L = (4 \times 0.85 + 0.20 + 5 + 5/2) \times 2.5 = 27.75$ **~ 28.00 kN**

Refer to Table 5.14

H = 0.30 kN - $c_{\varphi M,K}$ = 4000 kNcm/rad **N_{perm} = 32.00 kN > N = 28.00 kN**

LF dead weight + wind

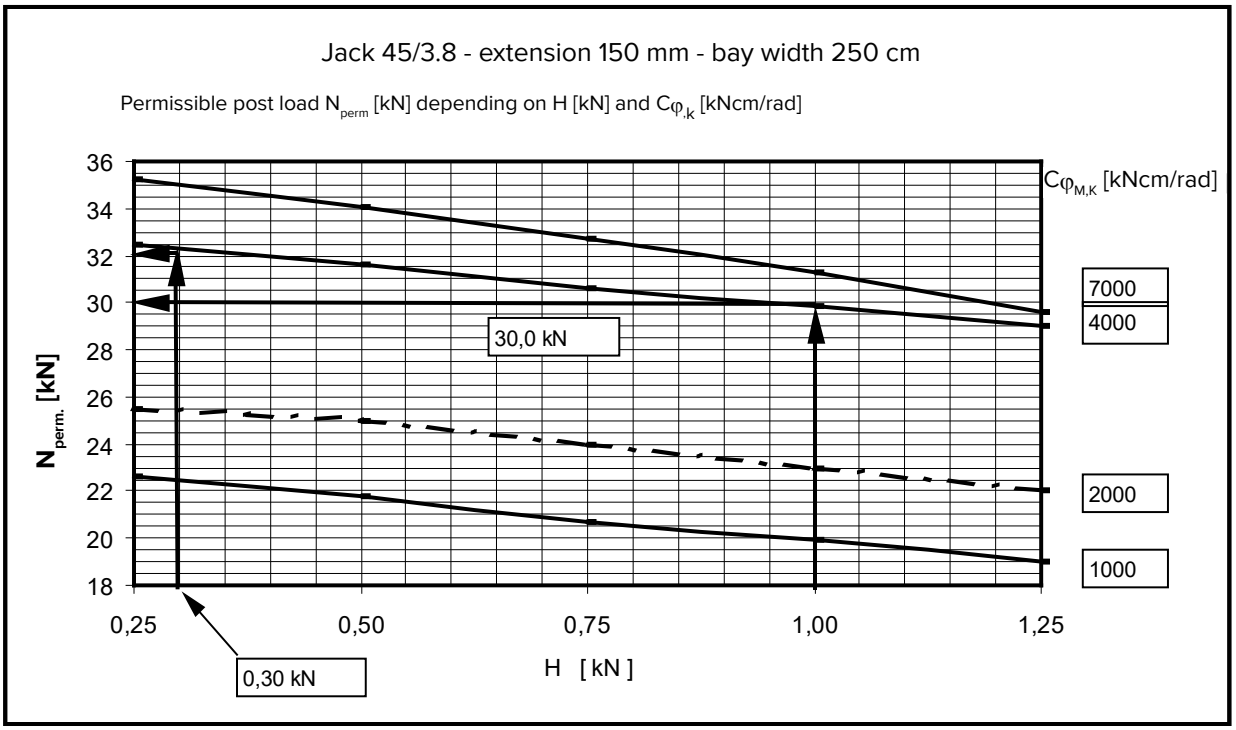
H = $((2 \times W + 2 \times W_{,r}) \times (6.5 + 4.5 + 2.5) + (2 \times W_u + 2 \times W_{u,r}) \times 8) / 8.5 / 16$

= $((2 \times 2.40 + 2 \times 1.35) \times 13,5 + (2 \times 1.30 + 2 \times 0.78) \times 8) / 8.5 / 16 = 0.99$ **~ 1.00 kN**

N = $(4 \times g + g_o) \times L = (4 \times 0.85 + 0.20) \times 2.5$ **~ 9.00 kN**

Refer to Diagram 5.3

H = 1.00kN - $c_{\varphi M,K}$ = 4000 kNcm/rad **N_{perm} = 30.0 kN > N = 9.00 kN**



5.13.5 Edge posts in the lower part of the scaffold

Average node stiffness - L_R = 250 cm - $c_{\varphi R,K}$ = 2085 ~ 2000 kNcm/rad (Table 5.10)

LF dead weight + live load + working wind

H = ((2 x W + 2 x W,$_r$) x (6.5 + 4.5 + 2.5) + (2 x W_u + 2 x $W_{u,r}$) x 8) / 8.5 / 16 x 0.30

= ((2 x 2.40 + 2 x 1.35) x 13.5 + (2 x 1.30 + 2 x 0.78) x 8) / 8.5 / 16 x 0.30 = 0.297

~ 0.30 kN

N = (4 x $g_{,r}$ + $g_{u,r}$ + $p_{,r}$ + $p_{,r}$ /2) x L = (4 x 0.75 + 0.20 + 2.50 + 2.50 / 2) x 2.5 = 17.4

~ 17.50 kN

Refer to Diagram 5.3:

H = 0.30 kN - $c_{\varphi R,K}$ = 2000 kNcm/rad **N_{perm} = 25.50 kN > N = 17.50 kN**

LF dead weight + wind

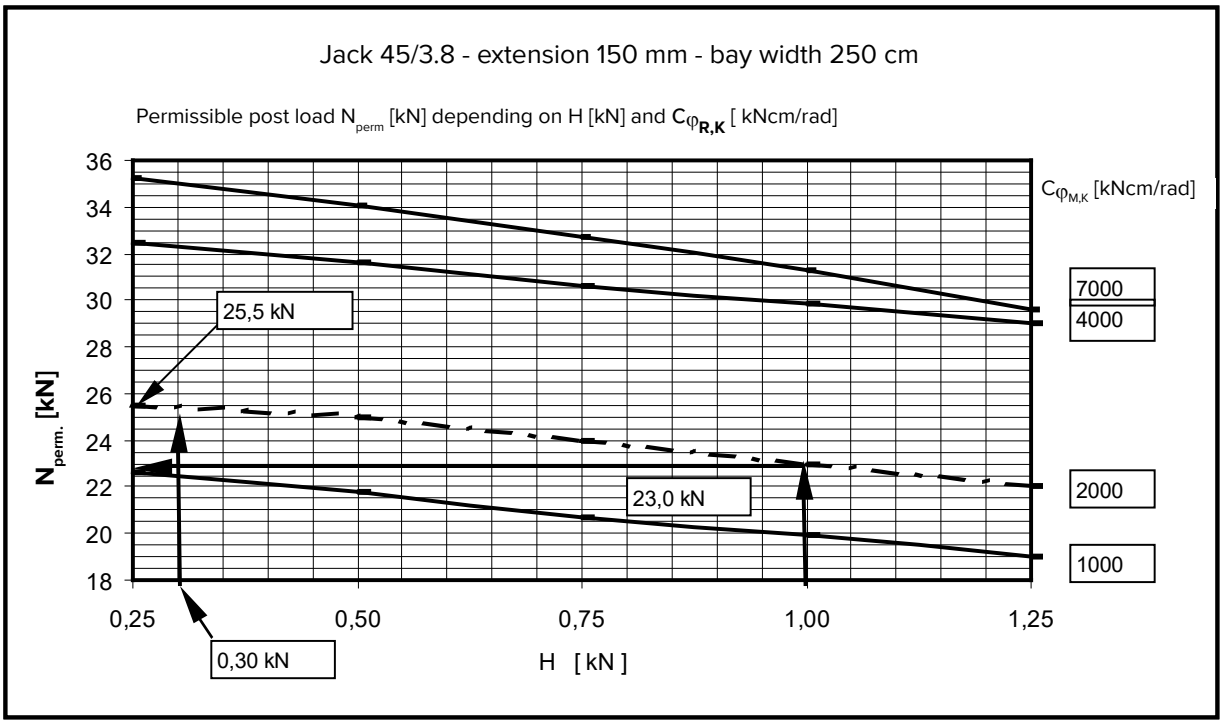
H = ((2 x W + 2 x W,$_r$) x (6.5 + 4.5 + 2.5) + (2 x W_u + 2 x $W_{u,r}$) x 8) / 8.5 / 16

= ((2 x 2.40 + 2 x 1.35) x 13.5 + (2 x 1.30 + 2 x 0.78) x 8) / 8.5 / 16 = 0.99 **~ 1.00 kN**

N = (4 x $g_{,r}$ + $g_{u,r}$) x L = (4 x 0.75 + 0.20) x 2.5 **= 8.00 kN**

Refer to Diagram 5.3:

H = 1,00 kN - $c_{\varphi R,K}$ = 2000 kNcm/rad **Nperm = 23.00 kN > N = 8.00 kN**



N_{perm} = 23.00 kN > N = 8.00 kN

5.13.6 Interior posts in general area

Average node stiffness - $L_R = L = 250$ cm - $C_{\varphi M,K} = 4171 \sim 4000$ kNcm/rad (Table 5.10)

V_{max} = ((W x (8.5 + 6.5 + 4.5 + 2.5) + W_u x 0.5) / 8.5 - W) / 4

= ((2.40 x 22 + 1.30 x 0.5) / 8.5 - 2.4) / 4 = 0.97 **~ 1.00 kN**

w ~ W/h = 2.40 / 2.0 **1.20 KN/m**

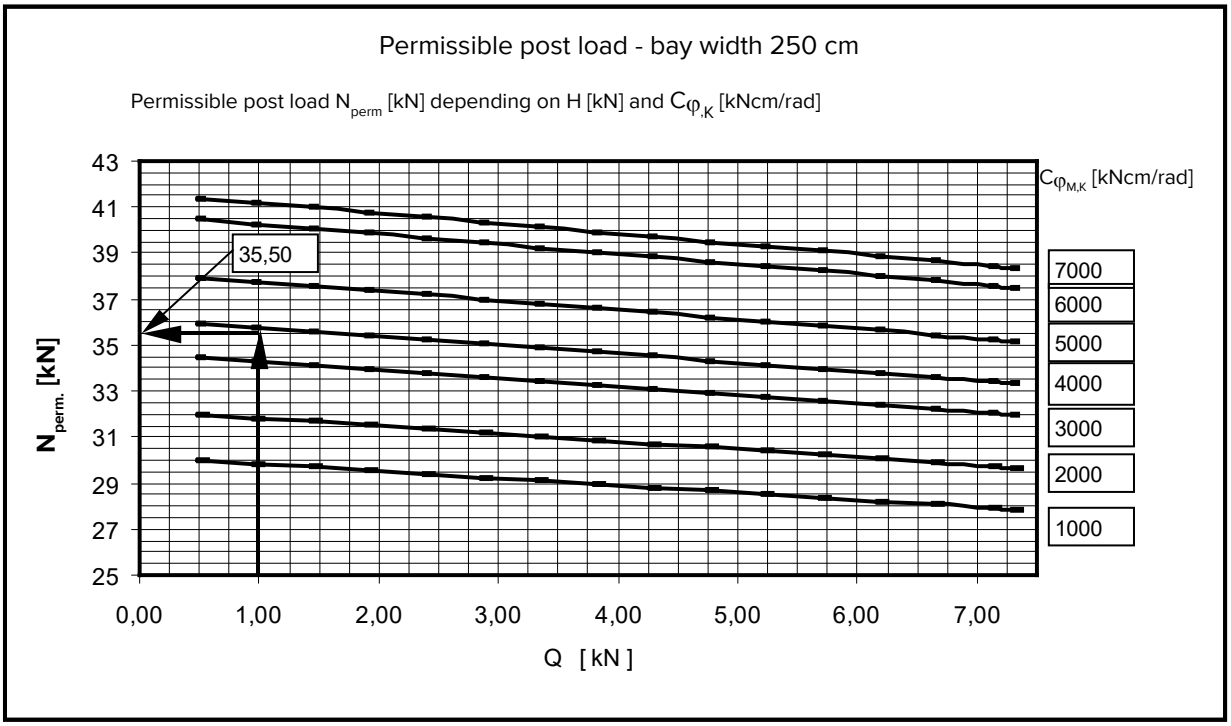
$N_{max} = N_{jack}$ plus normal forces from the effect of bracing must be added

= N_{base} + w x H^2 / 8 / L

17.50 + 1.20 x 8.5^2 / 8 / 2.50 = 17.5 + 4.33 = 21.84 kN **~ 22.00 kN**

Refer to diagram 5.21:

V = 1.0 kN - $C_{\varphi M,K}$ = 4000 kNcm/rad **N_{perm} = 35.50 kN > N = 22.00 kN**

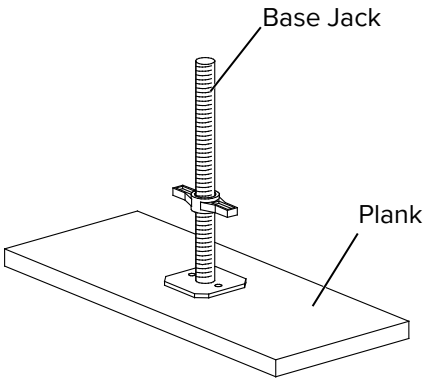


6 Assembly of standard components

6.1 Base Jacks

WARNING	**Safety note:**
	Erect the scaffold only on ground capable of supporting the load. When in doubt, use load-distributing substructures (e.g. planks).

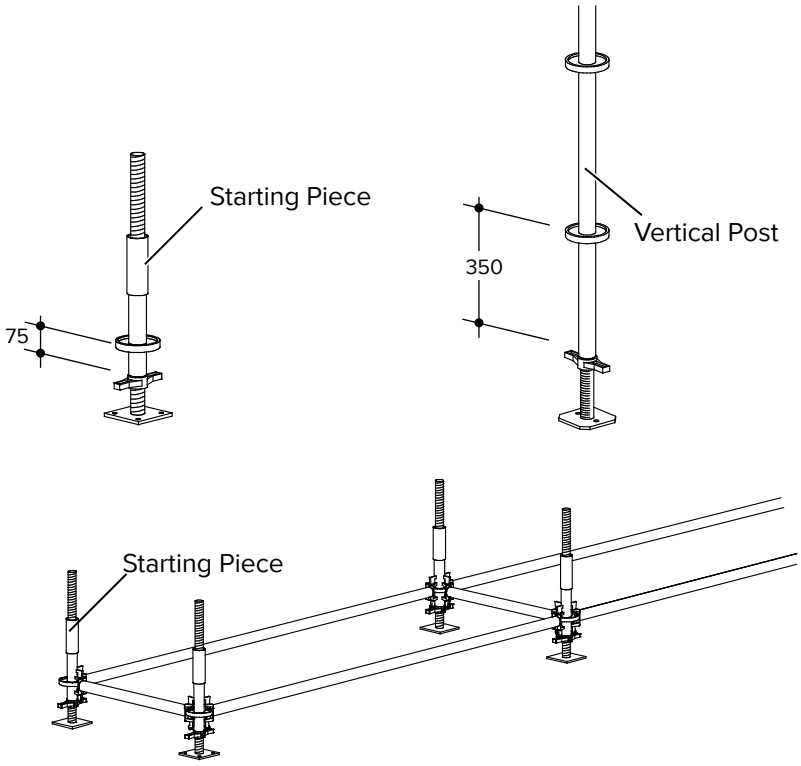
Begin erecting the scaffold at the highest ground level. Place a Base Jack or Base Plate under each Scaffold Post.



NOTE	**Note!**
	Depiction of the plank is omitted in the subsequent illustrations.

6.2 Starting Piece

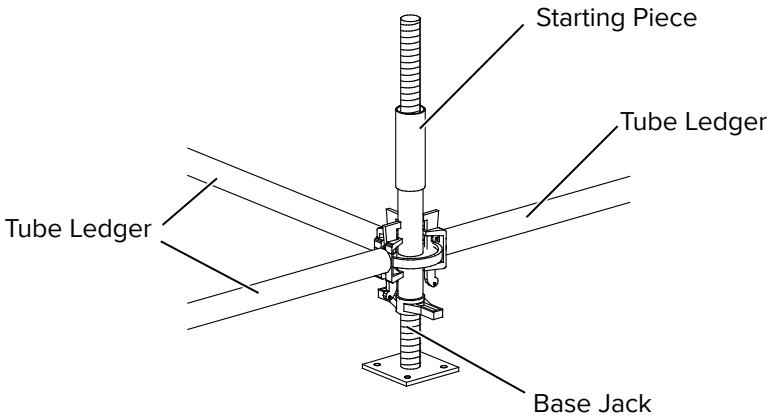
Place the Starting Piece over the Base Jack. This enables the scaffold to be assembled by one person. It is also possible to start with a Vertical Post (but not when erected as shown on section 9).



Unless stated otherwise, all dimensions in mm.

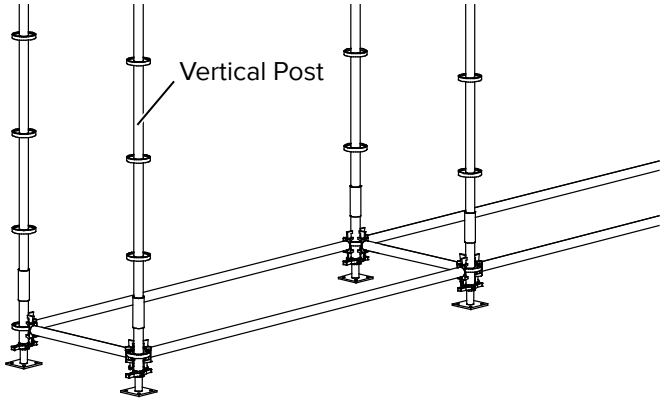
6.3 Tube Ledgers and Transoms U

Installation of the Tube Ledgers and Transoms U of the proper lengths in both longitudinal and transverse direction ensures that the scaffold has a stable base (Also refer to page 205).



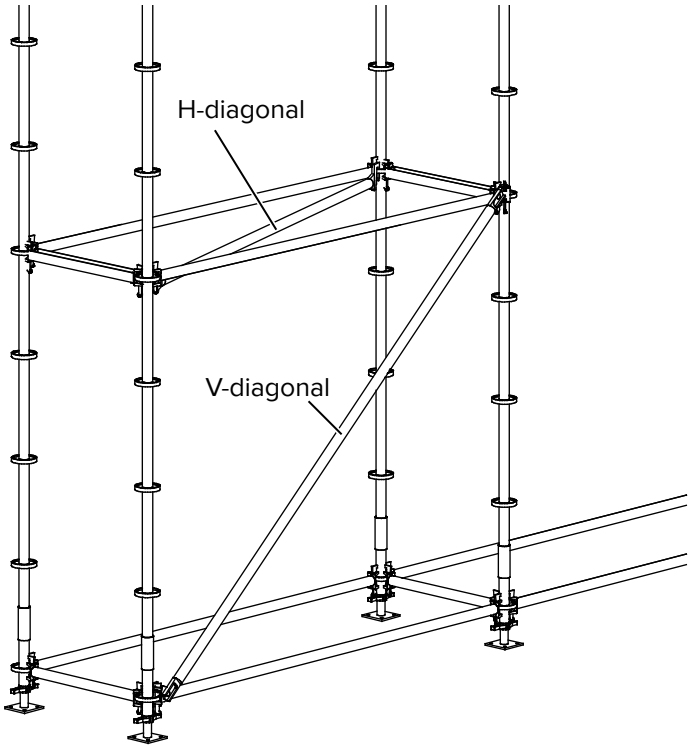
6.4 Vertical Posts

Next insert the Vertical Posts in the Starting Pieces to hold them in place.

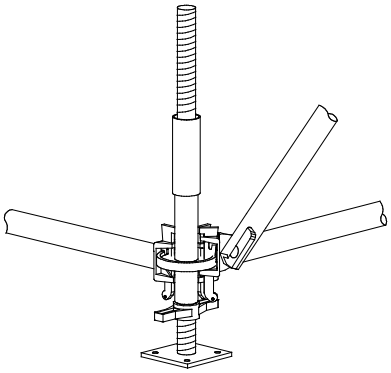


6.5 V- and H-diagonals

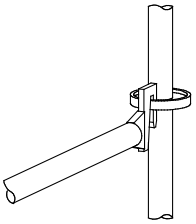
Use a wedge connection to connect a V-diagonal to the lower Rosette and to the Rosette on the opposite Vertical Post, located 2 m higher (Also refer to page 205). The H-diagonals, which serve as braces, may also be secured to the Rosettes with their wedge-shaped hooked ends (Also refer to page 205).



V-diagonal connection



H-diagonal connection



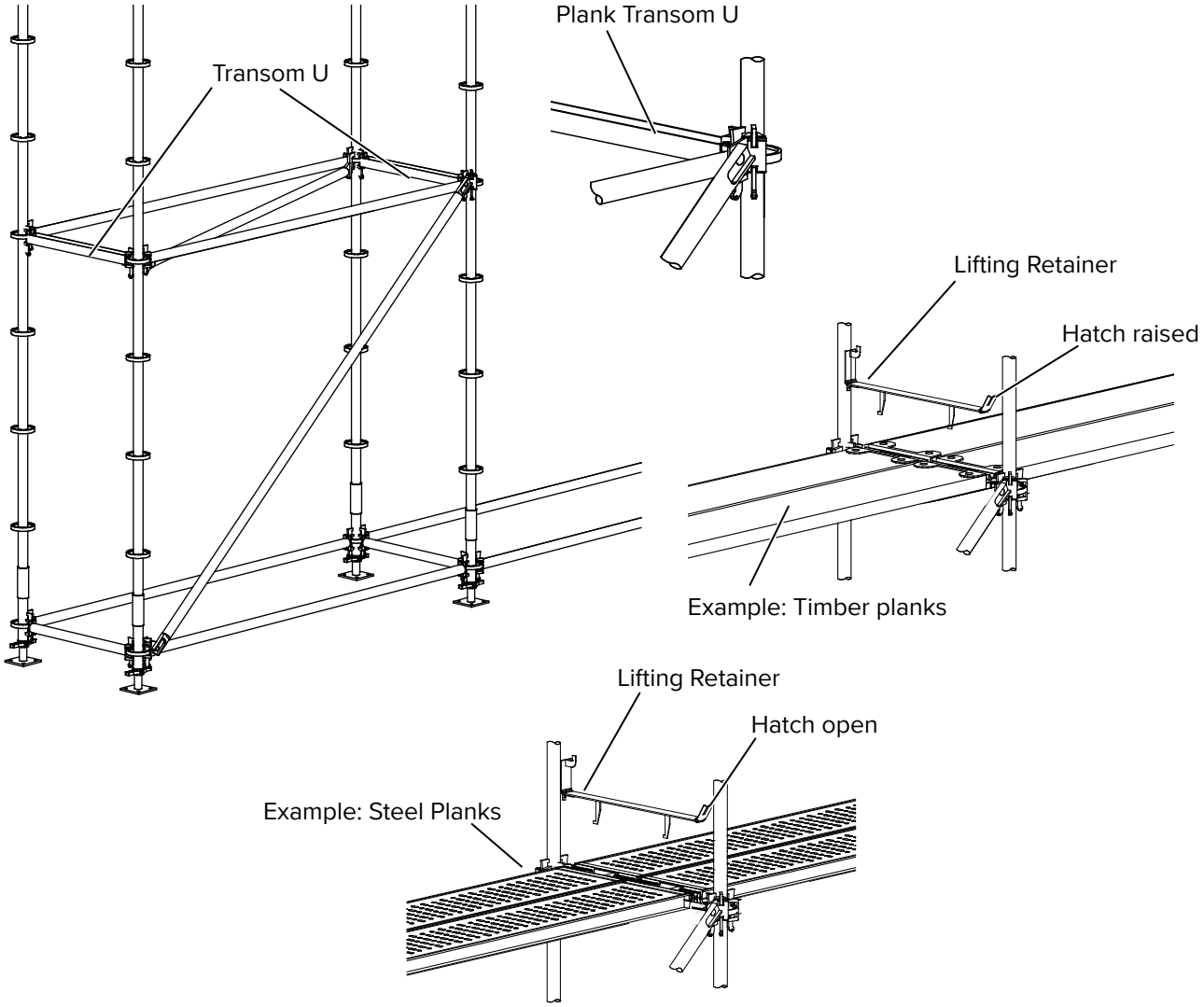
6.6 Using standard planks

Transoms U allow standard scaffold planks to be used. Install the transoms between two Vertical Posts by hooking them into Rosettes and then securing them with the built-in wedge. All of the transom planks are fitted with special supports that engage in the profile of the Transoms U. The Transom U allows all scaffold planks in the BOSTA scaffold series to be used, e.g.:

- Timber planks
- Steel Hollow Box Planks
- Steel Planks
- Alu Planks
- Horizontal Frames
- Alu Frame Decks

The following applies only to façade scaffolds:

Tube Ledgers or H-diagonals do not need to be installed at plank level when using system-oriented planks and Lifting Retainers. At least the knee rail must be comprised of a Tube Ledger. If a Tube Ledger is installed at plank height on the interior and exterior, Guard Rails (part code 651471- 651477) can be used as the hand rail and knee rail.



WARNING

Warning!
Always comply with the instructions in section 6.10 regarding Lifting Retainers.

NOTE

Note!
The Connection Part with the Lifting Retainer Tube can be used as an alternative.

6.7 Using commercially available timber planks

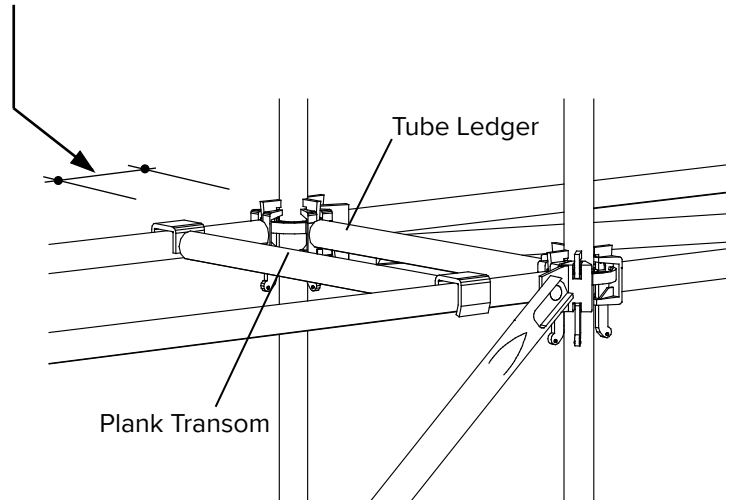
Non-overlapping plank joint

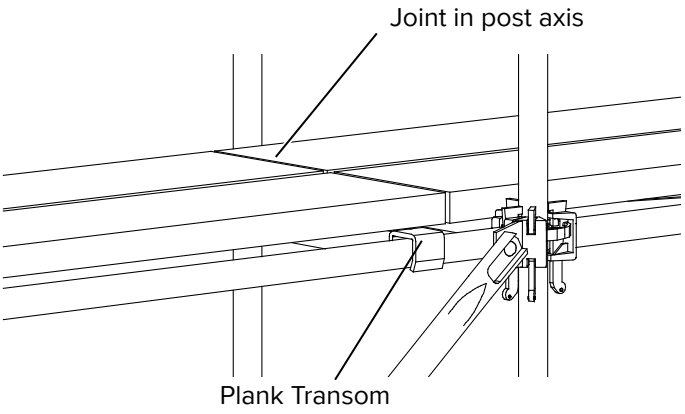
If instead of standard scaffold planks commercially available planks are used, install only Tube Ledges in place of the Transoms U. The plank joint should always be above a Tube Ledger. Using an adjustable Plank Transom installed on the longitudinal Tube Ledgers allows the planks to be joined such that they do not overlap. Then the Plank Transoms and Tube Ledgers are at the same level.

WARNING

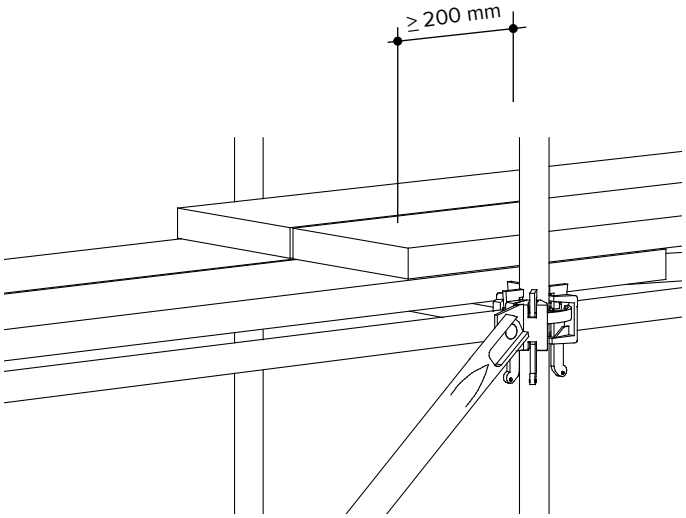
Warning!

The distance between the Plank Transom and the centre line of the Vertical Post may not exceed 25 cm.





Joint with overlapping timber planks without Plank Transom.



WARNING

Warning!

The scaffold planks must overlap the centre line of the Tube Ledger by at least 20 cm. Always comply with the instructions in section 6.10 regarding Lifting Retainers.

6.8 Widening the scaffold

Maximum permissible span for scaffold boards or timber planks (in metres)

Table 6.1

Load class [1]	Board or plank width cm	Board or plank thickness cm				
		3.0	3.5	4.0	4.5	5.0
1, 2, 3	20	1.25	1.50	1.75	2.25	2.50
	24 and 28	1.25	1.75	2.25	2.50	2.75
4	20	1.25	1.50	1.75	2.25	2.50
	24 and 28	1.25	1.75	2.00	2.25	2.50
5	20, 24, 28	1.25	1.25	1.50	1.75	2.00
6	20, 24, 28	1.00	1.25	1.25	1.50	1.75

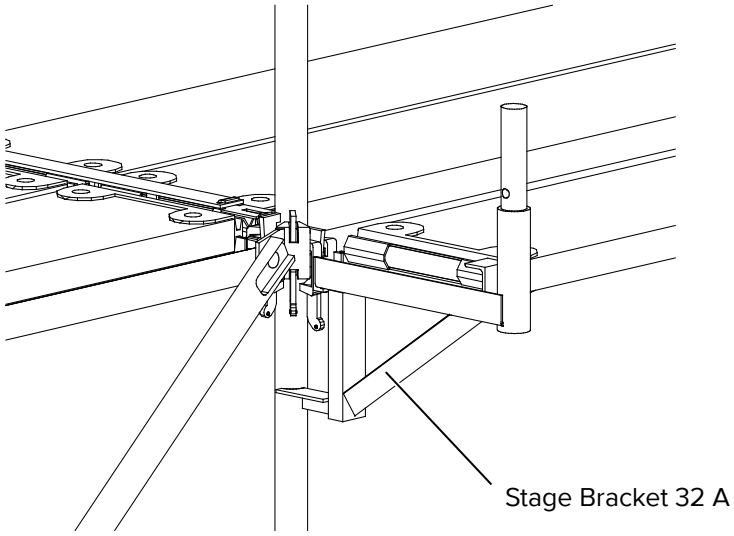
[1] LC per 12811-1:2004-03

Maximum permissible span for scaffold boards or timber planks (in metres) used as planks in protective scaffolds. If scaffold boards or planks are used in two scaffold layers vertically spaced 0.50 m apart, this is considered double planking.

Table 6.2

Plank width	Drop height	Greatest permissible span (in m) for double planking or planks with a thickness of				Maximum span (in m) for single planking or planks with a thickness of			
In cm	in m	3.5 cm	4.0 cm	4.5 cm	5.0 cm	3.5 cm	4.0 cm	4.5 cm	5.0 cm
20	1.0 1.5 2.0	1.5 1.3 1.2	1.8 1.6 1.5	2.1 1.9 1.7	2.6 2.2 2.0	- - -	1.1 1.0 -	1.2 1.1 1.0	1.4 1.3 1.2
24	1.0 1.5 2.0	1.7 1.5 1.4	2.1 1.8 1.6	2.5 2.2 2.0	2.7 2.5 2.2	1.0 - -	1.2 1.1 1.0	1.4 1.2 1.2	1.6 1.4 1.3
28	1.0 1.5 2.0	1.9 1.7 1.5	2.4 2.0 1.8	2.7 2.5 2.2	2.7 2.7 2.5	1.1 1.0 1.0	1.3 1.2 1.1	1.5 1.4 1.3	1.7 1.6 1.4

Stage Brackets 32A and 82A can be used to widen the working platform at the same level and in height increments of 50 cm (Rosette spacing).



Unless stated otherwise, all dimensions in mm.

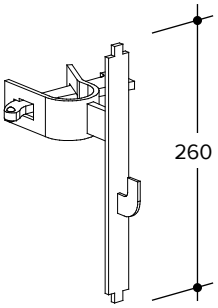
6.9 Corners

Corner with Outer Corner Bracket

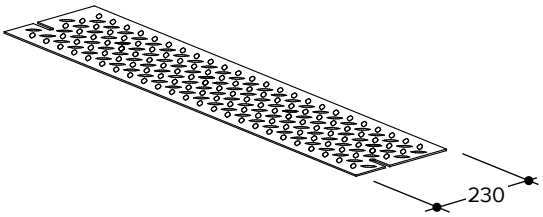
Example:

The Gap Plank covers the space between two scaffold bays. The Gap Plank is secured with a Connection Part.

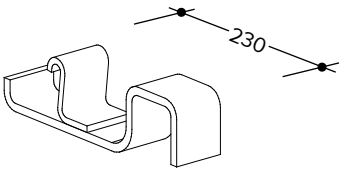
Connection Part



Gap Plank



Outer Corner Bracket



6.10 Lifting Retainers for MODEX Scaffolds

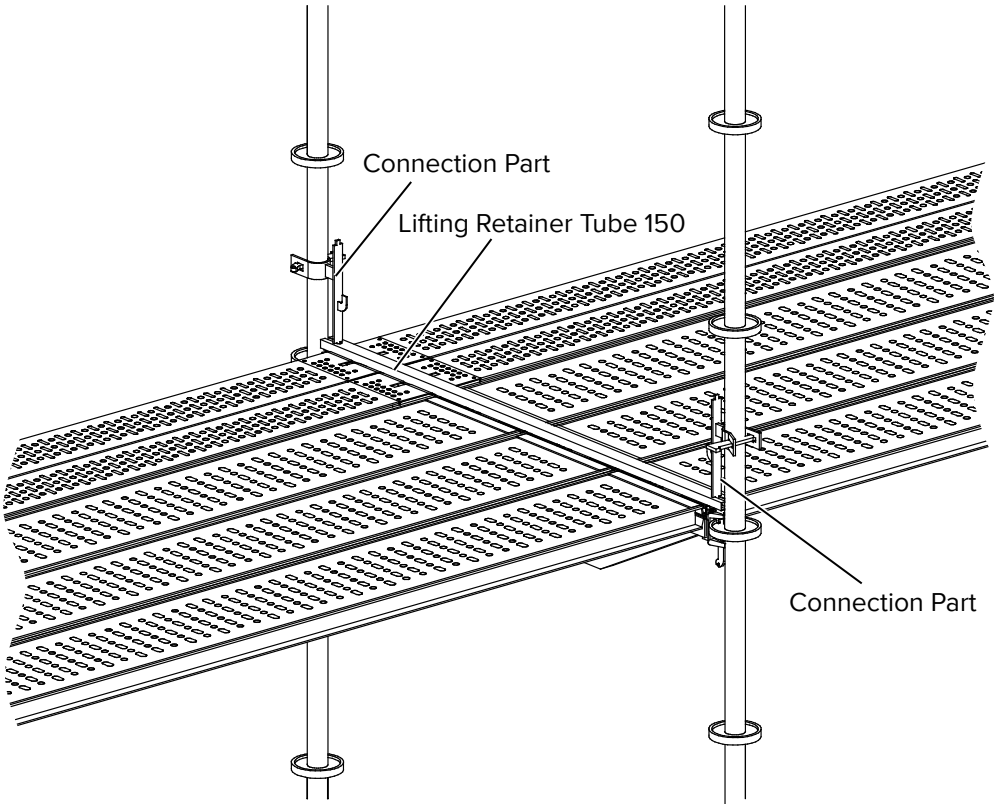
BOSTA system planks can be used in conjunction with Transoms U in the MODEX scaffold system. Position the planks close to one another, such that they can neither teeter nor give way. The planks must always (Refer to exceptions) be secured with a Lifting Retainer to prevent them from lifting off.

WARNING

Warning!

Always install Lifting Retainers when using mobile scaffolding and any scaffold being moved with hoisting equipment.

To prevent system-oriented planks from lifting off, secure them with suitable Lifting Retainers (Lifting Retainer Tubes with Connection Part, Lifting Retainers 82, 113 and the Lifting Retainer Uni).



Exceptions:

If planks do not serve to stiffen the scaffold (scaffold height less than 8.00 m), Lifting Retainers are not needed. Furthermore, Lifting Retainers may not be necessary indoors, where planks cannot lift off accidentally, and where the planks do not serve to brace the scaffold.

WARNING

Warning!

Lifting Retainers are mandatory in all other cases. The main safety objective is: "Planks must be properly secured to prevent accidental lift-off." This applies regardless of the load dimensions!

7 Moving scaffold components

7.1 General information

When erecting scaffolds in which the top planks are more than 8.0 m from the ground, use a construction hoist to erect and dismantle the scaffold. Special scaffold hoists as well as manual pulleys may be used.

If a platform lift is used, the upper platform must be designed such that the scaffolder does not have to lean over the edge. If the upper platform is higher than 2.00 m, it has to be equipped with side protection. The area around the lower part of the hoist must be cordoned off. Reinforce the scaffold ties near the hoist, complying with instructions in the user guide.

Several construction hoists should be employed at the same time at larger construction sites. This will reduce the horizontal transport distances and associated hazards, and it will minimise the physical strain to which construction workers are normally subjected.

The only case in which a construction hoist is not essential is when the scaffold bay height does not exceed 14.0 m and the scaffold is not longer than 10.0 m. Then scaffold components may be manually transported up and down. If this method is selected, form a "human transport chain," in which at least one person is positioned on each scaffold level, starting with the ground level (Refer to page 79, Fig. 3). Every scaffold bay in which a person is posted must be secured with a hand rail and a knee rail while vertically transporting objects - particularly the uppermost platform.

When using a construction hoist, the uppermost unloading point is the end of the vertical transport chain. When parts are transported manually, in case of the manual vertical transport, the end of the transport chain is the scaffolder on the highest platform, who then continues to erect the scaffold. The contractor is responsible for conducting a hazard assessment prior to beginning erection of the scaffold, one purpose being to check whether scaffold parts can be assembled on the highest platform. The following paragraphs describe various way to assemble scaffold components on the uppermost platform.

There is always a risk of falling when erecting, modifying or dismantling a scaffold. Plan work on a scaffold such that the risk of falling is eliminated or minimised. On the basis of the hazard assessment, the manufacturer is required to assess each specific case or task and to take appropriate measures to avoid dangerous situations.

Possible options are the use of posts extending 1.00 m past the uppermost scaffold level equipped with guard rails (advanced guard rail, AGR) and covered with planks; or the use of appropriate personal protective equipment (PPE) to prevent falling from heights.

Any or all of these protective measures can be implemented when using the MODEX scaffold system:

- AGR all around the top scaffold level
- AGR in the access bay and specification of anchor points for PPE
- Properly trained and instructed personnel, along with specification of PPE to prevent falling from heights
- Properly trained and instructed personnel.

WARNING

Safety note:

If PPE to prevent falling from heights is used, proceed as follows:

- When compiling the hazard assessment, include organisational and technical measures that may be required to rescue persons who have fallen and been caught by the PPE.
- There must be sufficient clearance below the deck where the person is using the PPE.
- Only PPE suitable for the intended purpose may be used (e.g. for use when moving horizontally, edge strain, required clearance, consideration of the maximum drop).
- PPE that uses steel wire as a lanyard may be used only when it has proven capable of resisting the edge strain resulting from a fall.
- Depending on the intended use, an EC type inspection is required for the selected PPE. It must be performed by an accredited test facility (observe CE label, declaration of conformity).
- Only the points on the scaffold indicated in section 7.4 may be used as anchor points.
- The respective supervisor should specify the anchor points pursuant to section 7.4 before beginning work.
- The supervisor is responsible for verifying that the PPE is used only as intended.
- Only one piece of PPE may be attached to a single anchor point.
- Use the PPE only as specified in the manufacturer's operating instructions.
- In the event of a fall, do not ascend the scaffold again until it has been completely repaired, e.g. to rescue a victim.

7.2 Assembly of a façade scaffold

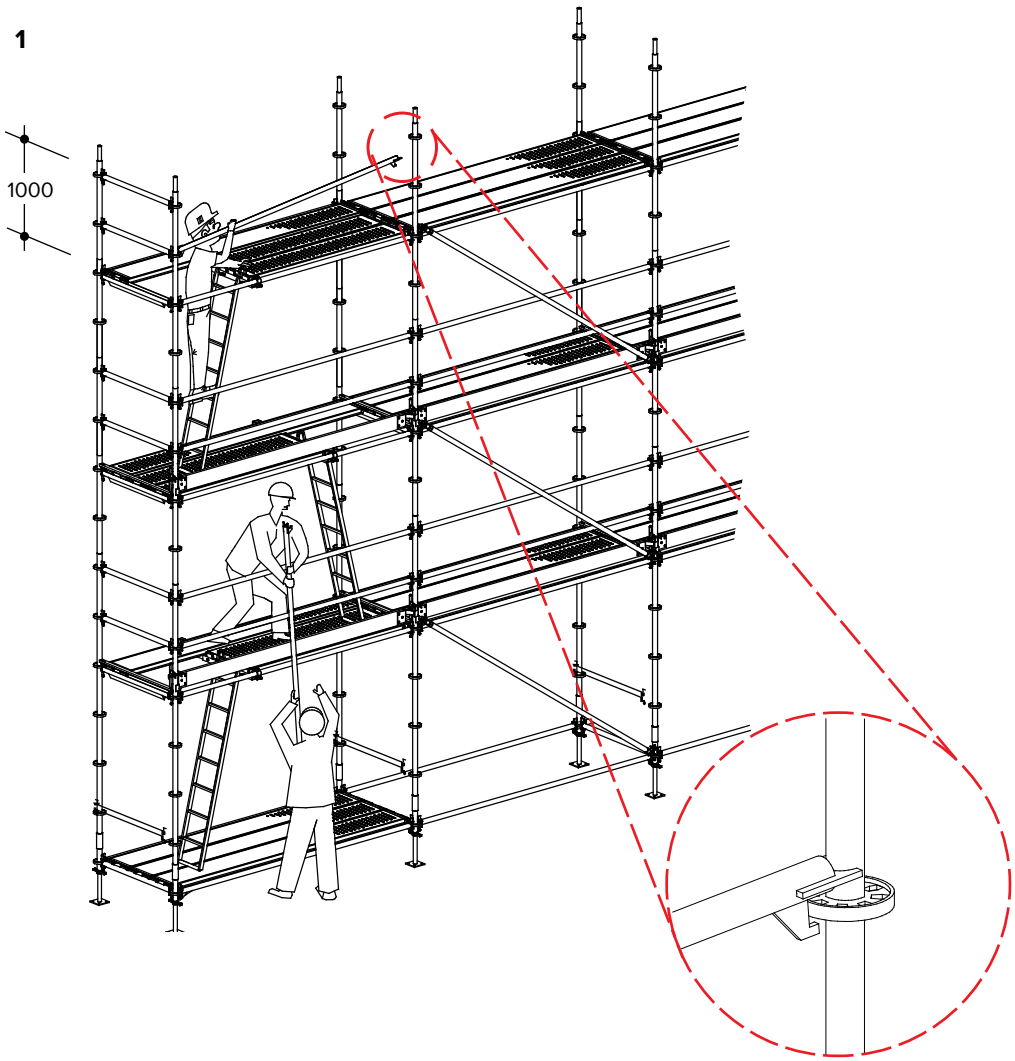
Begin erection with a Vertical Post 300 and then continue with a Vertical Post 200 or 400.

WARNING

Safety note:

It is essential that additional Tube Ledgers are attached above the first Tube Ledger to the lowest available joint connector, between all interior and exterior Vertical Posts.

Select the length of the Vertical Posts such that they extend at least 1.00 m past the top scaffold level covered with planks.



WARNING

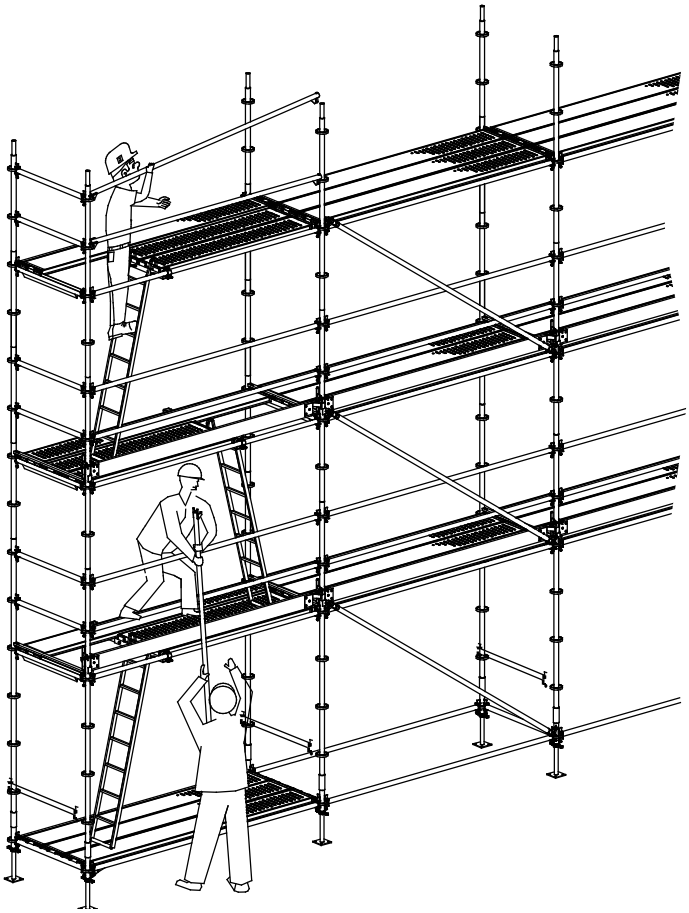
Safety note:

Risk of falling!

Standing on the ladder in an interior access bay, first attach the Knee Rail (Fig. 1) and then the Guard Rail (along the front of the scaffold); in the end bays, attach the rails along the end of the scaffold as well (Fig. 2).

Use the Guard Rails (part code 651471 - 651477) as knee and hand rails. This creates a scaffold bay enclosed in Guard Rails at the uppermost level.

2



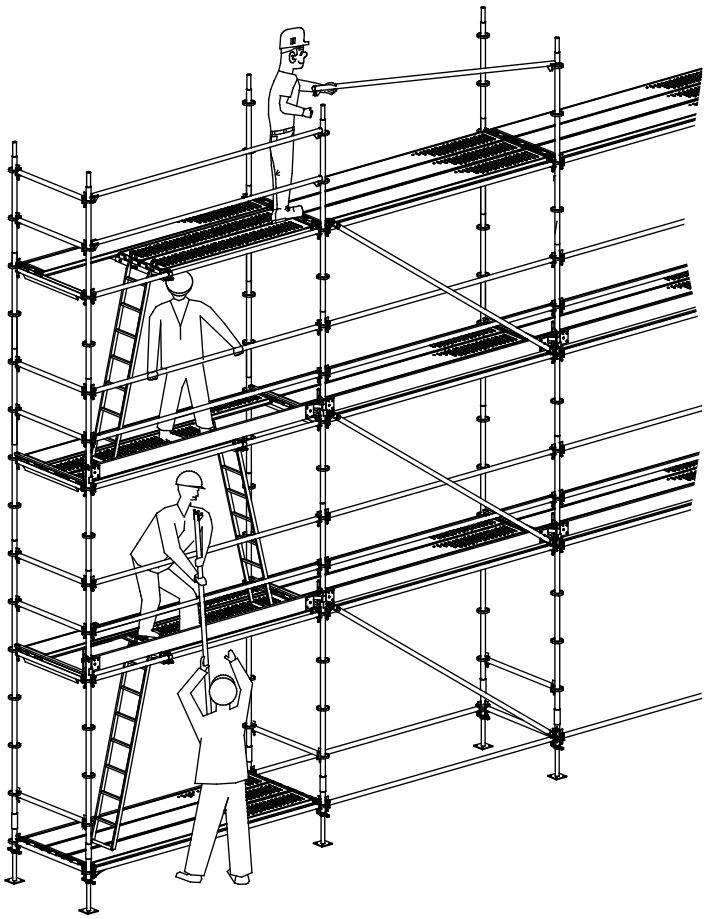
WARNING

Safety note:

Always make sure that Vertical Posts are not connected to one another at the height of the scaffold planks!

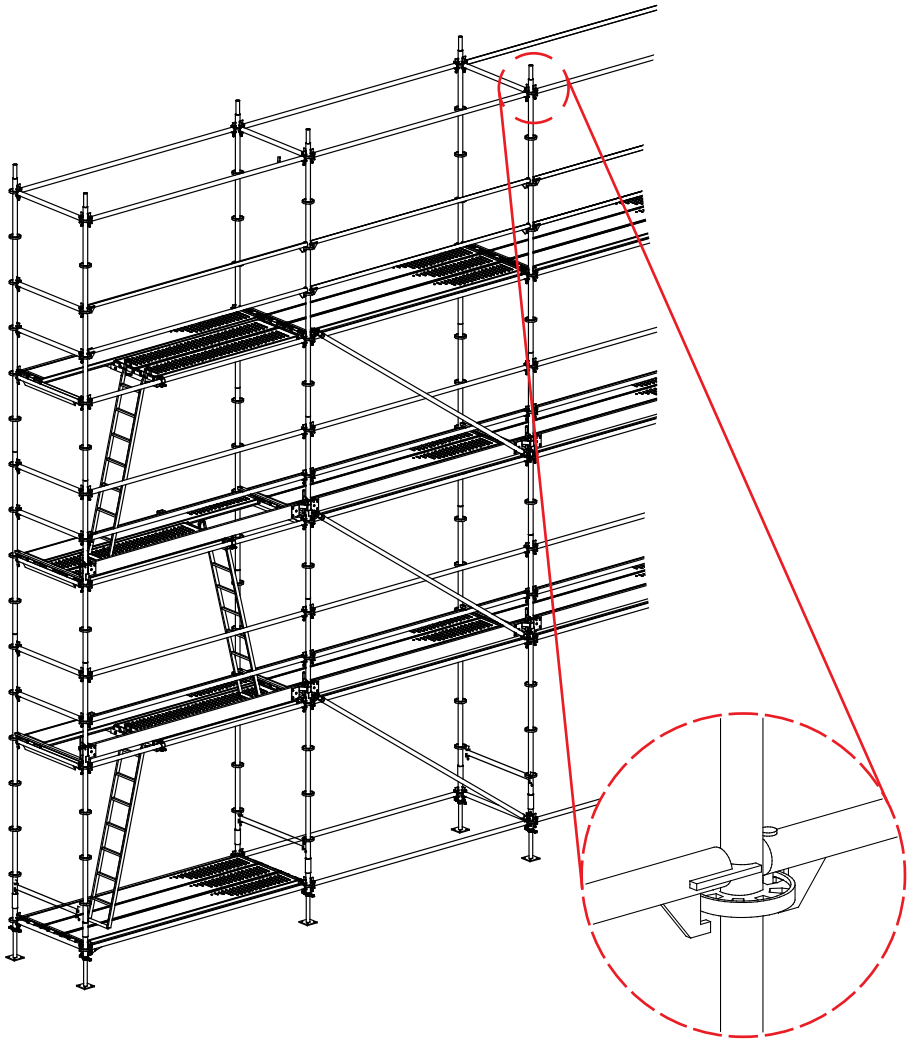
The scaffolder can now access the highest scaffold level, which is protected with guard rails (Figure 3).

3



Standing in this bay and using with Guard Rails mentioned above, the scaffolder can enclose and secure the next scaffold bay. The scaffolder may never leave a secured bay when erecting the next level. Proceed in this way to equip the entire uppermost level with Guard Rails. Then add Knee Rails and, when required, Toe Boards.

4



Finally, complete the scaffold by creating a 2.0 m high frame around the uppermost level, using Tube Ledgers to connect the Vertical Posts in longitudinal and transverse direction. Select the length of the Vertical Posts such that no joints are needed in the uppermost area!

Verify that the side protection is attached properly!

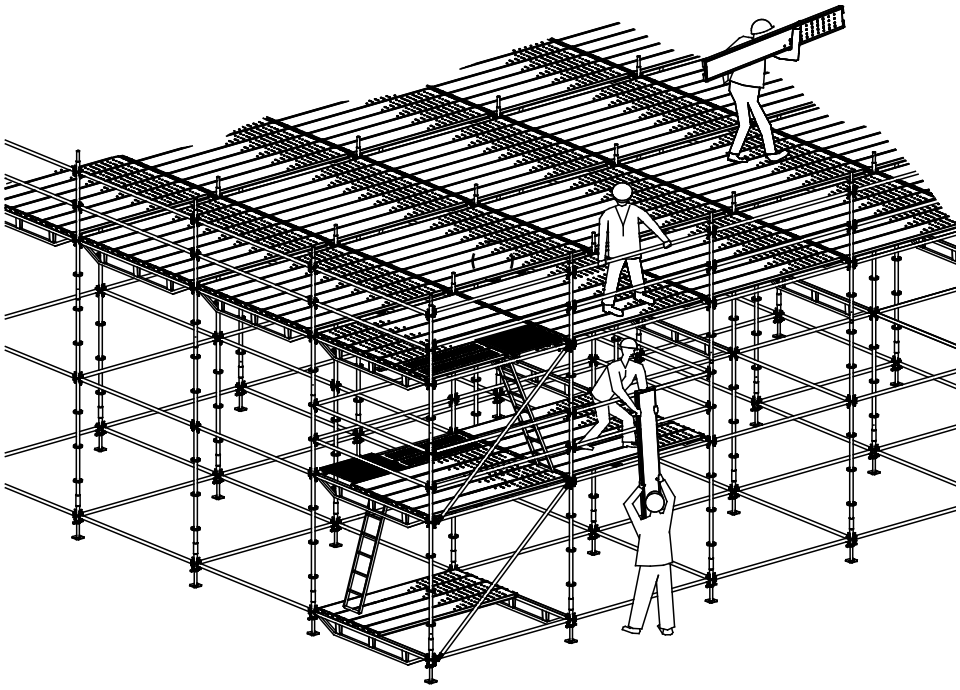
WARNING

Safety note:

To secure the scaffold against wind forces that may cause lift-off when the structure has a roof pitch ≤ 20° or it has interior corners, the joints between the Vertical Posts running from the uppermost level to the next tied level have to be connected with a Bolt M12x75 or a Ø 12 mm Frame Pin!

7.3 Assembly of birdcage scaffold

A birdcage scaffold is assembled essentially in the same order as a façade scaffold.

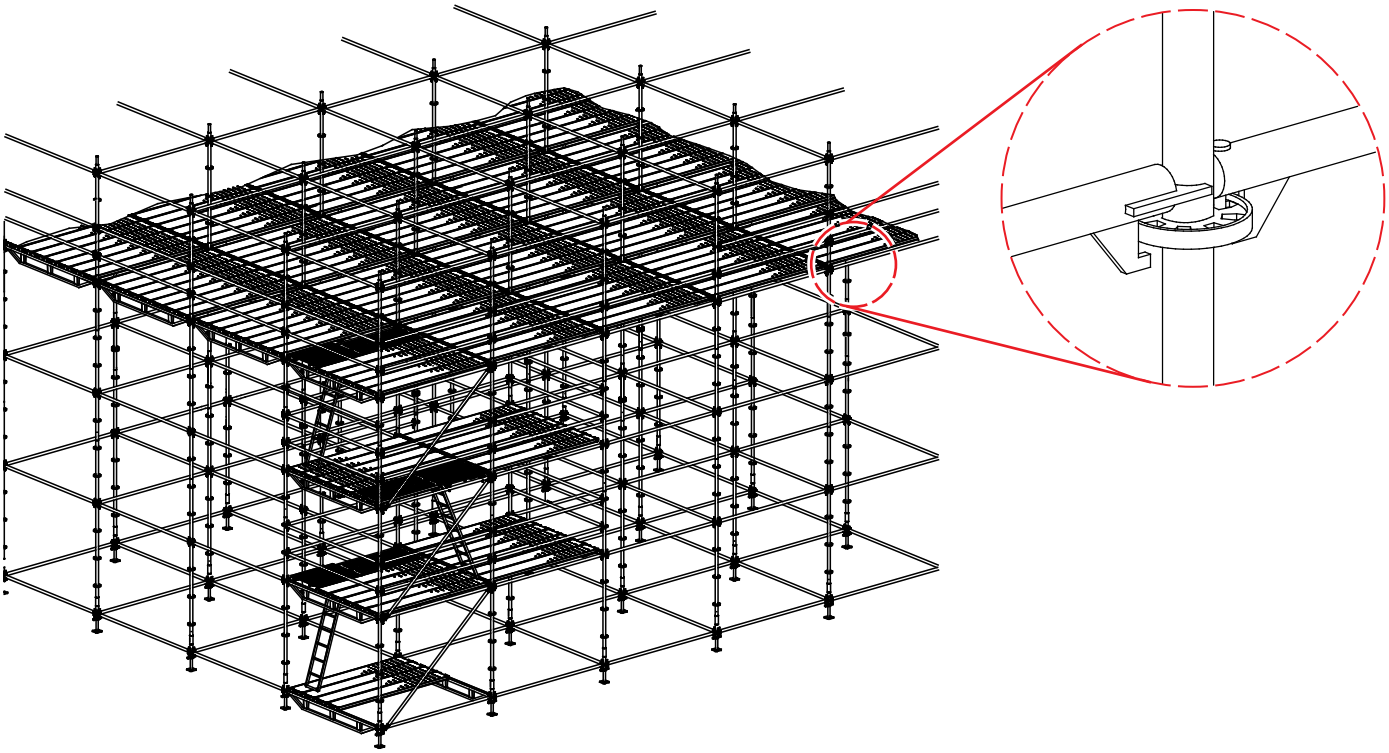


WARNING

Safety note:

Select the length of the Vertical Posts around the exterior such that they extend at least 1.00 m past the top scaffold level covered with planks.

Standing on the ladder in an interior access bay, first attach the knee rail and then the guard rail. Use the Guard Rails (part code 651471 - 651477) as knee and hand rails. This creates a scaffold bay enclosed in Guard Rails at the uppermost level. The scaffolder can now access the highest scaffold level, which is protected with Guard Rails. Standing in this bay and using with Guard Rails mentioned above, the scaffolder can enclose and secure the next scaffold bay. The scaffolder may never leave a secured bay when erecting the next level. First lay planks in the outer bays and attach Guard Rails. This way the entire uppermost level is secured with Guard Rails. Then add Knee Rails and, when required, Toe Boards.



WARNING	**Safety note:**
	Finally, complete the scaffold by creating a 2.0 m high frame around the uppermost level, using Tube Ledgers to connect the Vertical Posts in longitudinal and transverse direction. Select the length of the Vertical Posts such that no joints are needed in the uppermost area! Verify that the side protection is attached properly!

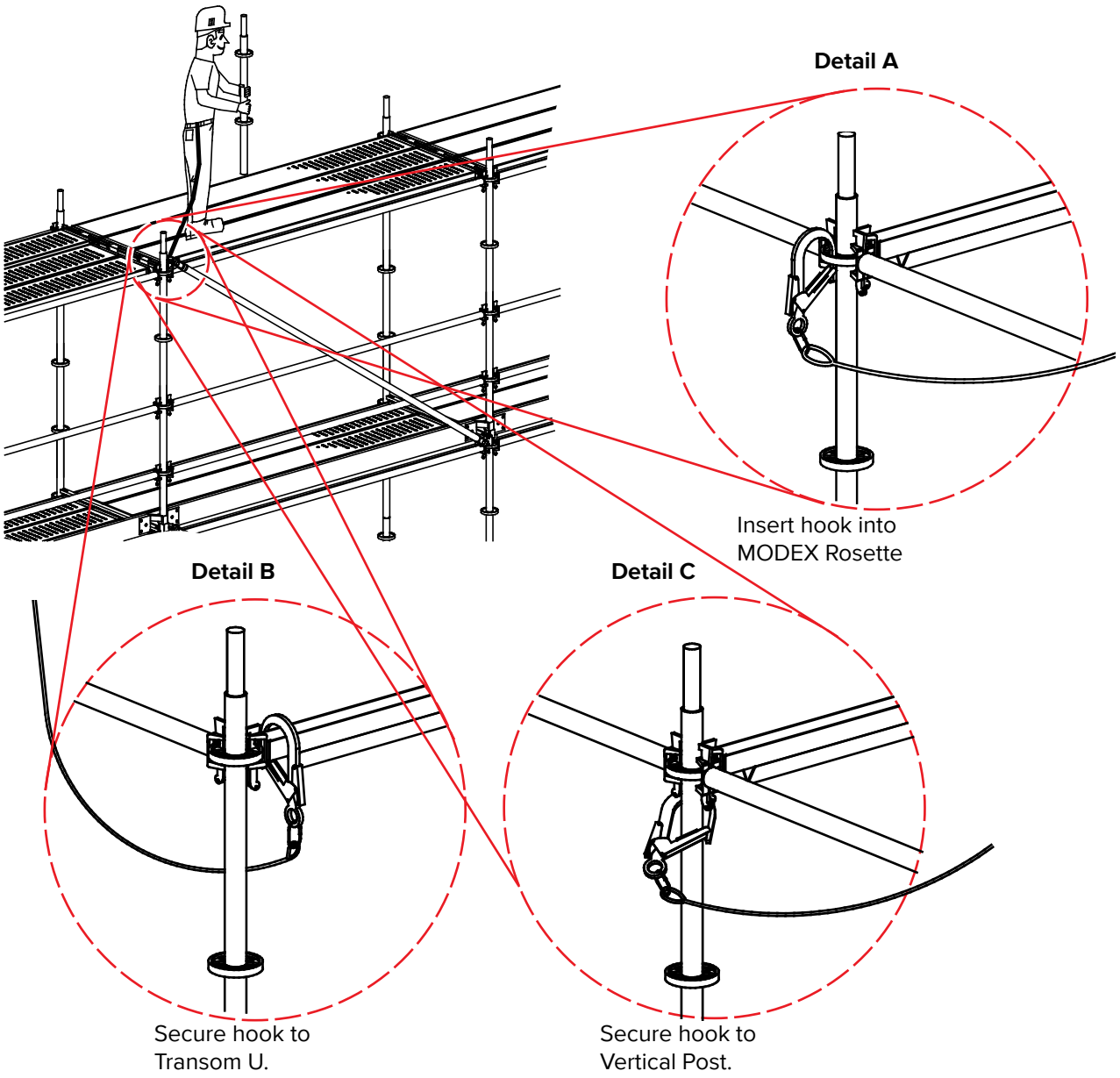
7.4 Using PPE to prevent falling from heights

WARNING	**Safety note:**
	Risk of falling!

Before the scaffolder ascends to the uppermost scaffold level, he has to tie his PPE to a suitable point. The suitable point is always below the highest level equipped with planks.

Possible anchor points:

- The outer-most vacant opening on the MODEX Rosette at plank level (Detail A).
- The Transom U below the planks (Detail B) or
- The post tube below the MODEX Rosette at plank level (Detail C).



WARNING

Safety note:

Always comply with the instructions in Section 7.1 on page 75 on using PPE to prevent falling from heights.

8 Stairs

8.1 General information

The following safe, ergonomically designed access points can be created using MODEX scaffold components:

- Interior scaffold access (including inside a scaffold tower)
- Staircase tower
- Emergency staircase

Design loads comply with EN 12811 as well as with the applicable regulations regarding occupational health and safety.

Interior accesses can be used in both façade scaffolds and birdcage scaffolds. MODEX system components are also used to erect a free-standing staircase tower.

Scaffold staircase acc. to EN 12811

Scaffold staircases are created using standard scaffold components and serve as access ways in working and protective scaffolds. The permissible load is 1.0 kN/m^2 on five flights of stairs, including the landings.

Staircase tower

A staircase tower is a staircase consisting of multiple flights, designed like a tower and made out of standard components. The permissible load is p = 2 kN/m^2 on 20 m of stairs, including the landings.

Emergency staircase

With flights and landings.

Public staircases, also called emergency staircases, are stairs available to the public. The permissible load is

p = 5 kN/m^2 on all flights and landings.

The MODEX Classic staircase can be used as a

- Staircase tower
- Site staircase
- Emergency staircase

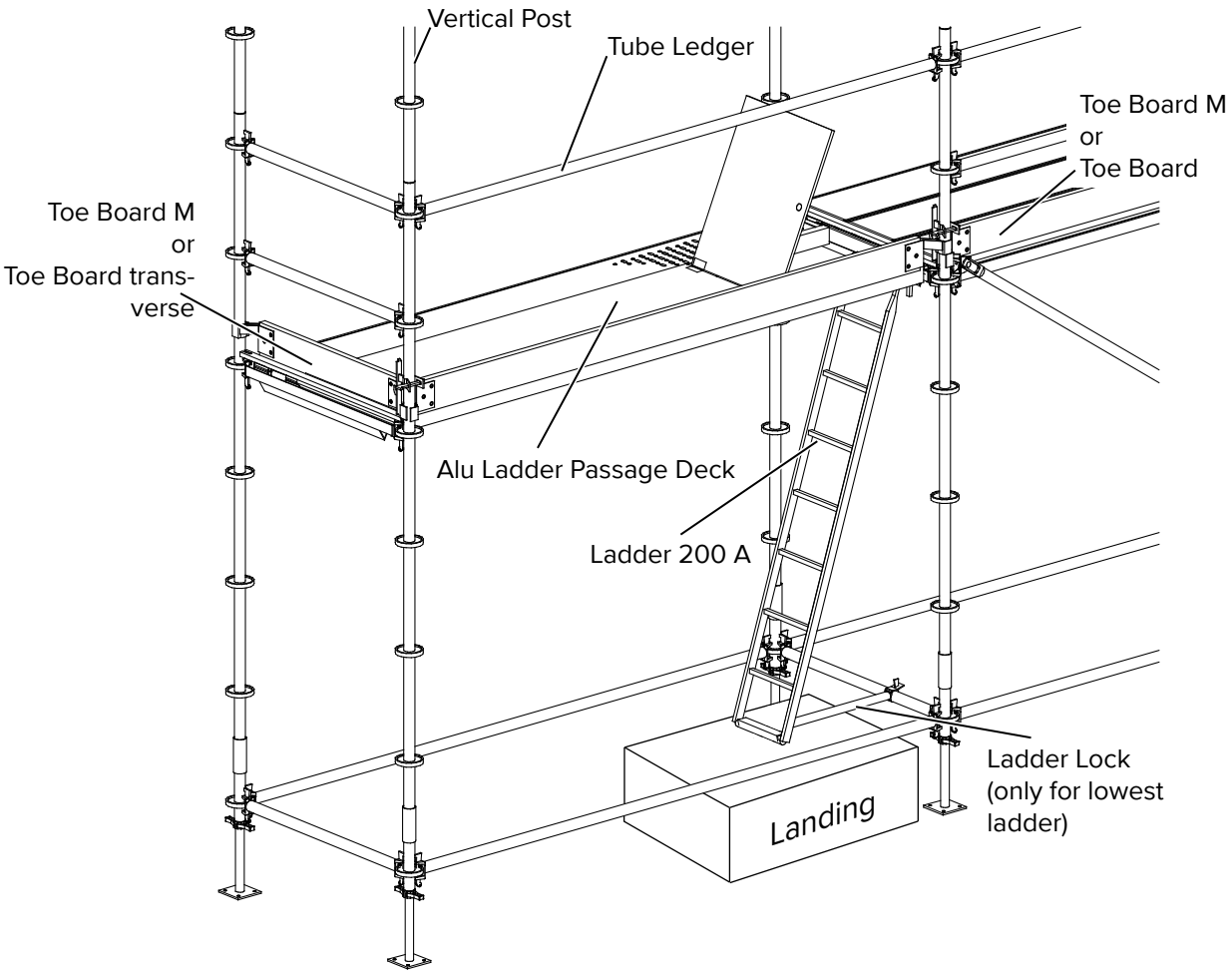
The MODEX Compact staircase can be used as a

- Staircase tower
- Site staircase

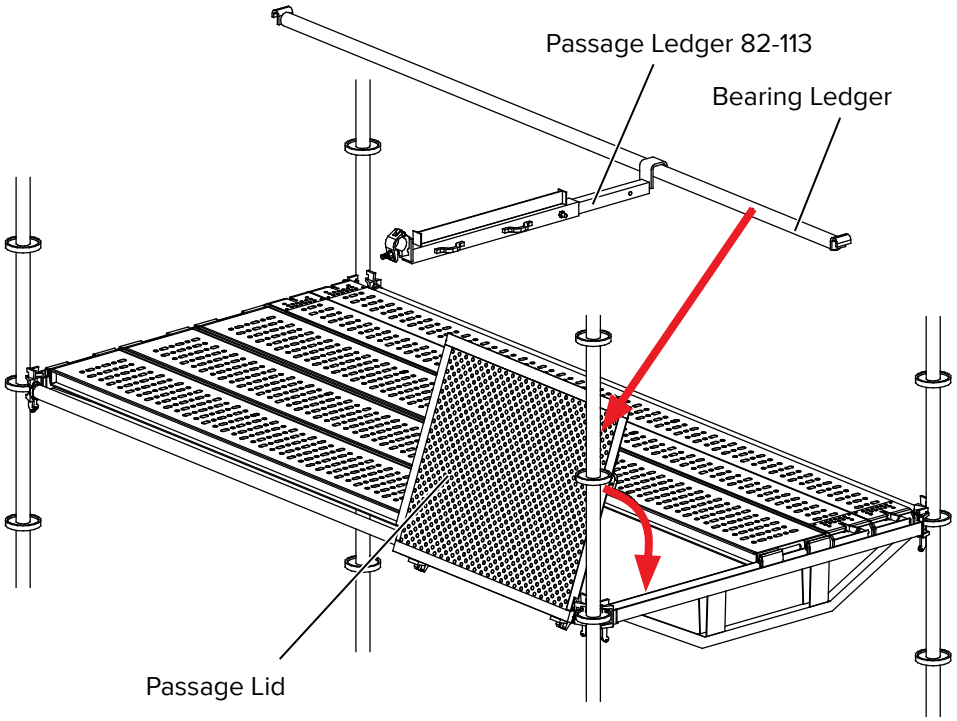
The user guide for the MODEX staircase tower and the MODEX site staircase are constructed on the basis of calculations reviewed to confirm compliance with German civil law.

8.2 Interior scaffold accesses

8.2.1 With Alu Ladder Passage Decks or Alu Ladder Passage Decks with Ladder



8.2.2 With the Passage Ledger 82 or 113 and the Bearing Ledger



When the Bearing Ledger (part code 651265) is used, the Passage Ledger 82-113 can also be used with larger bay widths (for Transoms U 1.25 m and longer).

8.3 MODEX Classic staircase

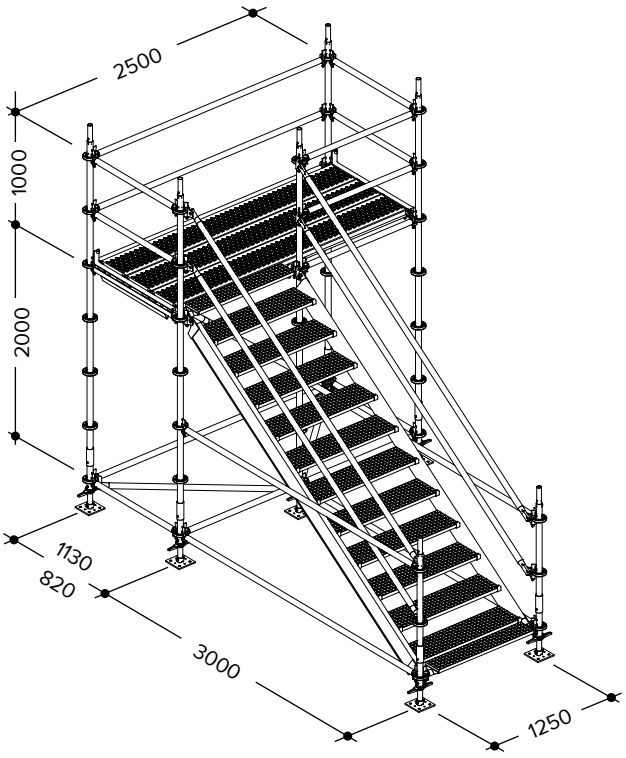


Table 8.1 Permissible erection heights and tie spacing

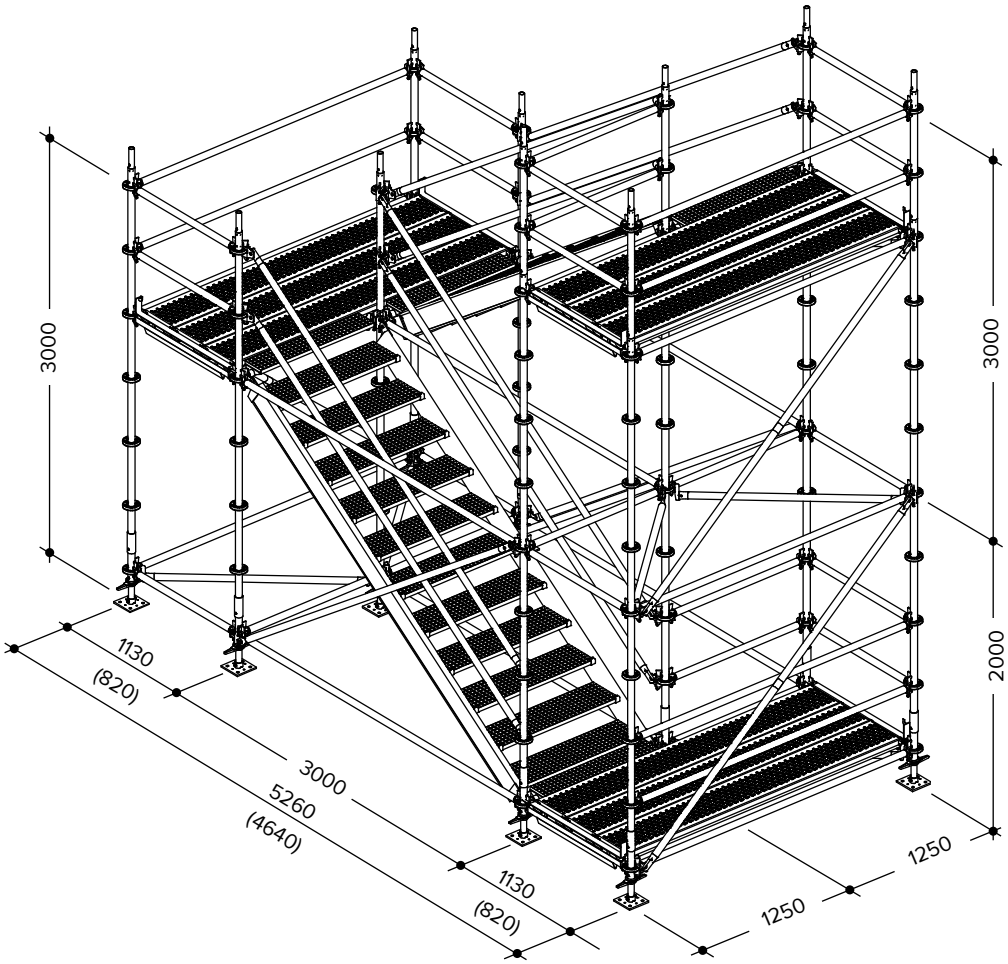
Staircase use	Load capacity	Landing planks	Erection height up to	Tie spacing	
				Every 4 m	Upper-most level
Emergency staircase	p = 5.0 kN/m²	Steel planks	16 m[1)]	yes	yes
Site staircase	p = 2.0 kN/m²	Steel planks	24 m[2)]	yes	yes
Staircase tower	p = 2.0 kN/m²		40 m[2)]	yes	yes

WARNING

Safety note:

1)Maximum jack extension length 15.0 cm
2)Maximum jack extension length 20.0 cm

Unless stated otherwise, all dimensions in mm.



WARNING

Safety note:

The distance between the building and the emergency staircase's exit platform (Refer to page 84) may not exceed 1.25 m.

System dimensions:

a) Staircase: 5.26 m x 2.50 m - landing width 1.13 m
b) Site staircase - e.g. for ascending to and descending from work areas:
4.64 m x 2.50 m - landing width 0.82 m

- Landings every 2.00 m
- Staircase system width: 1.25 m
- Effective step width: 1.07 m
- Step depth: 0.27 m
- Step height: 18.20 cm
- Number of steps per flight: 11 steps
- Staircase pitch: 34°
- Steps made of hot-dip galvanised Grids
- Landing system dimensions:
  a) 2.50 m x 1.13 m (three planks, 32 cm)
  b) 2.50 m x 0.82 m (two planks, 32 cm)
- Landings made of Steel Planks 250/32.

Permissible loads:

- Staircase load: p = 5.00 kN/m² or p = 2.00 kN/m² (Refer to page 84)
- Landing load: p = 5.00 kN/m² or p = 2.00 kN/m² (Refer to page 84)

Unless stated otherwise, all dimensions in mm.

8.3.1 Example of erection of a landing 4 m high!

Step 1

Step 1 Set up the Base Jacks (1) and roughly adjust the height.

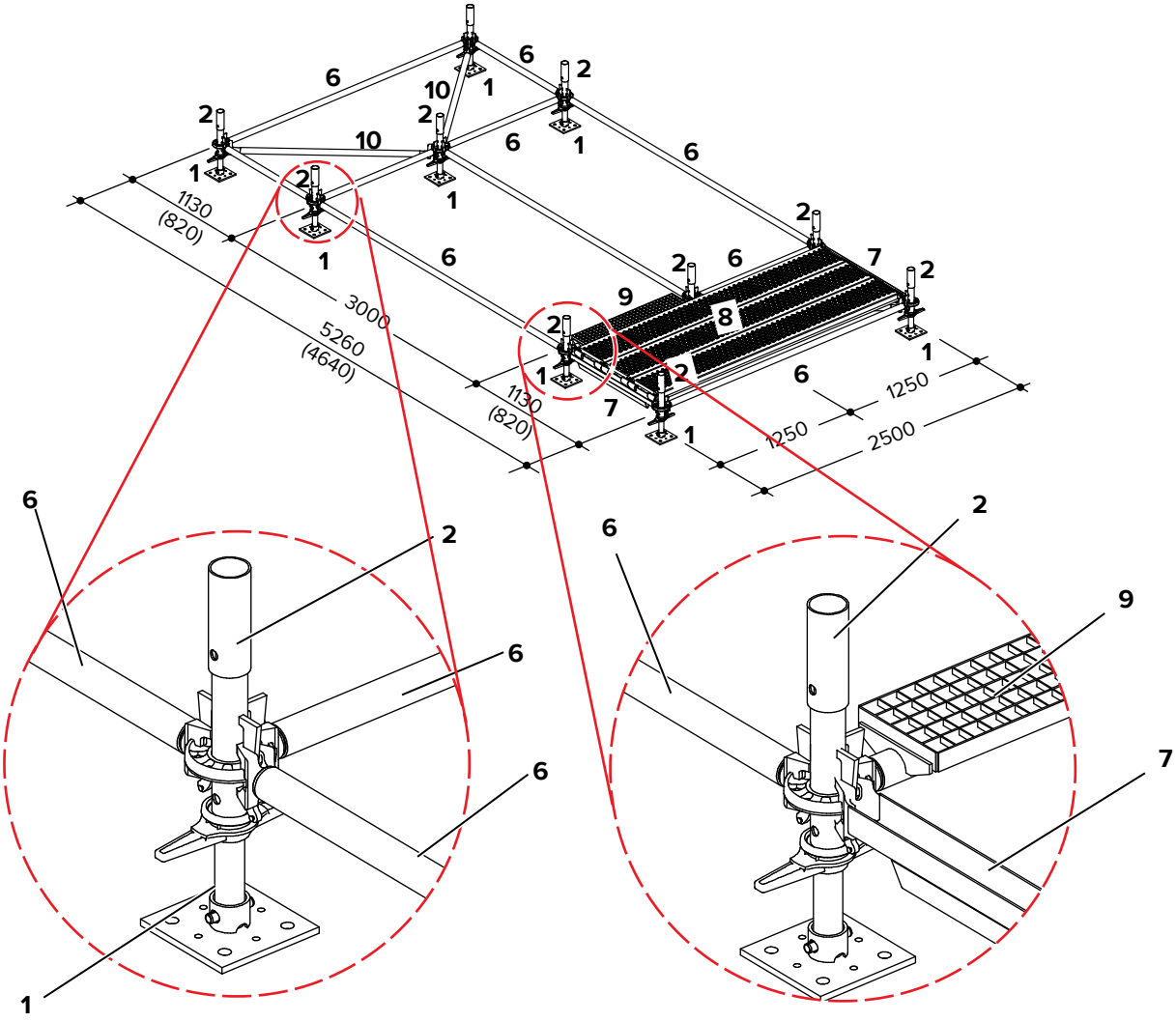
Step 2 Slide the Starting Pieces over the Base Jacks.

Step 3 Lay out the footprint using Tube Ledgers (6), Transoms U (7), Grid Bars (9) and H-diagonals (10).

Step 4 Ensure all Tube Ledgers are at the same level and the layout of the footprint is perpendicular.

Step 5 Fasten the wedges using a hammer.

Step 6 Insert steel planks (8) for the first landing.

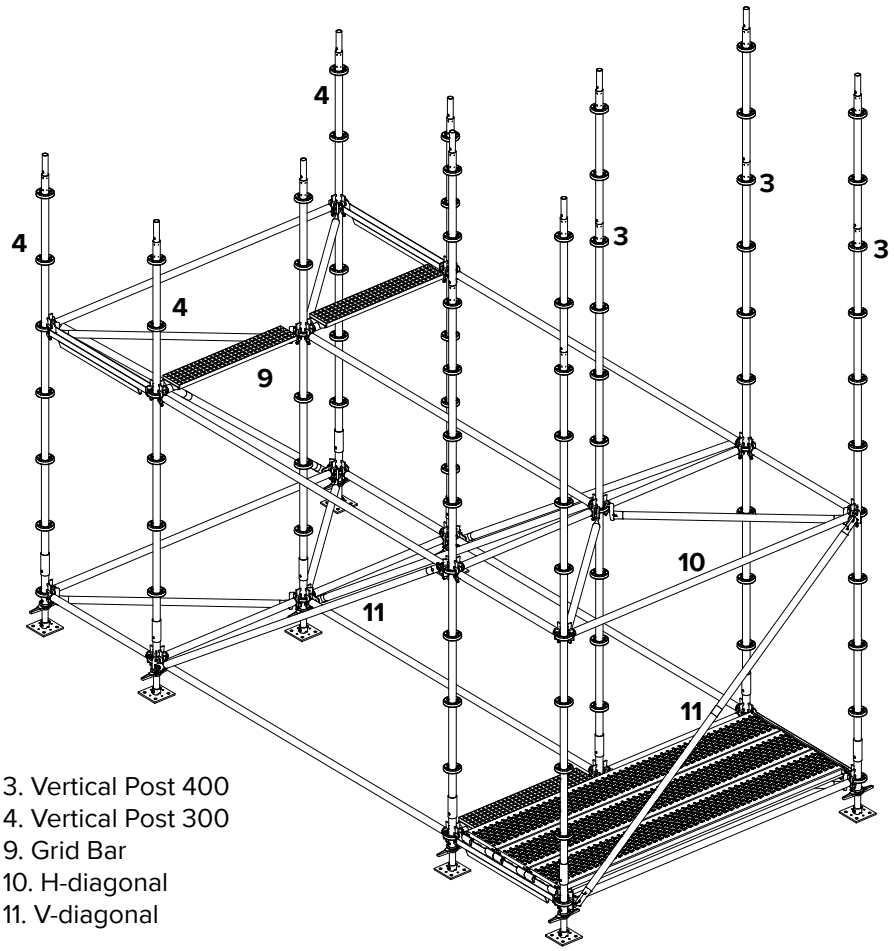


1. Base Jacks
2. Starting Piece
6. Tube Ledger
7. Transom U
8. Steel Plank
9. Grid Bar
10. H-diagonal

Unless stated otherwise, all dimensions in mm.

Step 2

Step 1 Insert five Vertical Posts 400 (3) into the Starting Pieces on the side where the landing is. Then insert five Vertical Posts 300 (4) into the Starting Pieces on the opposite side.



3. Vertical Post 400
4. Vertical Post 300
9. Grid Bar
10. H-diagonal
11. V-diagonal

VISUAL INSPECTION	Be sure to select the proper sides; the decisive factors are the height-offset upper handrail and landing.

Step 2 Repeat the installation of Tube Ledgers, Transoms U, Grid Bars, and H-diagonals. Install the V-diagonals (11), align the components and then fasten the wedges.

Step 3 Verify that the V-diagonals are properly positioned and aligned.

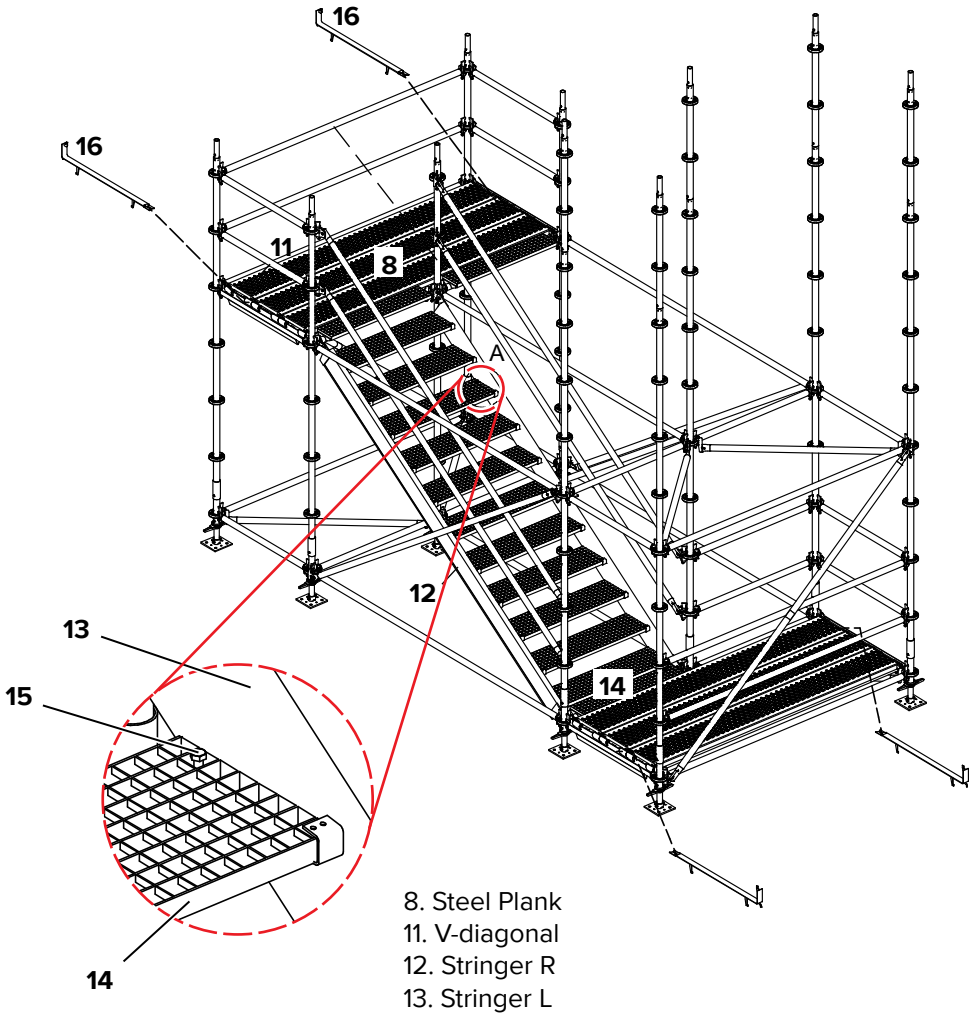
Step 3

Step 1 Attach the Stringers R (12) and L (13). Install V-diagonals (11) to serve as handrails and knee rails, and affix the Tube Ledgers around the landings. Finally, fasten the wedges.

Step 2 The Grids (14) are used as steps. Place them on the flat bars on the Stringers and pivot them into place.

Step 3 Secure the Grids (14) to the Stringer using the Grid Locking Devices (15), if the contractor has specified that this should be done.

Step 4 Insert Steel Planks (8) to form the landing and, if necessary, use Lifting Retainers (16) to lock into place.



8. Steel Plank
11. V-diagonal
12. Stringer R
13. Stringer L
14. Grid
15. Grid Locking Device
16. Lifting Retainer

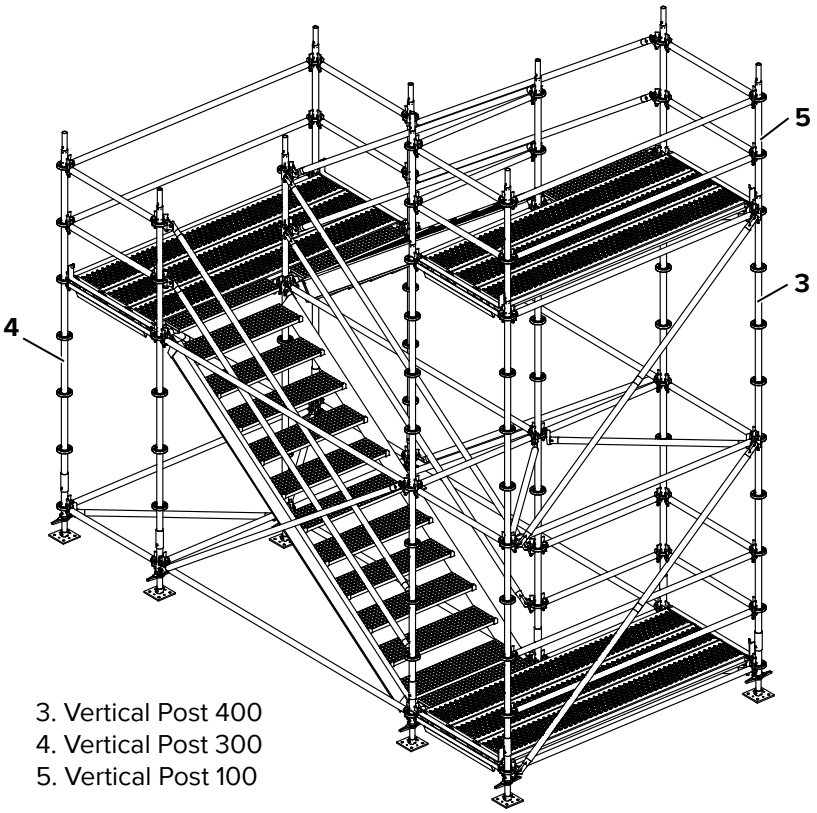
WARNING

Safety note:
Risk of falling!

Unless stated otherwise, all dimensions in mm.

Step 4

Continue erection as described above until the desired top landing height is reached. Refer to page 95 for information on positioning the diagonals. As the illustration shows, the upper height-offset landing of the staircase ends with a handrail. The Vertical Post 100 (5) is always used as the post above the entrance side.



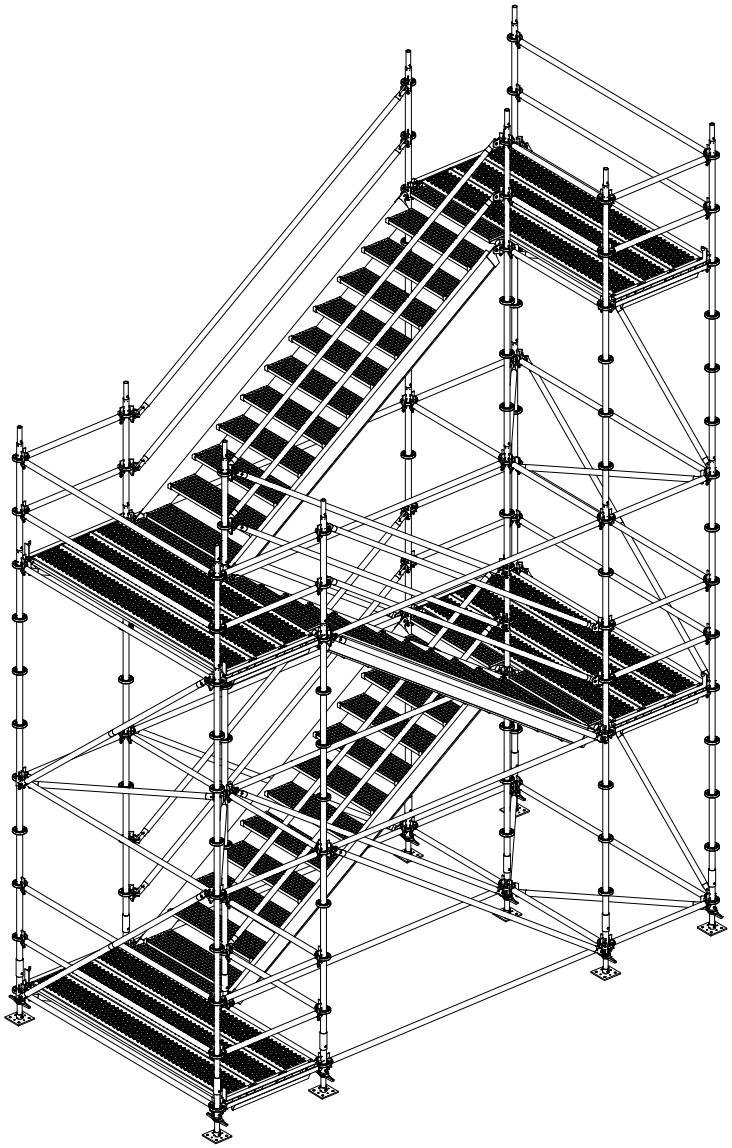
3. Vertical Post 400
4. Vertical Post 300
5. Vertical Post 100

WARNING

Safety note:

While it is being erected, the staircase should be tied as specified (Refer to page 95).

Illustration of upper landing



WARNING

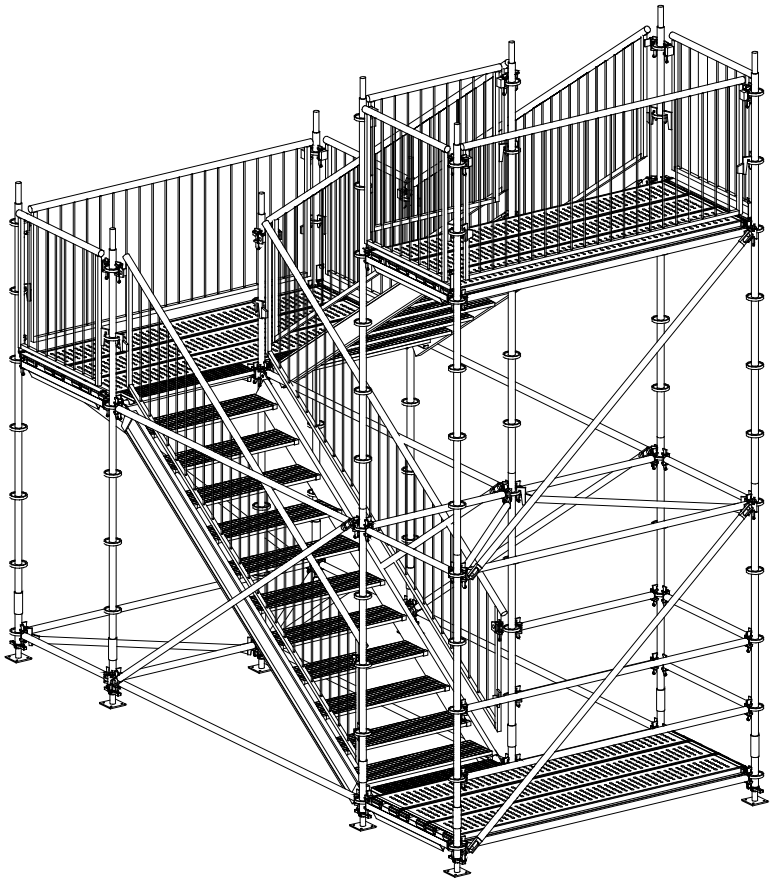
Safety note:

Always comply with the instructions regarding the use of Lifting Retainers contained in Section 6.10 on page 74!

Unless stated otherwise, all dimensions in mm.

Illustration of a MODEX staircase used as an emergency exit

The horizontal and diagonal braces serve as guard rails



Always comply with the specifications in Table 8.1 “Permissible erection heights and tie spacing” on page 86. The Tube Ledgers 250 that act as guard rails on the landings are not shown!

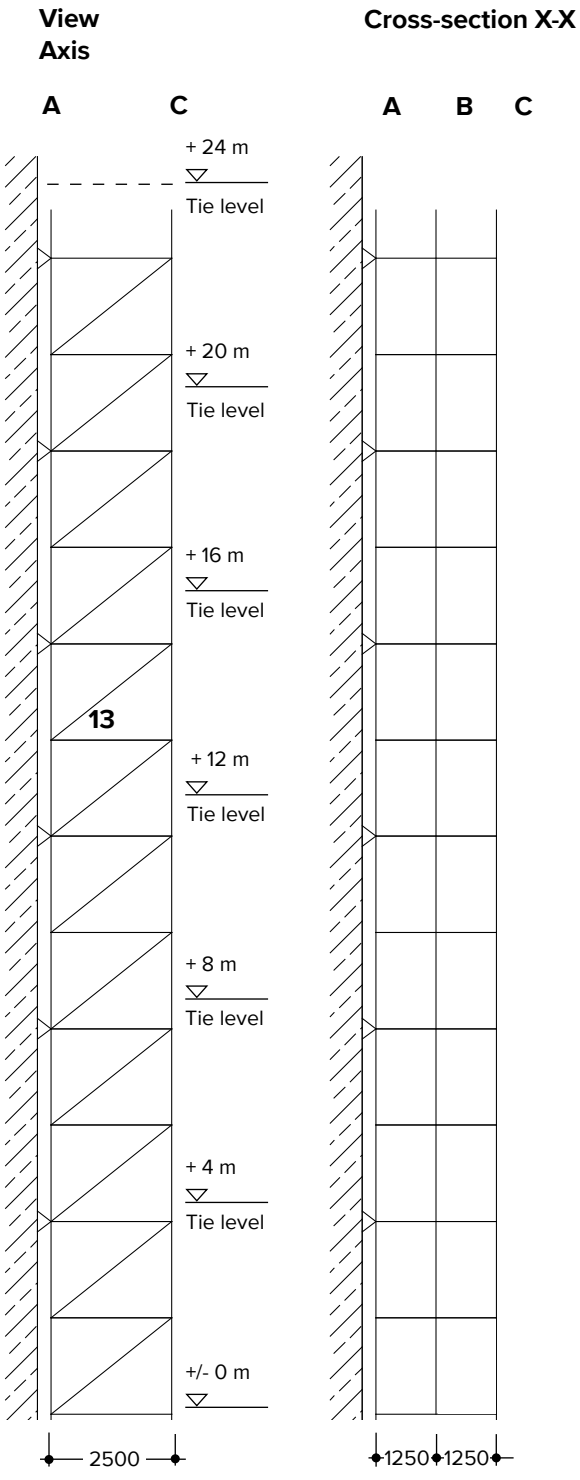
Arrangement of V-diagonals (13)

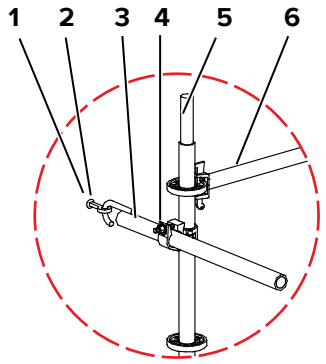
Axis 1 as shown

Axis 4 opposite

WARNING	**Safety note:** Covering with nets and tarpaulins is not permissible for the tying and arrangement of diagonals shown here!

WARNING	**Safety note:** 1)The compression under the Base Plate of the Jack may not exceed 8.3 MN/m^2; check on site. 2)The compression under the Base Plate of the Jack may not exceed 6.0 MN/m^2; check on site.



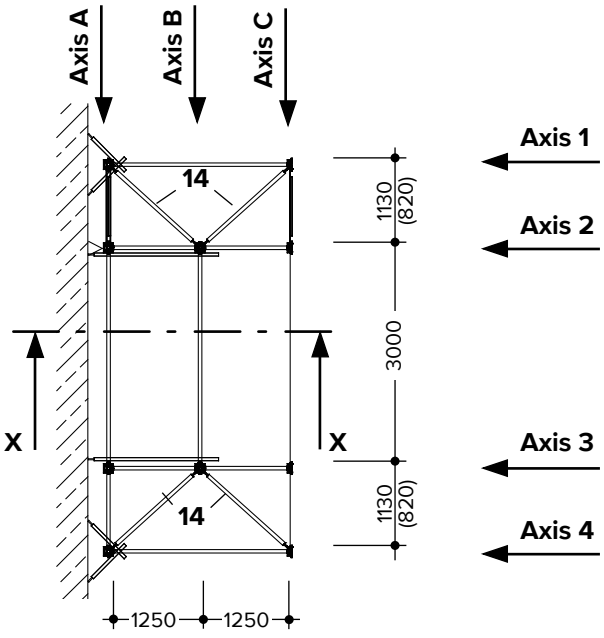


1 Plug
2 Eyebolt
3 Scaffold retainer 45 or 140
4 Rigid coupler 48/48
5 MODEX Vertical Post
6 MODEX Tube Ledger

Table 8.2

Ties and post loads (characteristic loads)

Tie forces			
⊥ Perpendicular to building kN	∥ Parallel to building [kN]	Maximum post load kN	Use as
6.1	5.5	44.3	Emergency staircase
6.7	4.4	32.8	Site staircase Staircase tower



H-diagonals (**14**) spaced 2 m apart in height.

—— Axes A and C

V-diagonals 200/300 always in the same direction.
Hand and knee rails (also V-diagonals 200/300) always in the direction of the staircase.

Unless stated otherwise, all dimensions in mm.

= = Axis B

V-diagonals 200/300 only below, in the opposite direction of the staircase.
Hand and knee rails (also V-diagonals 200/300) always in the direction of the staircase.

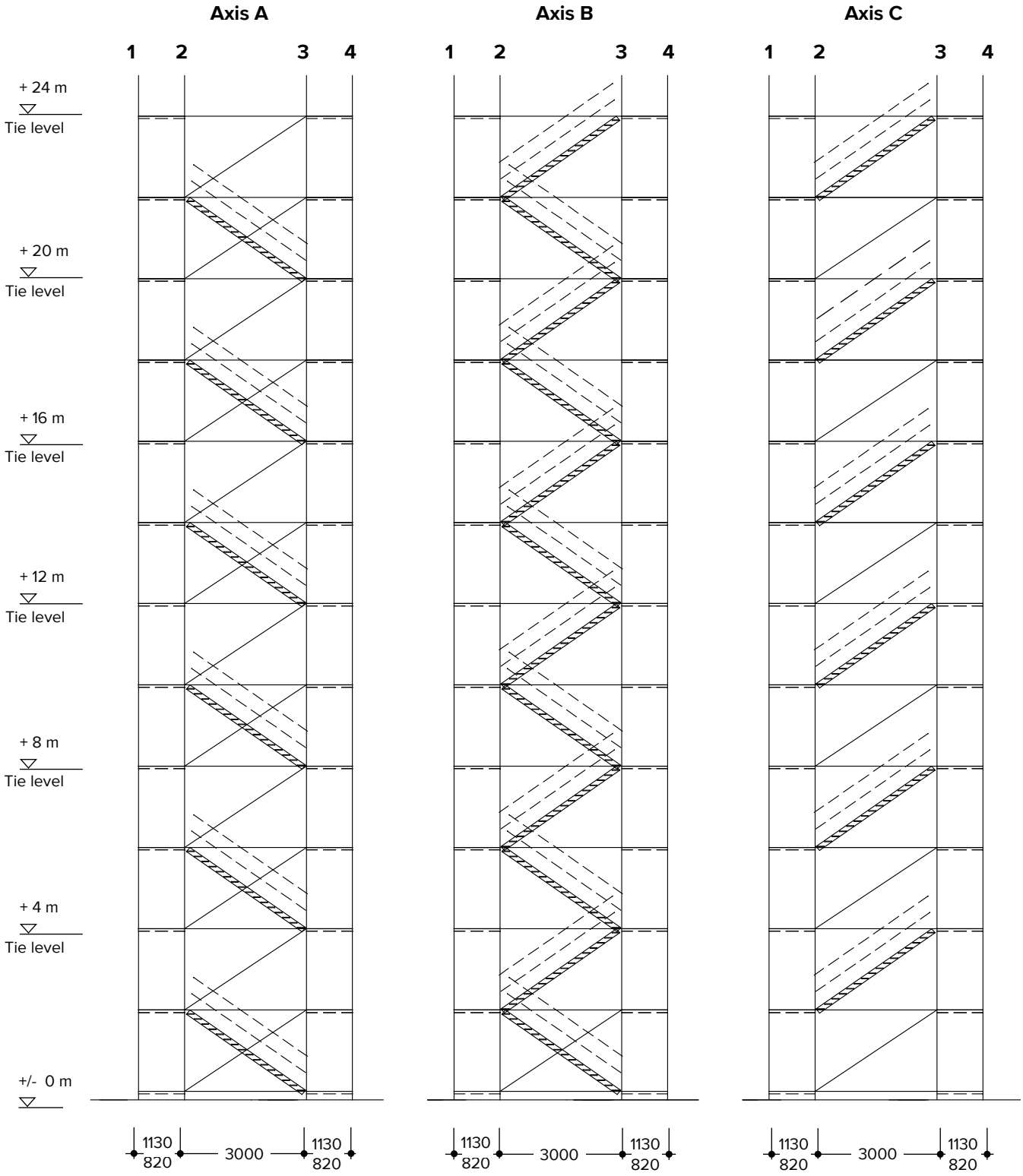


Table 8.3 Quantities of components needed for a MODEX Classic staircase

Landing width 1.13 m

Number of flights			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Uppermost landing [m]			2.20	4.20	6.20	8.20	10.20	12.20	14.20	16.20	18.20	20.20	22.20	24.20	26.20	28.20	30.20	32.20	34.20	36.20	38.20	40.20
Pos.	**Part code**	**Description**																				
1	148552	ID Base Jack 38/52	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
2	470929	Starting Piece	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
3	470918	Vertical Post 400		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
4	470907	Vertical Post 300	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	470870	Vertical Post 100	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	470951	Tube Ledger 300	4	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
7	470940	Tube Ledger 250	4	11	15	19	23	27	31	35	39	43	47	51	55	59	63	67	71	75	79	83
8	484739	Tube Ledger 125	5	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46
9	475760	Tube Ledger 113	6	16	22	28	34	40	46	52	58	64	70	76	82	88	94	100	106	112	118	124
10	651776	Transom 113/12.6 U	2	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
11	479091	Lifting Retainer 113	2	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
12	470984	V-diagonal 200/300	4	13	19	25	31	37	43	49	55	61	67	73	79	85	91	97	103	109	115	121
13	470973	V-diagonal 200/250	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
14	533506	H-diagonal 125/113	4	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70	74	78	82
15	427973	Steel Plank 250/32	3	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
16	525656	Grid Tube Ledger 125	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
17	526396	Stringer 200/300 R	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
18	526385	Stringer 200/300 L	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
19	525623	Grid 27/107	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220
20	525690	25 Grid Securing Device	1	2	3	4	5	6	7	7	8	9	10	11	12	13	14	14	15	16	17	18
21	78939	Scaffold Retainer 45			4	4	4	8	8	8	8	8	12	12	12	12	12	16	16	16	16	16
22	2514	Rigid Coupler 48/48			4	4	8	16	16	16	16	16	24	24	24	24	24	32	32	32	32	32
Total weight [kg]			668.7	1,539.6	2,178.8	2,805.6	3,437.2	4,081.2	4,708.0	5,332.8	5,959.6	6,586.4	7,230.4	7,857.2	8,484.0	9,110.8	9,737.6	10,379.6	11,006.4	11,633.2	12,260.0	12,886.8

Unless stated otherwise, all dimensions in mm.

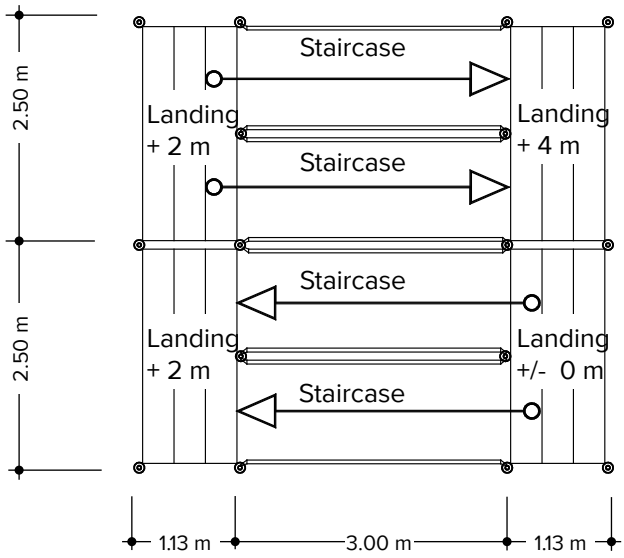
Table 8.4 Quantities of components needed for a MODEX Classic staircase
Landing width 0.82 m

Number of flights			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Uppermost landing [m]			2.20	4.20	6.20	8.20	10.20	12.20	14.20	16.20	18.20	20.20	22.20	24.20	26.20	28.20	30.20	32.20	34.20	36.20	38.20	40.20
Pos.	**Part code**	**Description**																				
1	551234	Base Jack 45/38	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
2	470929	Starting Piece	7	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
3	470918	Vertical Post 400		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
4	470907	Vertical Post 300	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	470870	Vertical Post 100	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	470951	Tube Ledger 300	4	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
7	470940	Tube Ledger 250	4	11	15	19	23	27	31	35	39	43	47	51	55	59	63	67	71	75	79	83
8	484739	Tube Ledger 125	5	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46
9	470930	Tube Ledger 82	6	16	22	28	34	40	46	52	58	64	70	76	82	88	94	100	106	112	118	124
10	470962	Transom 82U	2	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
11	479047	Lifting Retainer 82	2	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
12	470984	V-diagonal 200/300	4	13	19	25	31	37	43	49	55	61	67	73	79	85	91	97	103	109	115	121
13	470973	V-diagonal 200/250	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
14	533517	H-diagonal 125/82	4	10	14	18	22	26	30	34	38	42	46	50	54	58	62	66	70	74	78	82
15	427973	Steel Plank 250/32	2	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
16	525656	Grid Tube Ledger 125	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
17	526396	Stringer 200/300 R	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
18	526385	Stringer 200/300 L	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
19	525623	Grid 27/107	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220
20	525690	25 Grid Securing Device	1	2	3	4	5	6	7	7	8	9	10	11	12	13	14	14	15	16	17	18
21	78939	Scaffold Retainer 45			4	4	4	8	8	8	8	8	12	12	12	12	12	16	16	16	16	16
22	2514	Rigid Coupler 48/48			4	4	8	16	16	16	16	16	24	24	24	24	24	32	32	32	32	32
Total weight [kg]			626.2	1,415.9	2,012.6	2,596.9	3,186.0	3,787.5	4,371.8	4,954.1	5,538.4	6,122.7	6,724.2	7,308.5	7,892.8	8,477.1	9,061.4	9,660.9	10,245.2	10,829.5	11,413.8	11,998.1

Stairs

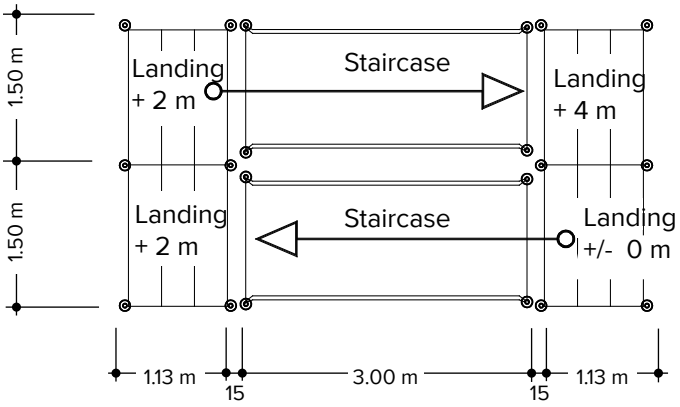
The staircase types shown here can also be created with the MODEX program.

Staircase tower (double flight)

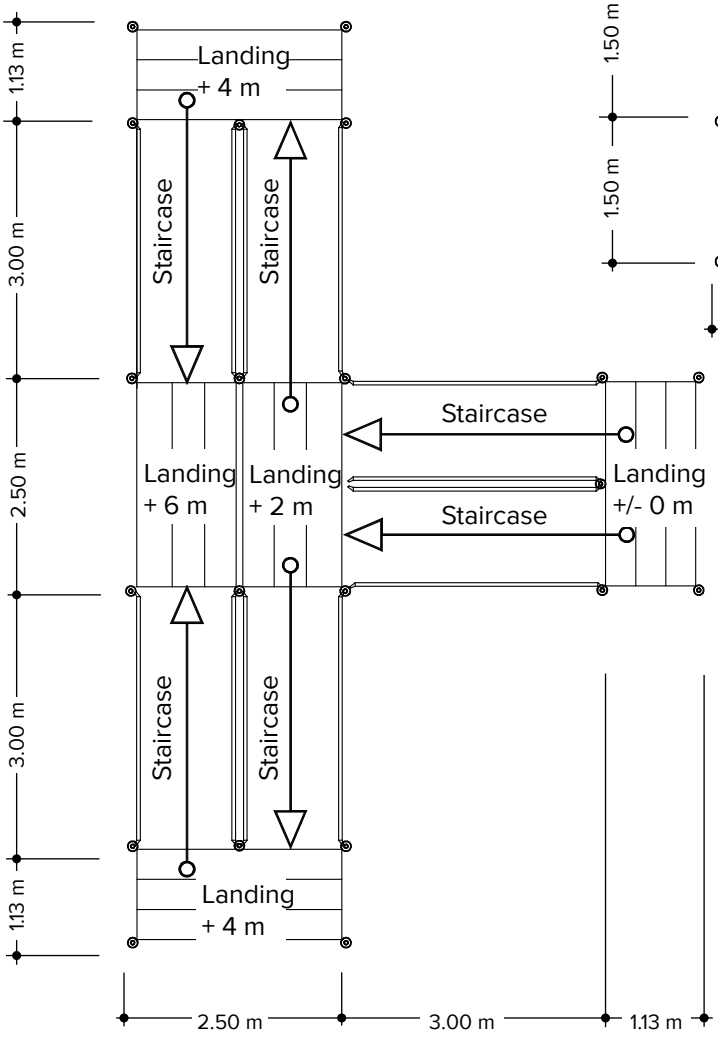


Emergency staircase

Staircase option with p = 5 kN/m² and a height of H > 16 m



Exhibition/stage staircase



Unless stated otherwise, all dimensions in mm.

8.4 MODEX Compact staircase

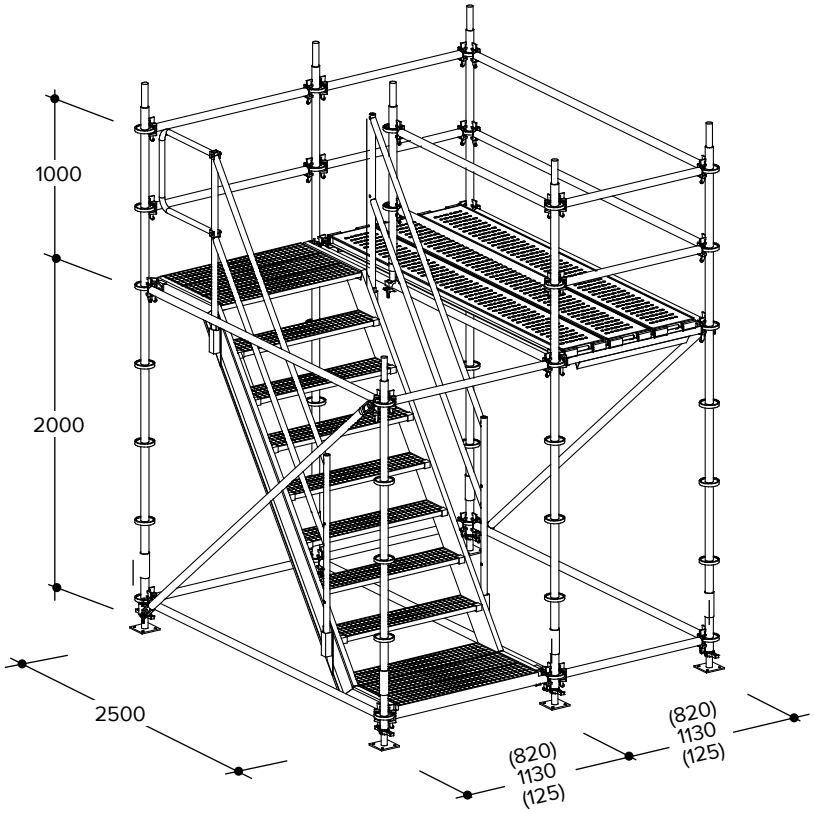


Table 8.5 **Permissible erection heights and tie spacing**

Staircase use	Load capacity	Erection height up to		Tie spacing	
		Not covered	Covered	Every 4 m	Uppermost level
Site staircase	p = 2.0 kN/m² On all flights and landings	32 m[1)]	28 m[1)]	yes	yes
Staircase tower	p = 2.0 kN/m² 20 m length (Flights and landings)	58 m[2)]	48 m[2)]	yes	yes

WARNING

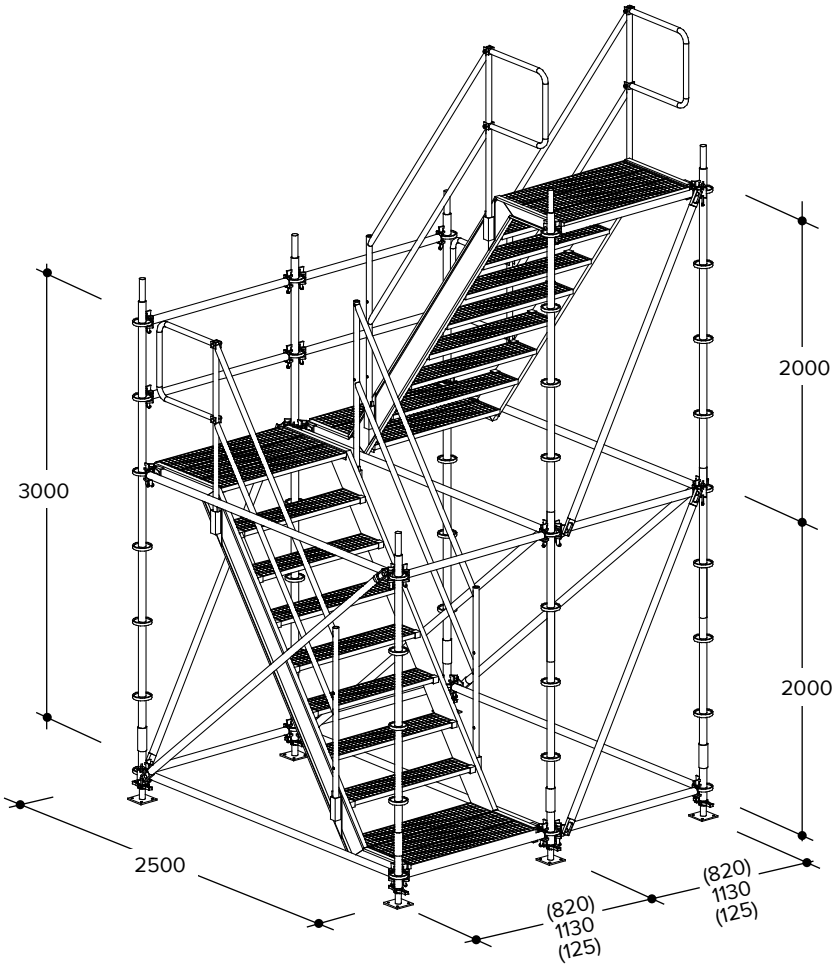
Safety note:

[1)] Max. 24 m
[2)] Max. 40 m

} if there is no tying in the lower scaffold section and the jack is extended no more than 10 cm.

Unless stated otherwise, all dimensions in mm.

Stairs



System dimensions:

Site staircase: 2.50 x 2.50 m
2.50 x 2.26 m
2.50 x 1.64 m

e.g. for ascending to and descending from work areas.

- Landings: every 2.00 m
- Staircase system width: 0.82; 1.13; 1.25 m
- Effective step width: 0.60; 0.91; 1.03 m
- Step depth: 0.21 m
- Step height: 0.25 m
- Steps per flight: 8
- Staircase pitch: 54°
- Steps and landings made of hot-dip galvanised Grids.

Permissible loads:

- -Step: p = 2.0 kN/m^2
- -Landing: p = 2.0 kN/m^2

Unless stated otherwise, all dimensions in mm.

Example of erection of a landing 4 m high

WARNING

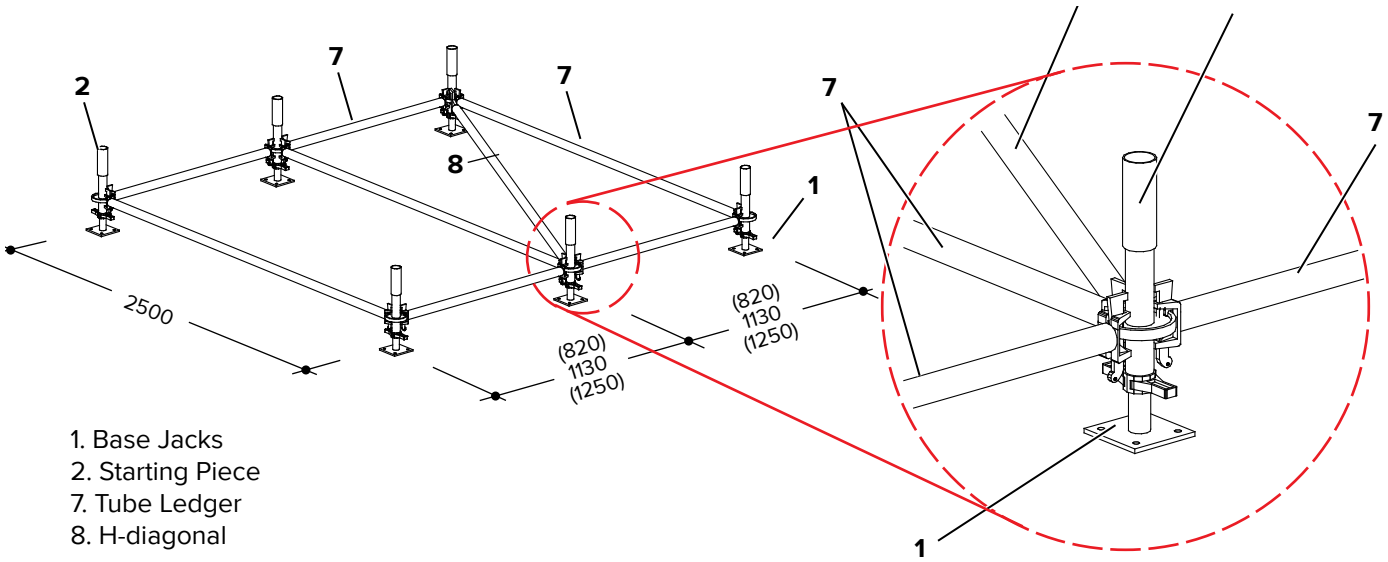
Safety note:

Erect the scaffold only on ground capable of supporting the load. When in doubt, use load-distributing substructures (e.g. planks).

Step 1

Step 1 Set up the Base Jacks (1) and roughly adjust the height. Slide the Starting Pieces over the Base Jacks. Lay out the footprint using Tube Ledgers (7) and H-diagonals (8). Ensure that all Tube Ledgers are at the same level and the layout of the footprint is perpendicular.

Step 2 Fasten the wedges.



1. Base Jacks
2. Starting Piece
7. Tube Ledger
8. H-diagonal

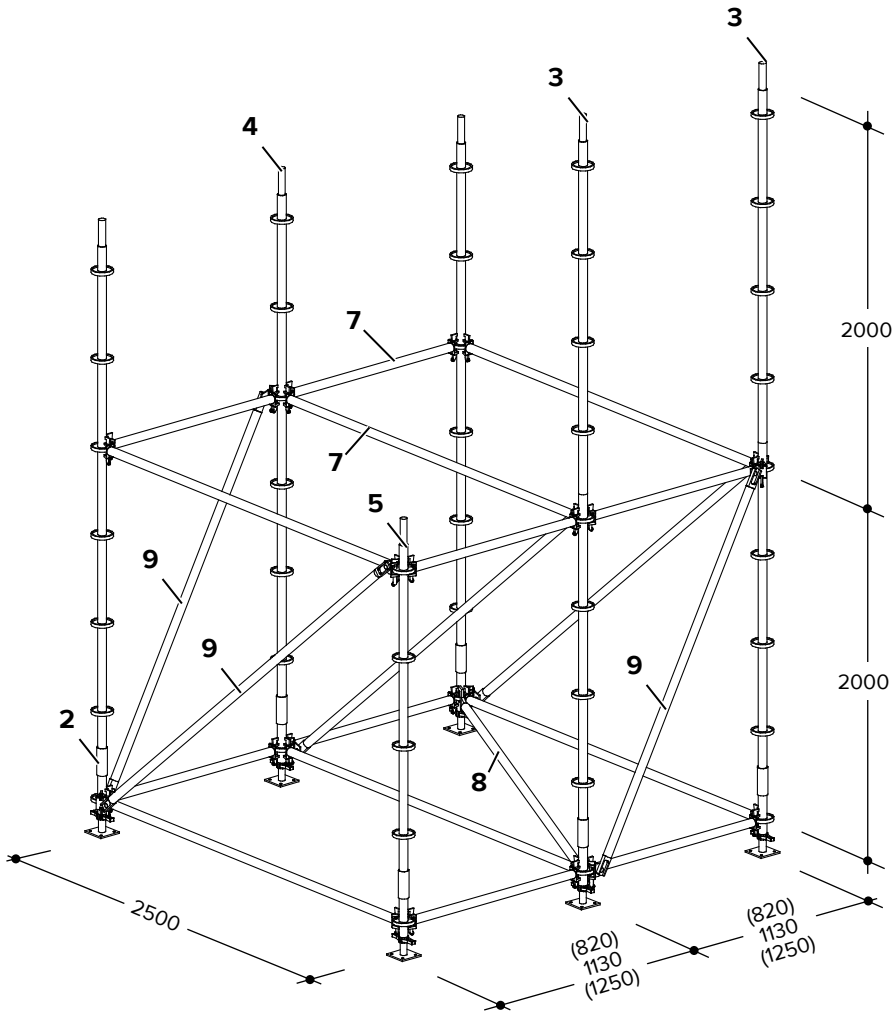
Step 2

Step 1 Two Vertical Posts 400 (3),

Step 2 one Vertical Post 200 (5) and, on the opposite side,

Step 3 three Vertical Posts (4) have to be inserted into the Starting Pieces.

Step 4 Repeat the installation of Tube Ledgers (7) and V-diagonals (9). Align the components and then key the structure. Verify that the V-diagonals are properly positioned and aligned!



2. Starting Piece
3. Vertical Post 400
4. Vertical Post 300
5. Vertical Post 200
7. Tube Ledger
8. H-diagonal
9. V-diagonal

VISUAL INSPECTION

Verify that the V-diagonals are properly positioned and aligned!

Step 3

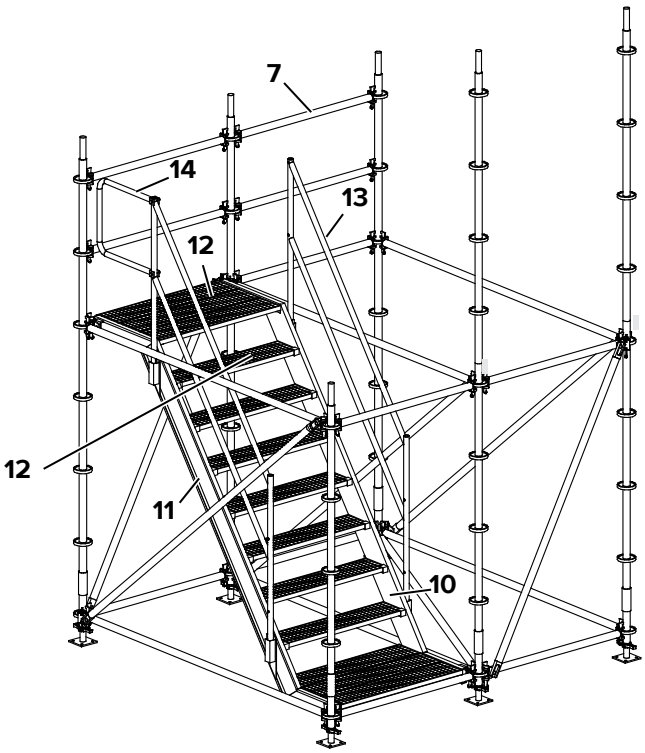
WARNING

Safety note:

Risk of falling!

Unless stated otherwise, all dimensions in mm.

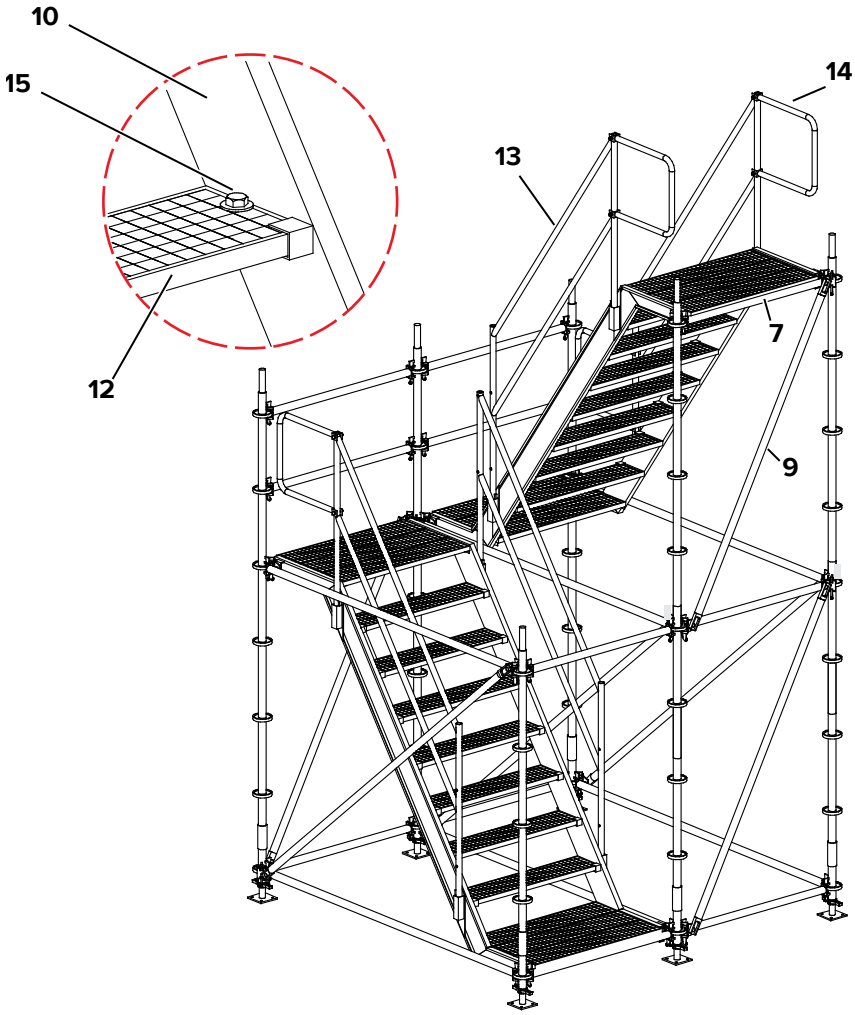
Attach Stringers R (10) and L (11) and fasten the wedges. The Grids (12) are used as steps. Place them on the flat bars on the Stringers and pivot them into place. Secure the Grids (14) to the Stringer using the Grid Locking Devices (15), using two devices per Grid. Refer to Section 6.10 on page 74 for exceptions. Insert the Basic Handrail (13) into the Stringers. Fasten the landing railing (14) to the Basic Handrail, thereby securing the landing.



7. Tube Ledger
10. Stringer R 200/250
11. Stringer L 200/250
12. Grid
13. Basic Handrail
14. Platform Handrail

Step 4

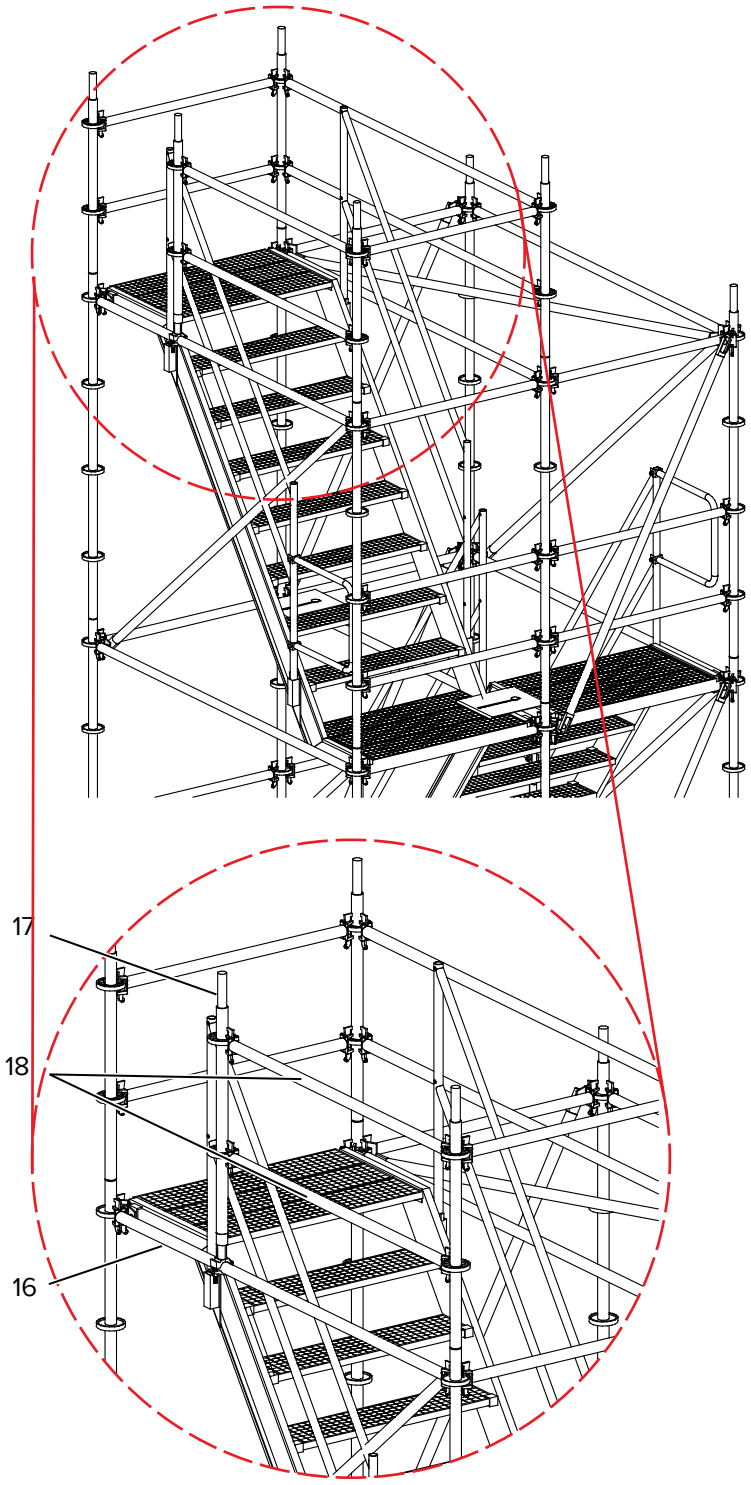
Continue erection as described above until the desired top landing height is reached. Stringers R (10) and L (11), Grids (12), Grid Locking Device (15), Basic Handrail (13), Landing Railing (14), V-diagonal (9) and Tube Ledger (7). As the illustration shows, the upper height-offset landing of the staircase ends with a handrail. The Vertical Post 100 is always used as the post above the entrance side.



7. Tube Ledger
9. V-diagonal
10. Stringer R 200/250
12. Grid
13. Basic Handrail
14. Platform Handrail
15. Grid Locking Device

Step 5

Fasten the Starting Piece for Tube Ledger (16) to the top Tube Ledger. Insert the Vertical Post 100 (17) into the Starting Piece for Tube Ledger. The two Tube Ledgers 168 (18) secure the top level on the ascent side.



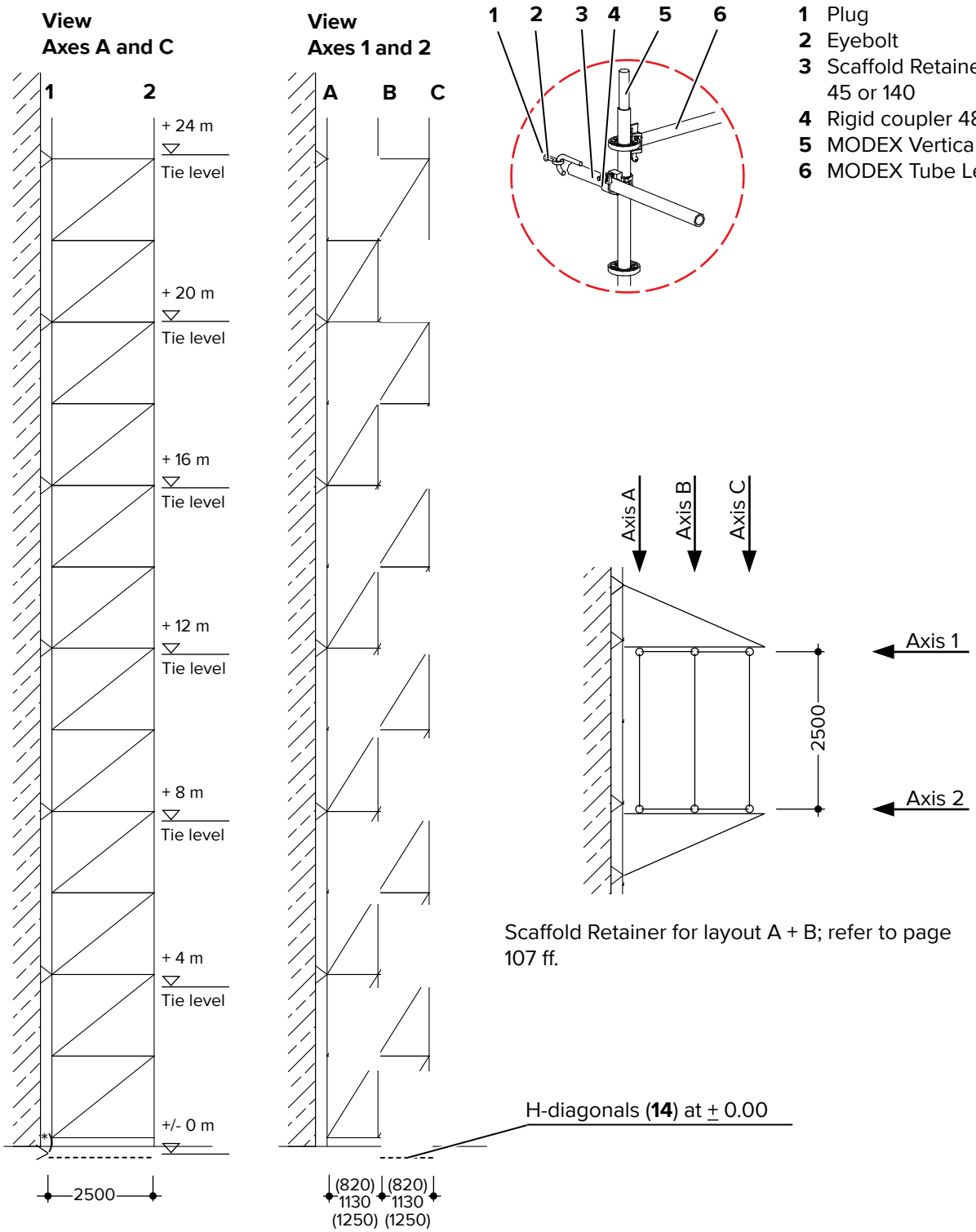
Always comply with the specifications in the Table “Permissible erection heights and tie spacing” on page 86.

The Tube Ledgers 250 that act as guard rails on the landings are not shown!

Arrangement of V-diagonals (13)

Axis A as shown

Axis C opposite



1 Plug
2 Eyebolt
3 Scaffold Retainer 45 or 140
4 Rigid coupler 48/48
5 MODEX Vertical Post
6 MODEX Tube Ledger

Scaffold Retainer for layout A + B; refer to page 107 ff.

*) Refer to notes[1] and [2] for the table on page 99

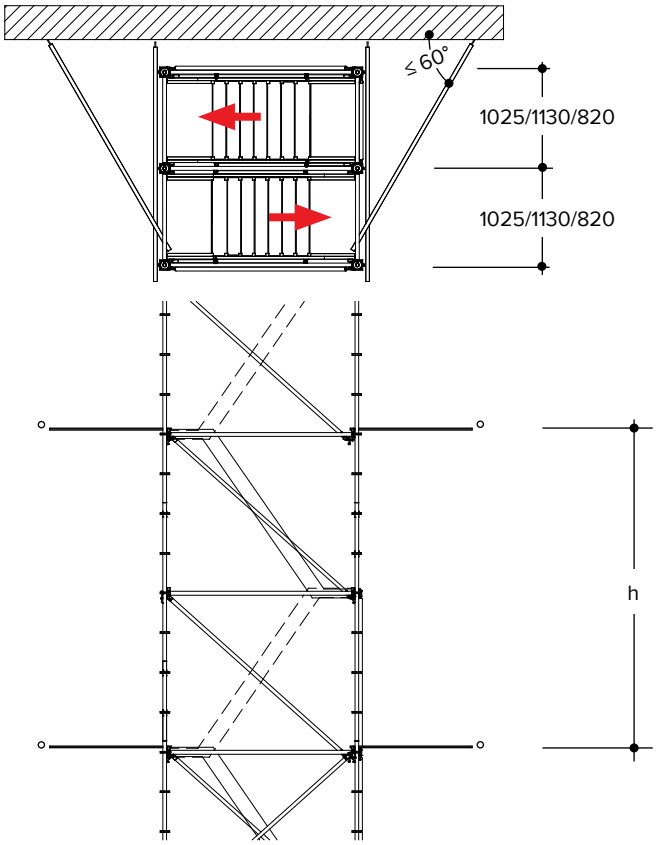
NOTE

Note!

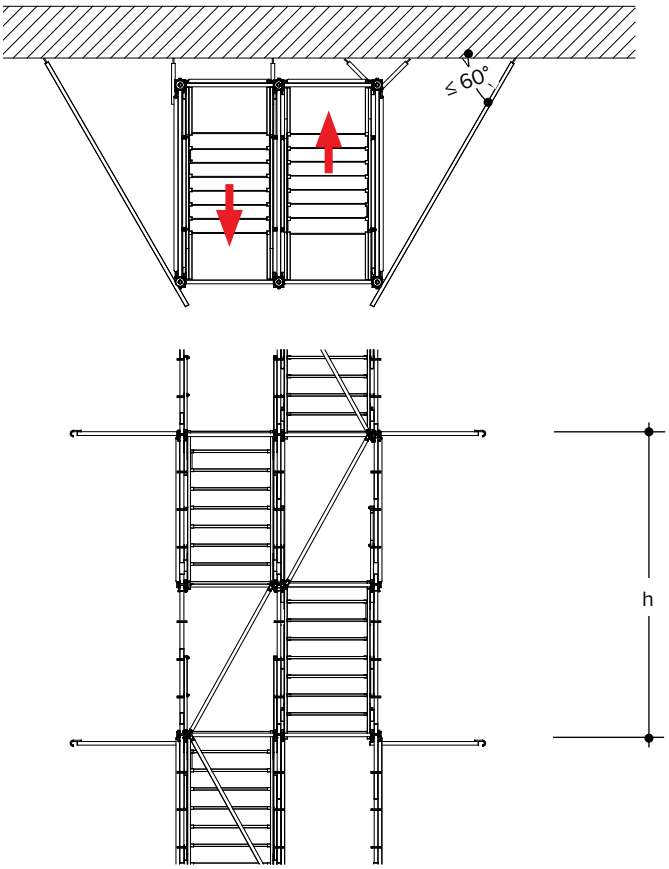
Covering with nets and tarpaulins is permissible for the tying and arrangement of diagonals shown here!

Unless stated otherwise, all dimensions in mm.

A: Site staircase, opposite / staircase tower



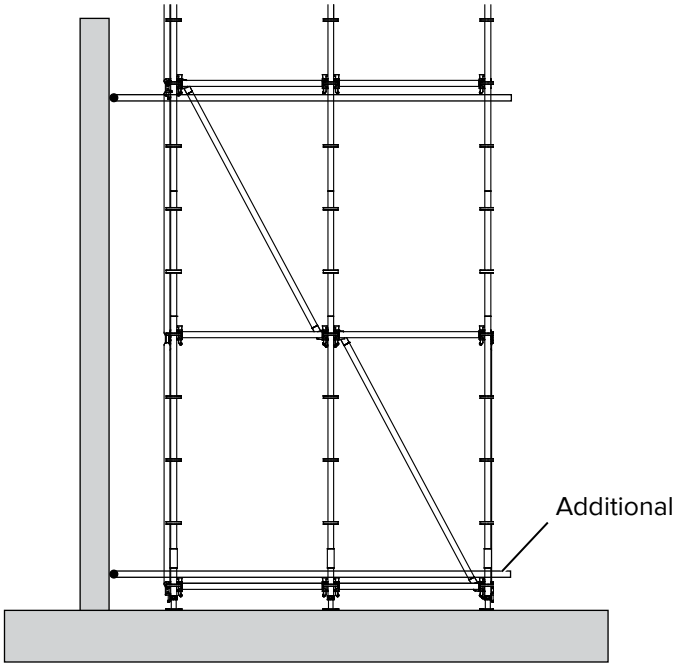
B: Site staircase, dogleg stair/staircase tower



NOTE	**Note!** Covering with nets and tarpaulins is permissible for the tying and arrangement of diagonals shown here!

NOTE	**For A and B!** Height H: < 24 m for site staircase, < 40 m for staircase tower Tie spacing: h = 4 m (not covered), h = 2 m (covered) Maximum extension of Base Jack 10 cm

Maximum scaffold height permissible with additional tying in lower area



Site staircase: permissible H = 32 m
Staircase tower: permissible H = 58 m

Max. V = 37.3 kN

Tying forces

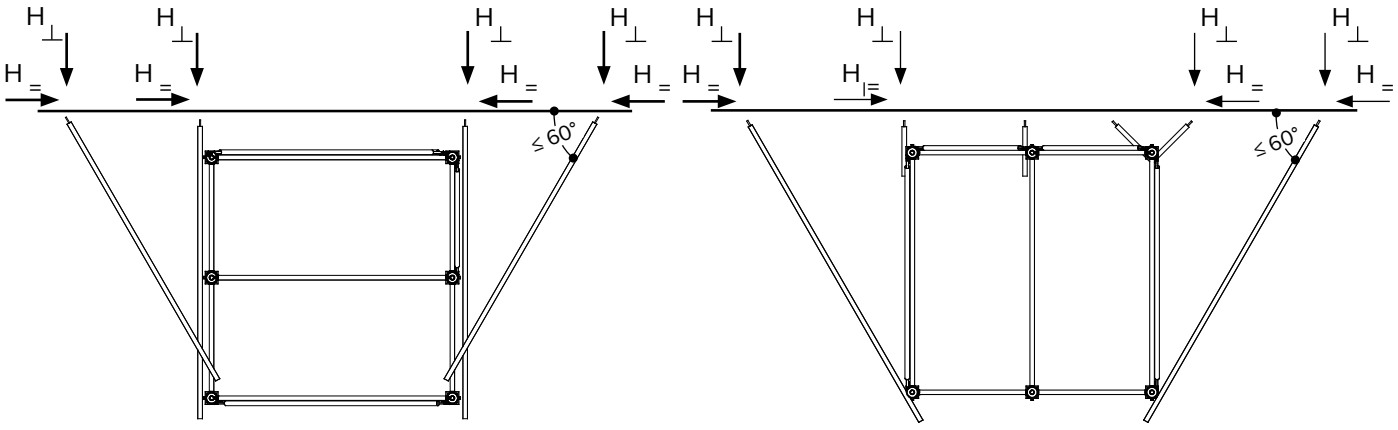


Table 8.6

Tie forces	
Not covered: (tie spacing 4 m)	Max. H = + 3.60 kN Max. H = + 1.80 kN
Covered: (tie spacing 2 m)	Max. H = 3.58 kN Max. H = 2.07 kN

Unless stated otherwise, all dimensions in mm.

Axes A and C

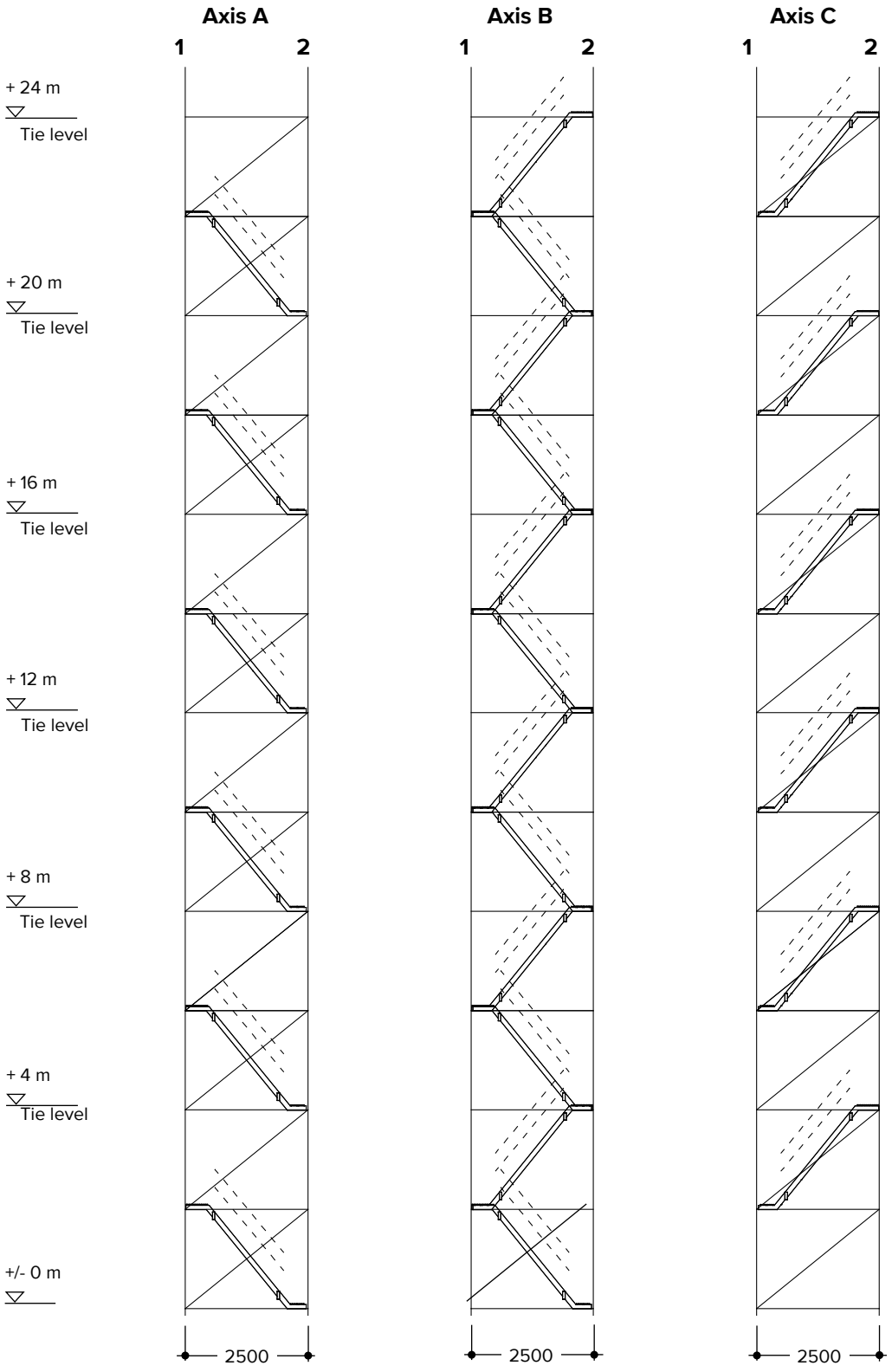
V-diagonals 200/250 always in the same direction.

Guard Rails always in direction of staircase.

Axis B

V-diagonals 200/250 only below, in the opposite direction of the staircase.

Guard Rails always in direction of staircase.



Unless stated otherwise, all dimensions in mm.

Table 8.7 BOM for a MODEX Compact staircase
Staircase system width 0.82 m

Number of flights															
Uppermost landing [m]				4.20	6.20	8.20	10.20	12.20	14.20	16.20	18.20	20.20	22.20	24.20	26.20	28.20
Pos.	Part code	Description	Weight [kg/unit]													
1	540575	Base Jack 70/3.8	4.00	6	6	6	6	6	6	6	6	6	6	6	6	6
2	470929	Starting Piece	2.00	6	6	6	6	6	6	6	6	6	6	6	6	6
3	470918	Vertical Post 400	20.20		6	6	12	12	18	18	24	24	30	30	36	36
4	470907	Vertical Post 300	15.30	6	6	6	6	6	6	6	6	6	6	6	6	6
5	470892	Vertical Post 200	10.50	6		6		6		6		6		6		6
6	470870	Vertical Post 100	5.60	1	1	1	1	1	1	1	1	1	1	1	1	1
7	470940	Tube Ledger 250	10.20	11	14	17	20	23	26	29	32	35	38	41	44	47
8	651765	Tube Ledger 168	7.10	2	2	2	2	2	2	2	2	2	2	2	2	2
9	470930	Tube Ledger 82	3.80	21	29	37	45	53	61	69	77	85	93	101	109	117
10	651547	Starting Piece for Tube Ledger	1.60	1	1	1	1	1	1	1	1	1	1	1	1	1
11	588511	V-diagonal 200/82	9.80	4	6	8	10	12	14	16	18	20	22	24	26	28
12	470973	V-diagonal 200/250	13.50	4	6	8	10	12	14	16	18	20	22	24	26	28
13	478763	H-diagonal 250/82	10.40	2	2	2	2	2	2	2	2	2	2	2	2	2
14	651698	Basic Handrail	13.10	4	6	8	10	12	14	16	18	20	22	24	26	28
15	651703	Platform Handrail	3.00	4	6	8	10	12	14	16	18	20	22	24	26	28
16	651694	Stringer L	28.30	2	3	4	5	6	7	8	9	10	11	12	13	14
17	651680	Stringer R	28.30	2	3	4	5	6	7	8	9	10	11	12	13	14
18	467041	Scaffold Retainer 250	9.70	4	8	8	12	12	16	16	20	20	24	24	28	28
19	2525	Swivel Coupler 48/48	1.40	2	4	4	6	6	8	8	10	10	12	12	14	14
20	525690	25 Grid Securing Device	2.00	3	4	5	6	7	8	9	10	11	12	13	14	15
21	2514	Rigid Coupler 48/48	1.20	6	12	12	18	18	24	24	30	30	36	36	42	42
22	651707	Grid 21-60	3.90	26	39	52	65	78	91	104	117	130	143	156	169	182
Total weight				852.00	1,208.10	1,520.20	1,876.30	2,188.40	2,544.50	2,856.60	3,212.70	3,524.80	3,880.90	4,193.00	4,549.10	4,861.20

Unless stated otherwise, all dimensions in mm.

Table 8.8 BOM for a MODEX Compact staircase

Staircase system width 1.13 m

Number of flights				1	2	3	4	5	6	7	8	9	10	11
Uppermost landing [m]				4.20	6.20	8.20	10.20	12.20	14.20	16.20	18.20	20.20	22.20	24.20
Pos.	Part code	Description	Weight [kg/unit]											
1	540575	Base Jack 70/3.8	4.00	6	6	6	6	6	6	6	6	6	6	6
2	470929	Starting Piece	2.00	6	6	6	6	6	6	6	6	6	6	6
3	470918	Vertical Post 400	20.20		6	6	12	12	18	18	24	24	30	30
4	470907	Vertical Post 300	15.30	6	6	6	6	6	6	6	6	6	6	6
5	470892	Vertical Post 200	10.50	6		6		6		6		6		6
6	470870	Vertical Post 100	5.60	1	1	1	1	1	1	1	1	1	1	1
7	470940	Tube Ledger 250	10.20	11	14	17	20	23	26	29	32	35	38	41
8	651765	Tube Ledger 168	7.10	2	2	2	2	2	2	2	2	2	2	2
9	475760	Tube Ledger 113	5.00	21	29	37	45	53	61	69	77	85	93	101
10	651547	Starting Piece for Tube Ledger	1.60	1	1	1	1	1	1	1	1	1	1	1
11	557676	V-diagonal 200/113	10.30	4	6	8	10	12	14	16	18	20	22	24
12	470973	V-diagonal 200/250	13.50	4	6	8	10	12	14	16	18	20	22	24
13	478785	H-diagonal 250/113	10.80	2	2	2	2	2	2	2	2	2	2	2
14	651698	Basic Handrail	13.10	4	6	8	10	12	14	16	18	20	22	24
15	651703	Platform Handrail	3.00	4	6	8	10	12	14	16	18	20	22	24
16	651694	Stringer L	28.30	2	3	4	5	6	7	8	9	10	11	12
17	651680	Stringer R	28.30	2	3	4	5	6	7	8	9	10	11	12
18	467041	Scaffold Retainer 250	9.70	4	8	8	12	12	16	16	20	20	24	24
19	2525	Swivel Coupler 48/48	1.40	2	4	4	6	6	8	8	10	10	12	12
20	525690	25 Grid Securing Device	2.00	3	4	5	6	7	8	9	10	11	12	13
21	002514	Rigid Coupler 48/48	1.20	6	12	12	18	18	24	24	30	30	36	36
22	651708	Grid 21-91	5.90	26	39	52	65	78	91	104	117	130	143	156
				932.00	1,324.70	1,673.40	2,066.10	2,414.80	2,807.50	3,156.20	3,548.90	3,897.60	4,290.30	4,639.00

Table 8.9 BOM for a MODEX Compact staircase
Staircase system width 1.25 m

Number of flights				1	2	3	4	5	6	7	8	9	10	11
Uppermost landing [m]				4.20	6.20	8.20	10.20	12.20	14.20	16.20	18.20	20.20	22.20	24.20
Pos.	Part code	Description	Weight [kg/unit]											
1	540575	Base Jack 70/3.8	4.00	6	6	6	6	6	6	6	6	6	6	6
2	470929	Starting Piece	2.00	6	6	6	6	6	6	6	6	6	6	6
3	470918	Vertical Post 400	20.20		6	6	12	12	18	18	24	24	30	30
4	470907	Vertical Post 300	15.30	6	6	6	6	6	6	6	6	6	6	6
5	470892	Vertical Post 200	10.50	6		6		6		6		6		6
6	470870	Vertical Post 100	5.60	1	1	1	1	1	1	1	1	1	1	1
7	470940	Tube Ledger 250	10.20	11	14	17	20	23	26	29	32	35	38	41
8	651765	Tube Ledger 168	7.10	2	2	2	2	2	2	2	2	2	2	2
9	484739	Tube Ledger 125	5.50	21	29	37	45	53	61	69	77	85	93	101
10	651547	Starting Piece for Tube Ledger	1.60	1	1	1	1	1	1	1	1	1	1	1
11	651656	V-diagonal 200/125	10.40	4	6	8	10	12	14	16	18	20	22	24
12	470973	V-diagonal 200/250	13.50	4	6	8	10	12	14	16	18	20	22	24
13	651627	H-diagonal 250/125	10.90	2	2	2	2	2	2	2	2	2	2	2
14	651698	Basic Handrail	13.10	4	6	8	10	12	14	16	18	20	22	24
15	651703	Platform Handrail	3.00	4	6	8	10	12	14	16	18	20	22	24
16	651694	Stringer L	28.30	2	3	4	5	6	7	8	9	10	11	12
17	651680	Stringer R	28.30	2	3	4	5	6	7	8	9	10	11	12
18	467063	Scaffold Retainer 350	13.50	2	4	4	6	6	8	8	10	10	12	12
19	467041	Scaffold Retainer 250	9.70	2	4	4	6	6	8	8	10	10	12	12
20	2525	Swivel Coupler 48/48	1.40	2	4	4	6	6	8	8	10	10	12	12
21	525690	25 Grid Securing Device	2.00	3	4	5	6	7	8	9	10	11	12	13
22	2514	Rigid Coupler 48/48	1.20	6	12	12	18	18	24	24	30	30	36	36
23	651709	Grid 21-103	6.80	26	39	52	65	78	91	104	117	130	143	156
				974.10	1,390.30	1,754.90	2,171.10	2,535.70	2,951.90	3,316.50	3,732.70	4,097.30	4,513.50	4,878.10

Unless stated otherwise, all dimensions in mm.

9 Façade

9.1 General information

Highly efficient and flexible façade scaffolds can be constructed with MODEX scaffold components. The following pages describe various ways to erect the standard MODEX façade scaffolds. Proof of the scaffold's structural integrity has already been provided for this type of erection. The maximum erection height for the individual erection options is specified as a factor of the covering of the scaffold, the type of façade, the tying pattern, the load capacity, the bay width, and the location of the first tie. The tying forces for the various options are also indicated. Refer to Table 9.1 for the specifications applicable to the various erection options. The required certificates are issued pursuant to EN 12810 and EN 12811.

WARNING

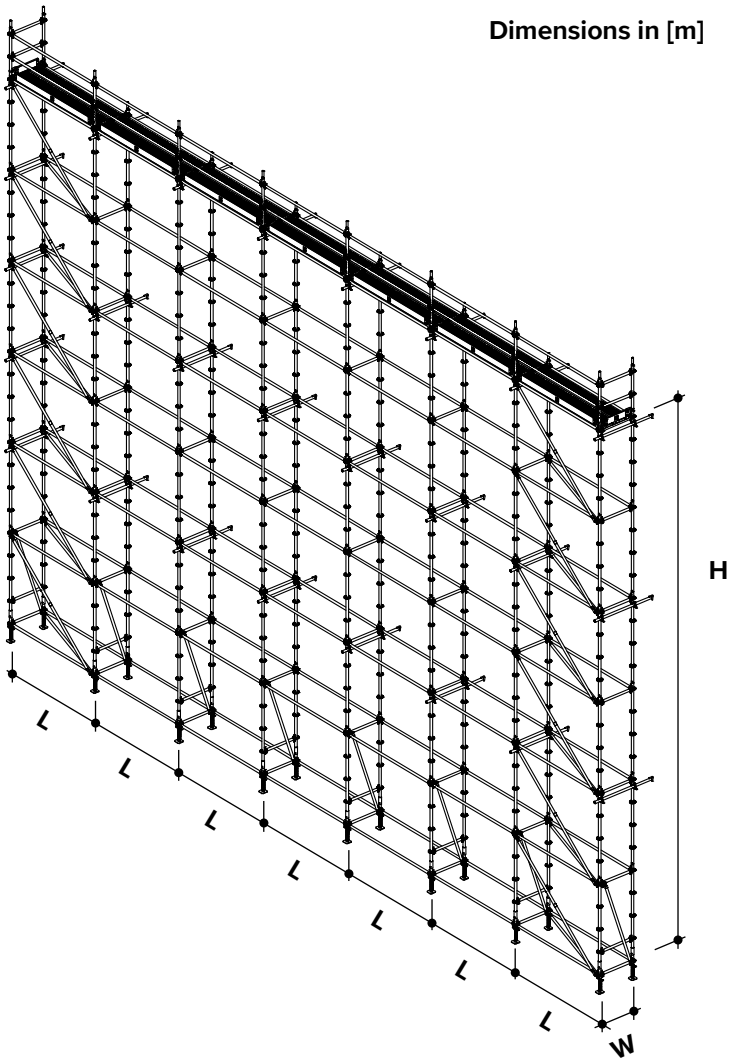
Safety note:

Always comply with the instructions regarding the use of Lifting Retainers contained in section 6.10!

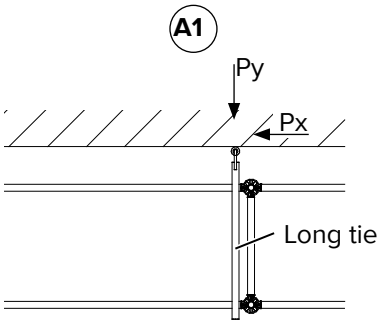
Table 9.1 **All dimensions in [m]**

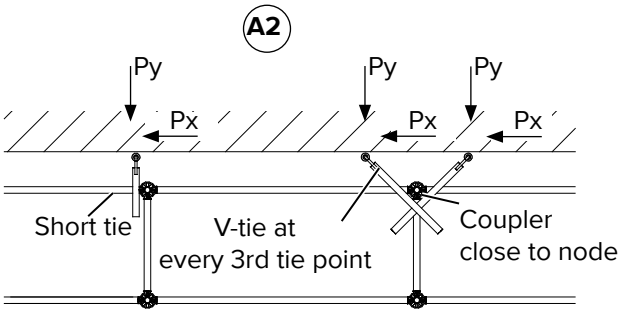
Covering	Façade	Tying pattern	Load	Bay length	First tie position	Max. H
Without	Closed	1	LC 4	L ≤ 2.50	at 4.00	26
			LC 3	L ≤ 3.00	at 4.00	26
		2	LC 4	L ≤ 2.50	at 4.00	38
			LC 3	L ≤ 2.50	at 4.00	42
			LC 3	L = 3.00	at 4.00	36
Tarp		3	LC 4	L ≤ 2.50	at 2.00	58
			LC 3	L = 3.00	at 2.00	52
Without	Open and closed	4	LC 4	L ≤ 2.50	at 4.00	26
			LC 3	L = 3.00	at 4.00	26
Tarp		5	LC 4	L ≤ 2.50	at 2.00	42
			LC 3	L = 3.00	at 2.00	40

Dimensions in [m]



9.2 Tying

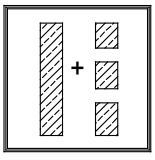




V-tie with short ties

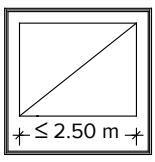
Meaning of pictograms

= Covered or not covered

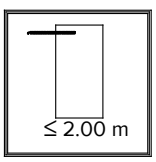


= Closed + open façade

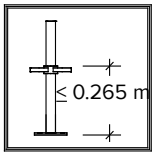
= Load class 4



= Bay length L (2.50 m)



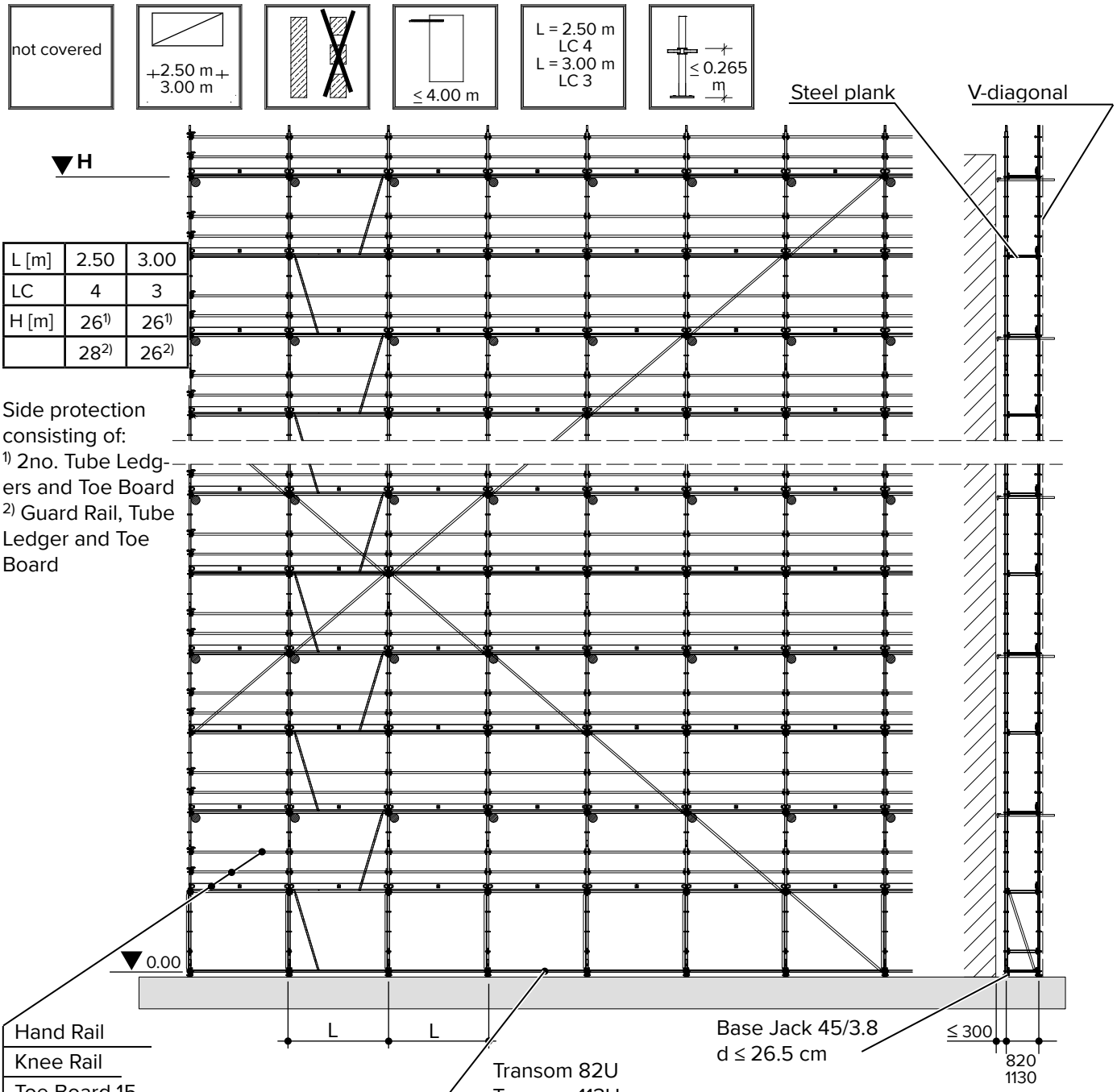
= First tie (no higher than 2.00 m)

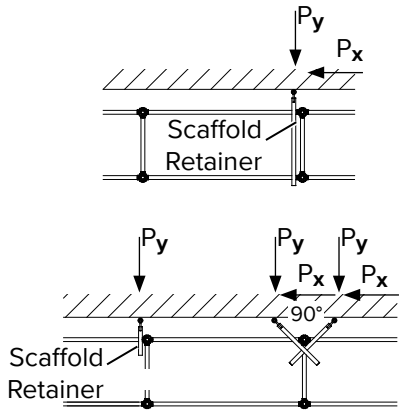


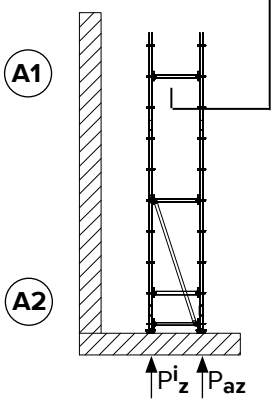
= Jack extension length (≤ 0.265 m)

Unless stated otherwise, all dimensions in mm.

1







Tie point: A1 or A2

Table 9.2

Bearing forces for scaffolds that are not covered						
Scaffold Retainer				Base point		
Tie point		P_x [kN]	P_y [kN]		P^i_z [kN] Without Stage Bracket	P^a_z [kN]
A1		± 0.42	± 2.08		10.75	15.92
A2	V-tie in every third bay	± 1.04	± 1.04	Where bridged	16.13	23.88
	Short tie	0	± 2.08			

Unless stated otherwise, all dimensions in mm.

2

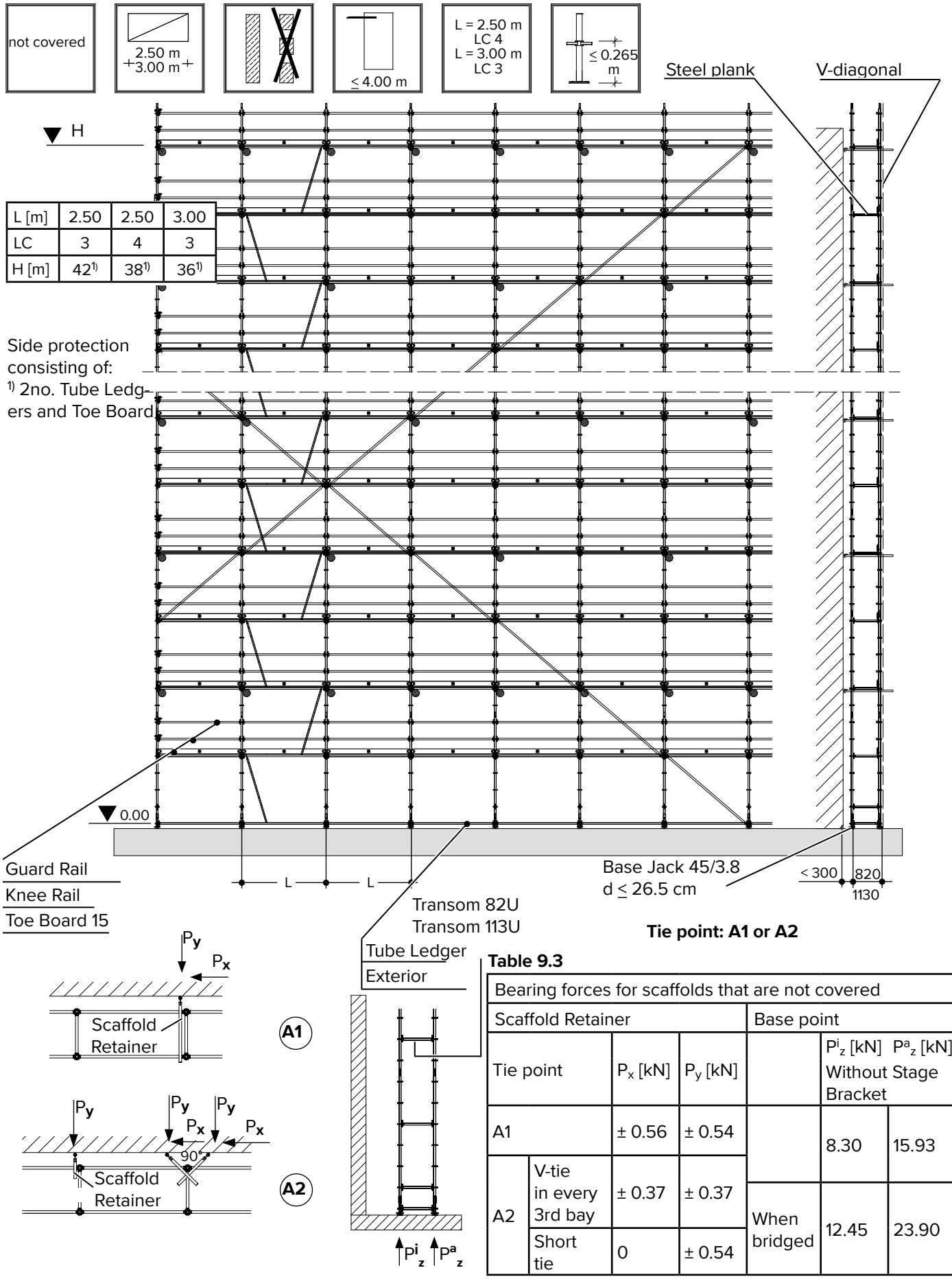


Table 9.3

Bearing forces for scaffolds that are not covered					
Scaffold Retainer				Base point	
Tie point		P_x [kN]	P_y [kN]		P^i_z [kN] Without Stage Bracket	P^a_z [kN] Without Stage Bracket
A1		± 0.56	± 0.54		8.30	15.93
A2	V-tie in every 3rd bay	± 0.37	± 0.37	When bridged	12.45	23.90
	Short tie	0	± 0.54			

Unless stated otherwise, all dimensions in mm.

3

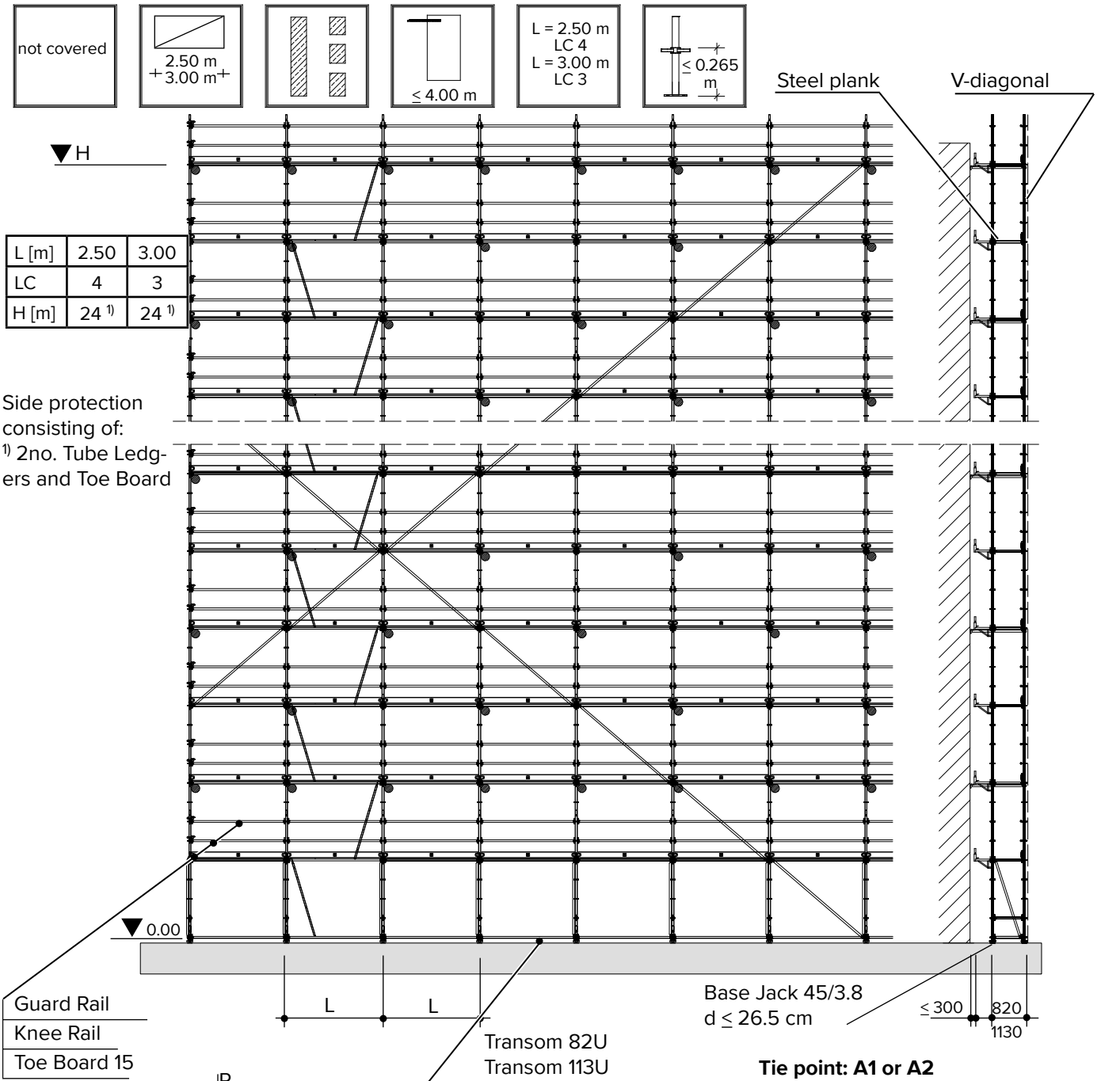
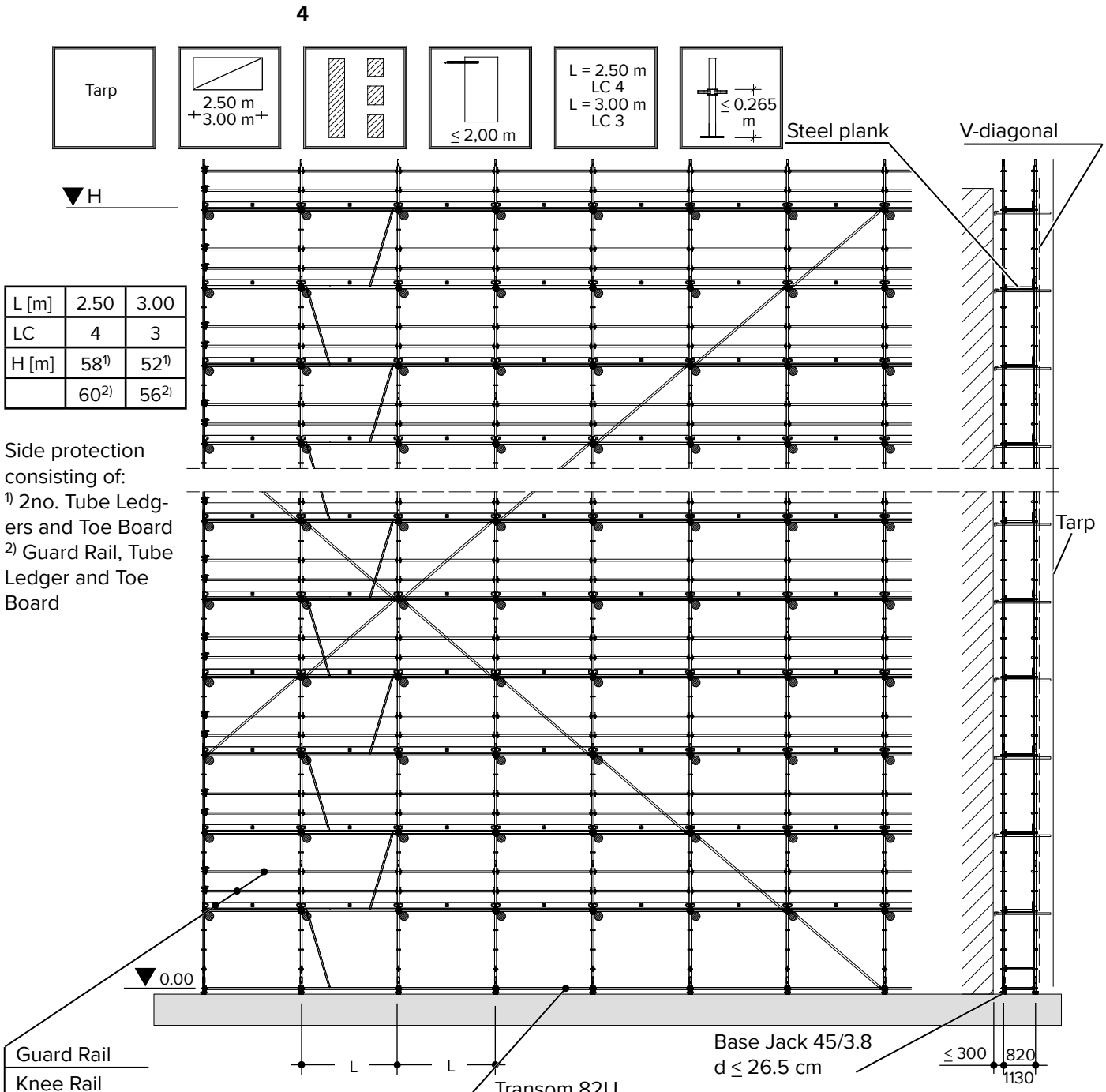


Table 9.4

Bearing forces for scaffolds that are not covered					
Scaffold Retainer			Base point		
Tie point		P_x [kN]	P_y [kN]	P^i_z [kN] with Stage Bracket	P^a_z [kN]
A1		± 0.42	± 2.08	19.45	16.09
A2	V-tie in every 3rd bay	± 1.04	± 1.04	Where bridged: 26.90	23.42
	Short tie	0	± 2.08		

Unless stated otherwise, all dimensions in mm.



L [m]	2.50	3.00
LC	4	3
H [m]	58[1)]	52[1)]
	60[2)]	56[2)]

Side protection consisting of:
[1)] 2no. Tube Ledgers and Toe Board
[2)] Guard Rail, Tube Ledger and Toe Board

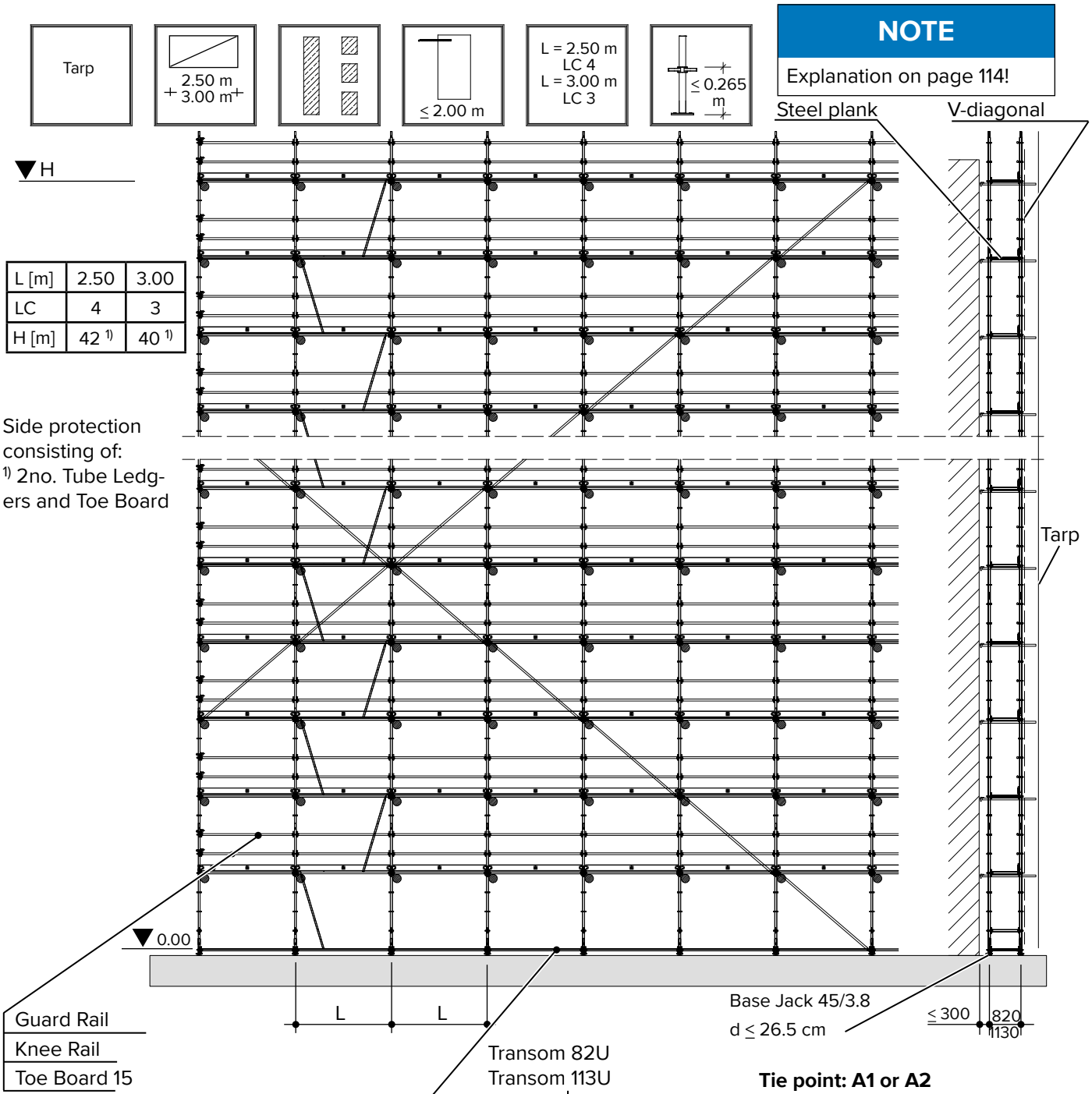
Tie point: A1 or A2

Table 9.5

Bearing forces for scaffolds that are not covered						
Scaffold Retainer				Base point		
Tie point		P_x [kN]	P_y [kN]		P^i_z [kN] Without Stage Bracket	P^a_z [kN]
A1		± 1.17	± 7.38		17.43	28.45
A2	V-tie in every 3rd bay	± 3.70	± 3.70	Where bridged	17.13	28.45
	Short tie	0	± 7.38			

Unless stated otherwise, all dimensions in mm.

5



Tie point: A1 or A2

Table 9.6

Bearing forces for scaffolds that are not covered					
Scaffold Retainer				Base point	
Tie point		P_x [kN]	P_y [kN]	P^i_z [kN] Without Stage Bracket	P^a_z [kN] Without Stage Bracket
A1		± 1.17	± 7.38	26.90	23.42
A2	V-tie in every 3rd	± 3.70	± 3.70	Where bridged: 26.90	Where bridged: 23.42
	Short tie	0	± 7.38		

Unless stated otherwise, all dimensions in mm.

9.3 Pedestrian passage

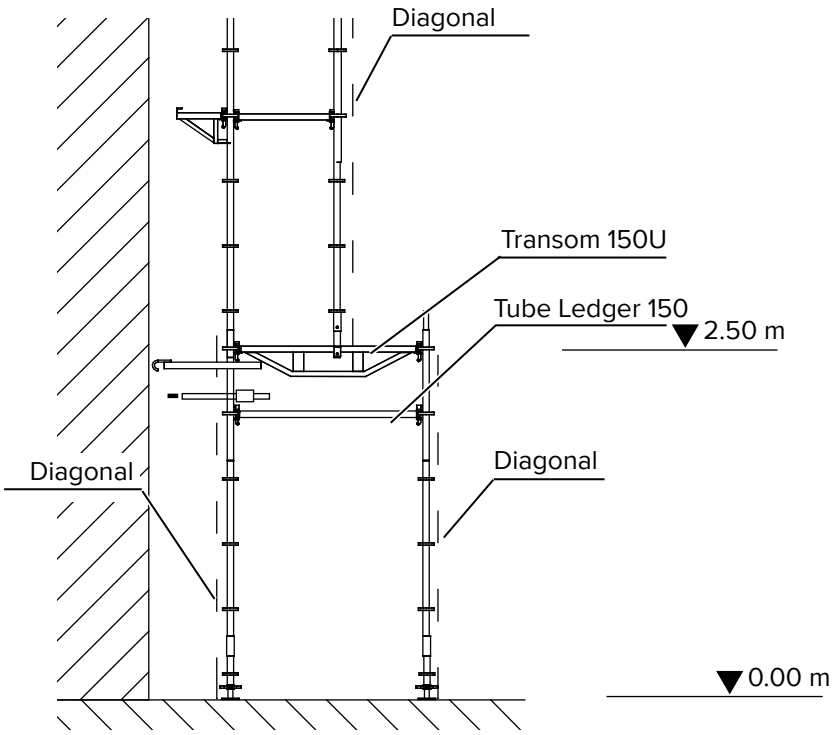
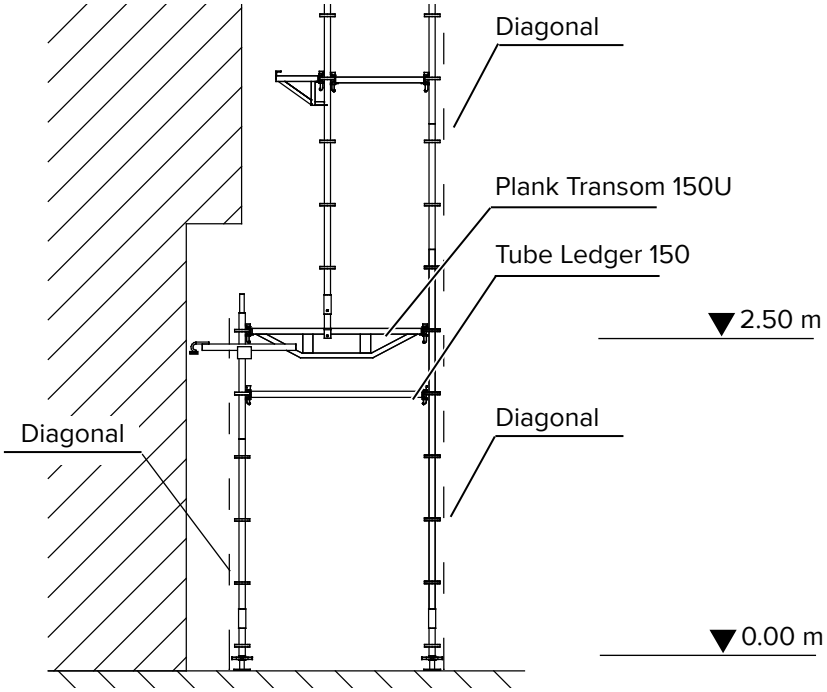


Table 9.7

Permissible height H [m]				
		Bay length 2.50 m LC 3	Bay length 2.50 m LC 4	Bay length 3.00 m LC 3
Scaffold not covered	Pedestrian passage	32	28	26
	Lattice Girder	42	38	36
Scaffold covered	Pedestrian passage	30	30	30
	Lattice Girder	30	30	24
Scaffold covered, with Stage Bracket	Pedestrian passage	16	14	16
	Lattice Girder	18	18	14



Unless stated otherwise, all dimensions in mm.

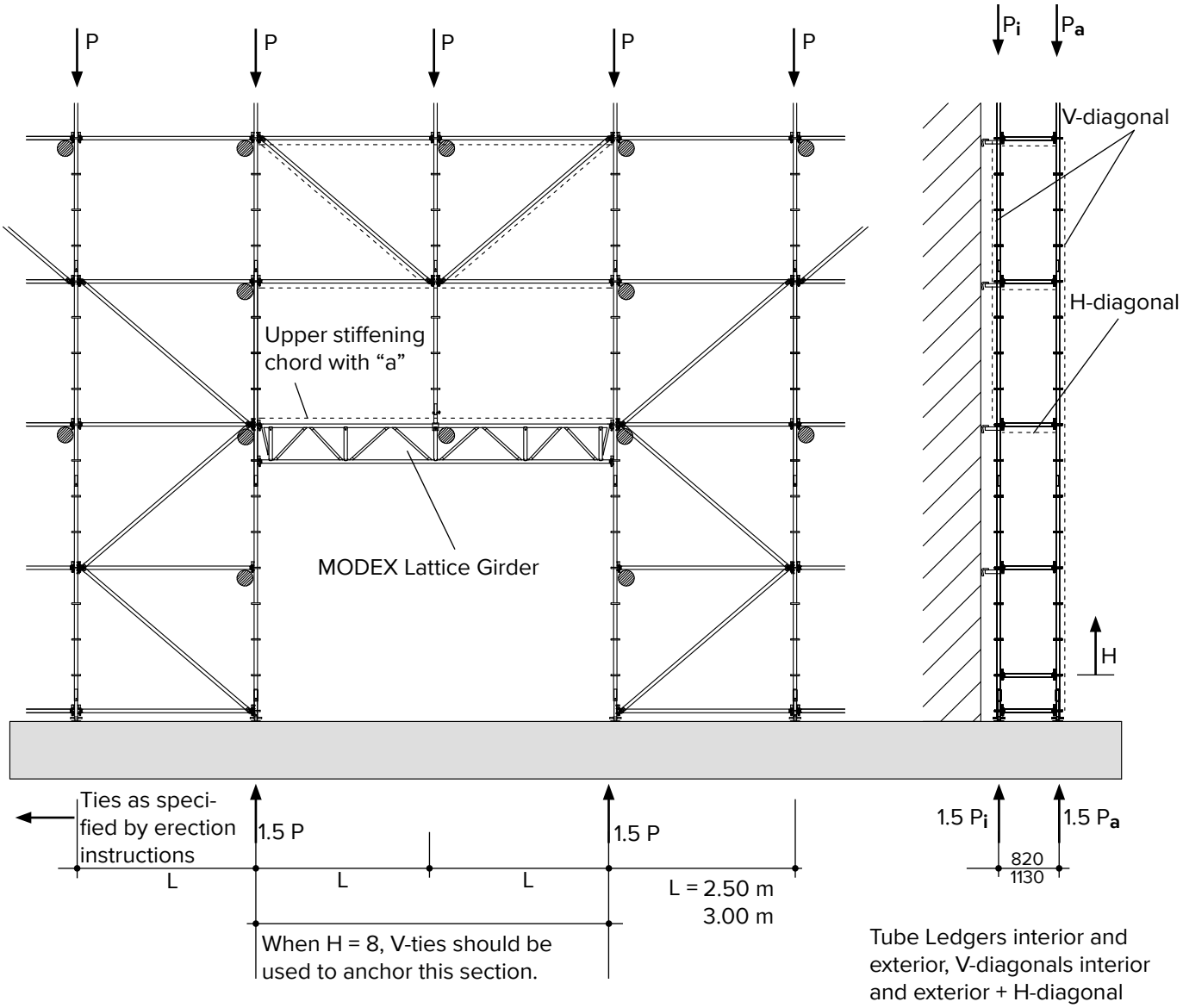
9.4 Bridging at H = 4 m

NOTE

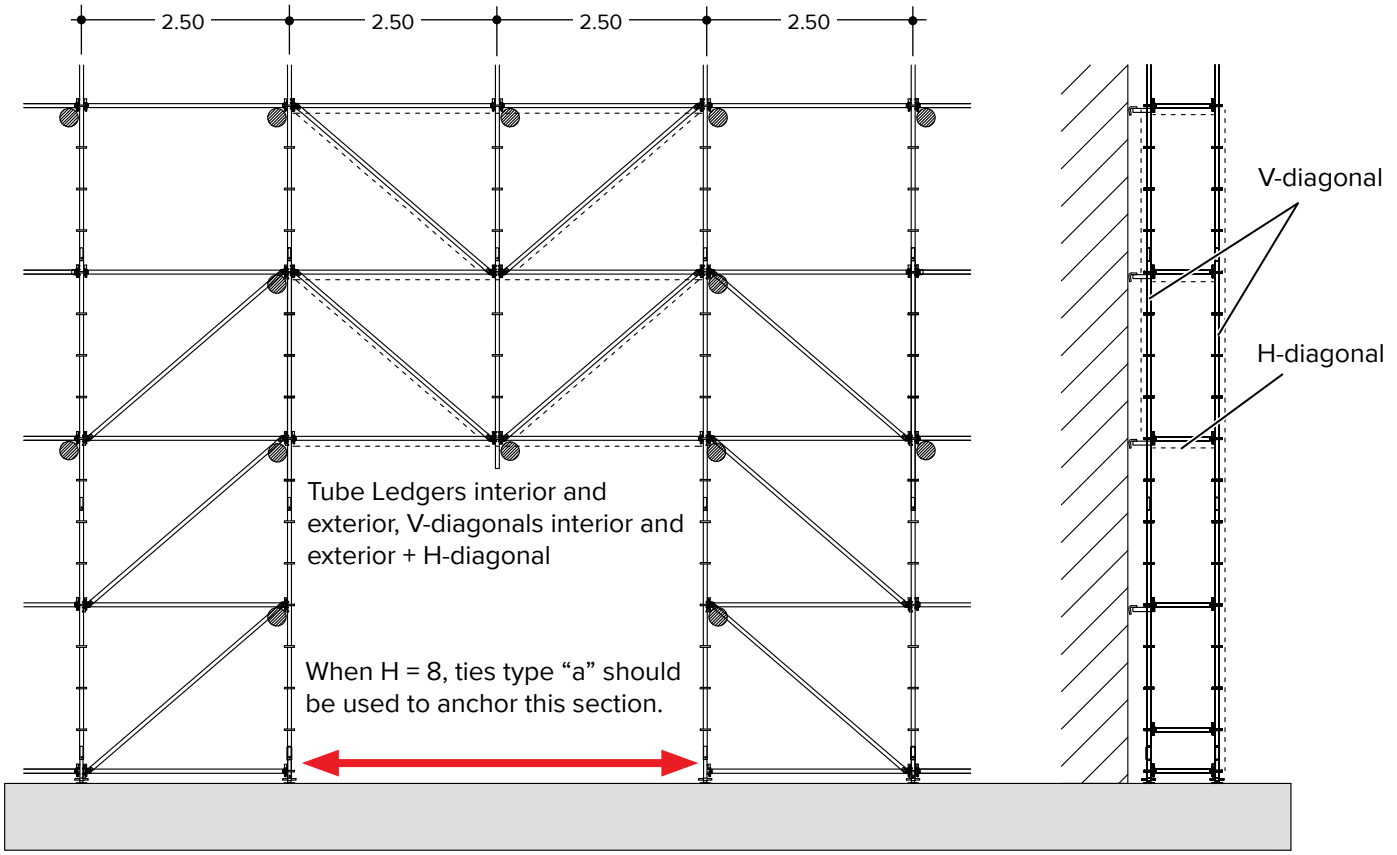
Note!
Heights are indicated on page 120!

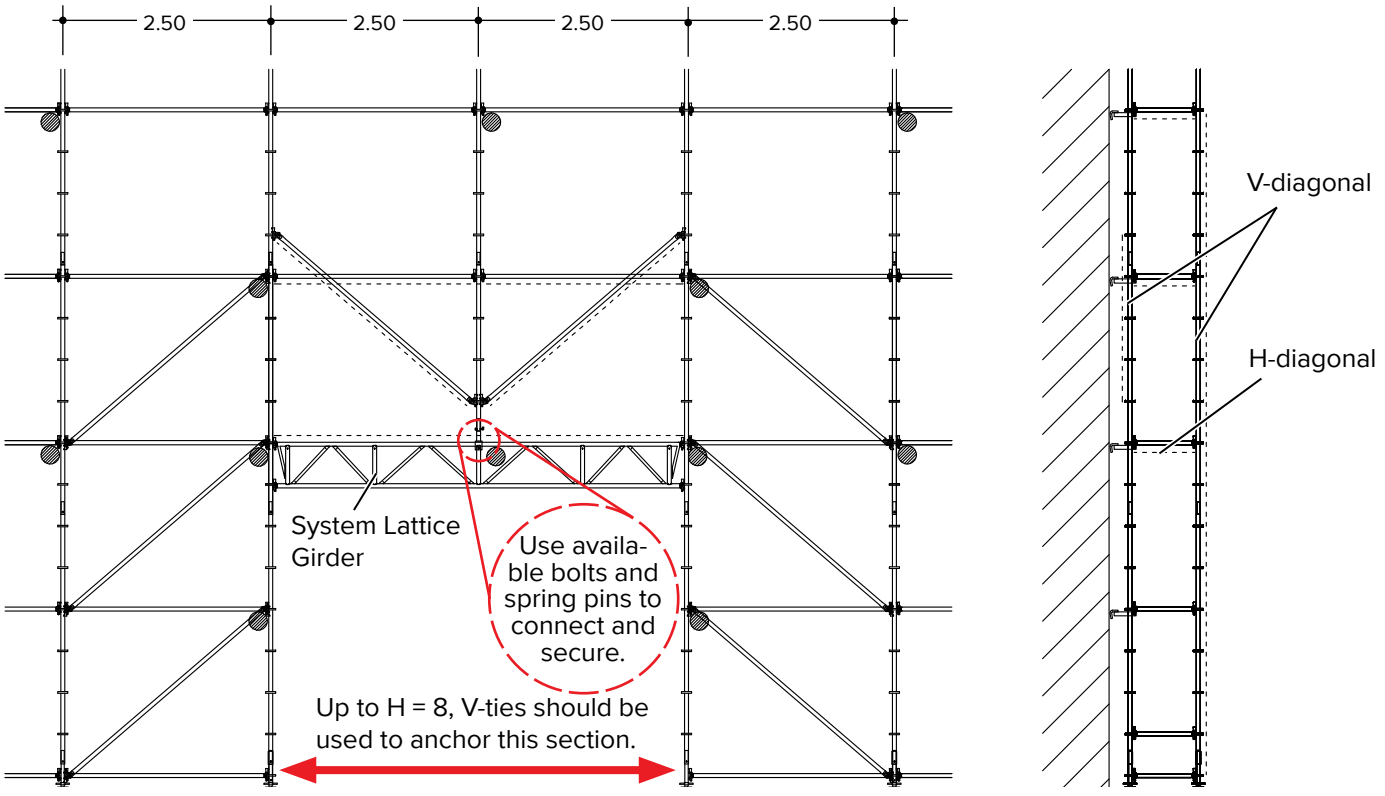
WARNING

Safety note:
Whenever sections are bridged, ties have to be placed up to eight meters high at the edges and in the centre of the bridged section. These should always be V-ties.



Stiffening “a” in upper chord:
L = 2.50 m: a = 2.50 m
L = 3.00 m: a = 3.00 m





Tube Ledgers interior and exterior, V-diagonals interior and exterior + H-diagonal

NOTE

Note!

Heights are indicated on page 120!

Unless stated otherwise, all dimensions in mm.

9.5 Stage Brackets

The working platform of the MODEX scaffold can be enlarged by 32 cm or even by 64 cm, (the entire width of the system) by using Stage Brackets.

Stage Bracket 32 A

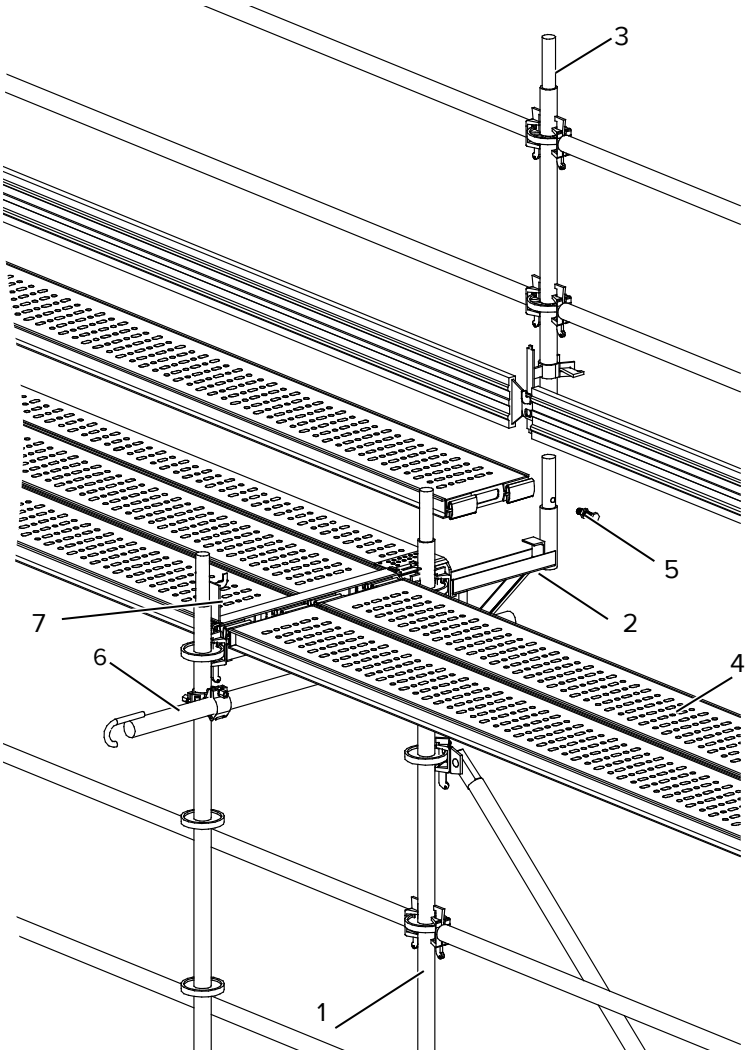
Install Stage Brackets by simply inserting the joint connector into the MODEX Rosette. Then insert the wedge, attached to the joint connector, into the opening on the MODEX Rosette. Finally, drive the pins top down into the respective opening until rebound is felt.

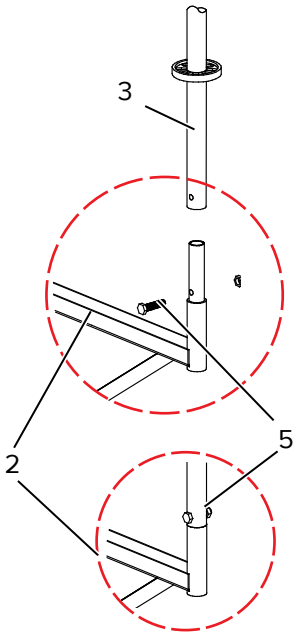
WARNING

Safety note:

Risk of falling!

Lifting Retainers secure the planks placed onto the Stage Bracket (Refer to the notes in Section 6.10). A Vertical Post 100 can be inserted into the tubular joint of the Stage Bracket to serve as a railing post.





WARNING

Safety note:

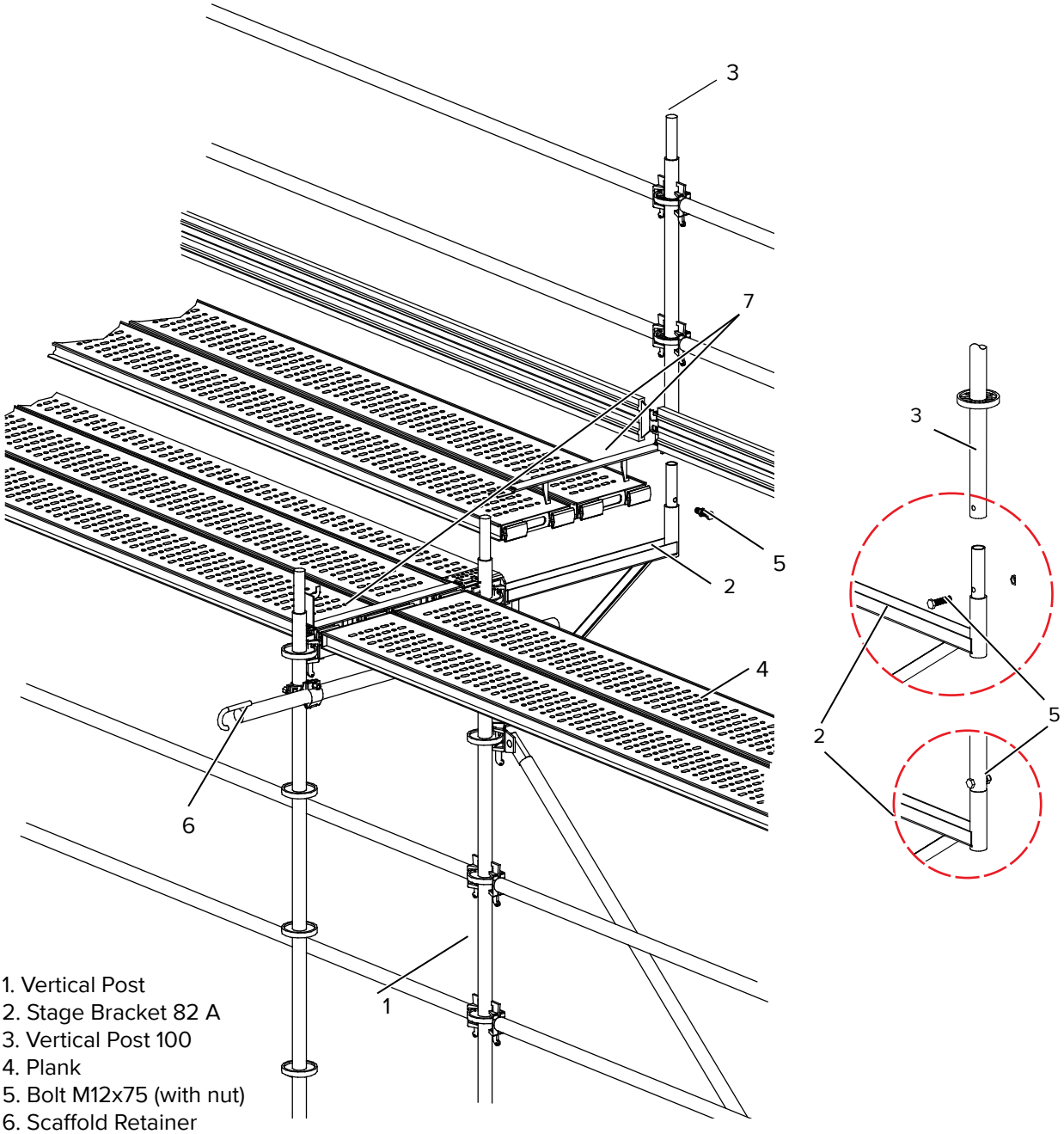
Always use a Bolt M12x75 with nut or a Ø 12 Frame Pin to secure the Vertical Post 100 to the Stage Bracket 32 A.

1. Vertical Post
2. Stage Bracket 82 A
3. Vertical Post 100
4. Plank
5. Bolt M12x75 (with nut)
6. Scaffold Retainer
7. Lifting Retainer

Stage Bracket 82 A

Install Stage Brackets by inserting the joint connector into the MODEX Rosette at the desired plank level and inserting the lower hook simultaneously into the MODEX Rosette below. Then insert the wedge, attached to the joint connector, into the opening on the MODEX Rosette. Finally, drive the pins top down into the respective opening until rebound is felt.

Lifting Retainers secure the planks placed onto the Stage Bracket and the planks on the scaffolding (Refer to the notes in Section 6.10). A Vertical Post 100 can be inserted into the tubular joint of the Stage Bracket to serve as a side protection post.



1. Vertical Post
2. Stage Bracket 82 A
3. Vertical Post 100
4. Plank
5. Bolt M12x75 (with nut)
6. Scaffold Retainer
7. Lifting Retainer

WARNING

Safety note:

Risk of falling!

WARNING

Safety note:

Always use a Bolt M12x75 with nut or a Ø 12 Frame Pin to secure the Vertical Post 100 to the Stage Bracket 32 A!

Unless stated otherwise, all dimensions in mm.

9.6 Use as protective scaffold

When the scaffold is used as a protective scaffold, the vertical distance between the edge of the building and the working platform may not exceed 2.00 m. And the distance b1 between the edge of the building and interior side of the side protection must be at least 0.90 m. When used as a protective scaffold, always comply with the applicable regulations pertaining to the occupational health and safety.

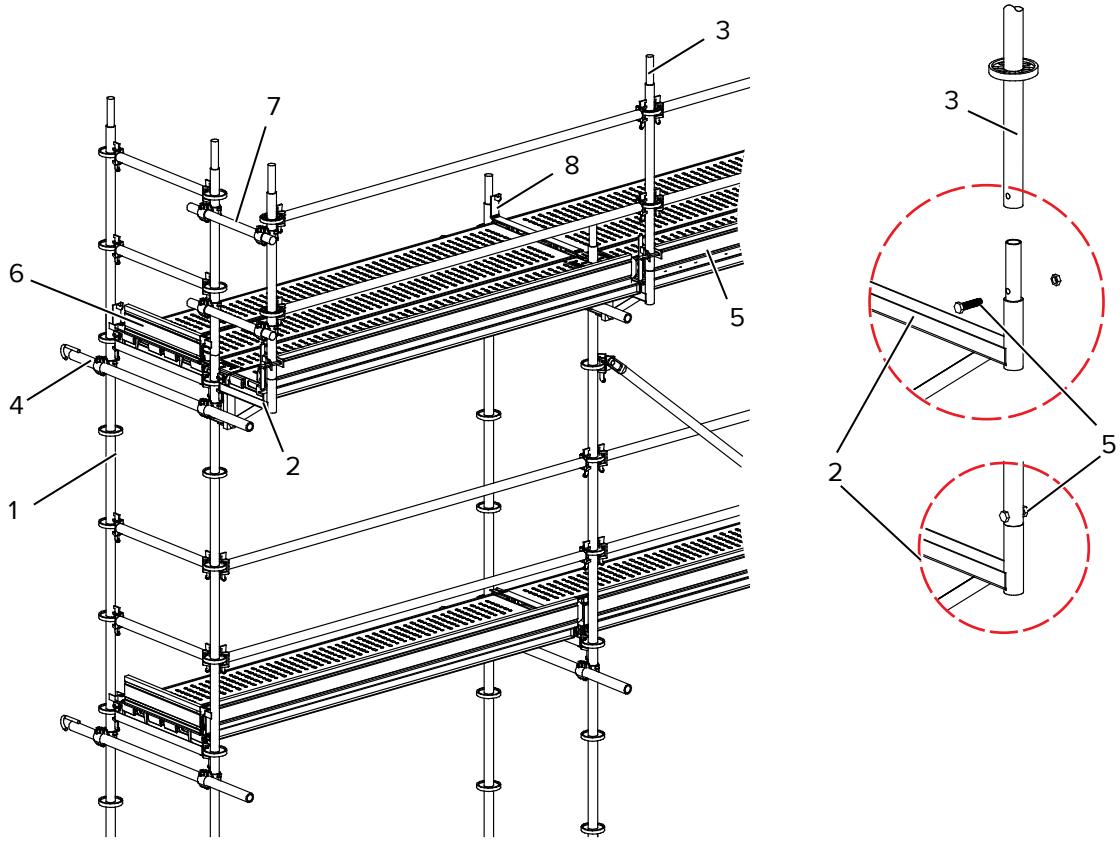
WARNING

Safety note:

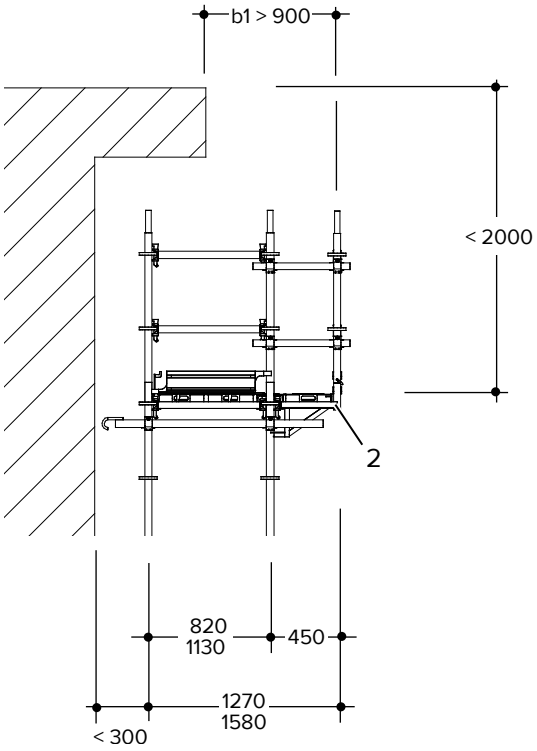
Use a Bolt M12x75 with nut or a Ø 12 Frame Pin to secure the Vertical Post 100!

With Stage Bracket 32 A on the exterior

Use Lifting Retainers to secure the planks. Connect the Stage Bracket 32 A to the respective Rosette of the Vertical Post at plank level, then place the planks. When it is needed, the longitudinal side protection is comprised of a Vertical Post 100, Tube Ledgers and Toe Boards. The end of the scaffold is secured by two Tube Ledgers with a Steel Toe Board Trans. Close the gap in the side protection with two 0.50 m tubes, with two couplers each.



1. Vertical Post
2. Stage Bracket 32 A
3. Vertical Post 100
4. Scaffold Retainer
5. Steel Plank
6. Steel Plank Trans
7. Scaffold tube
8. Lifting Retainer
9. Bolt M12x75 (with nut)



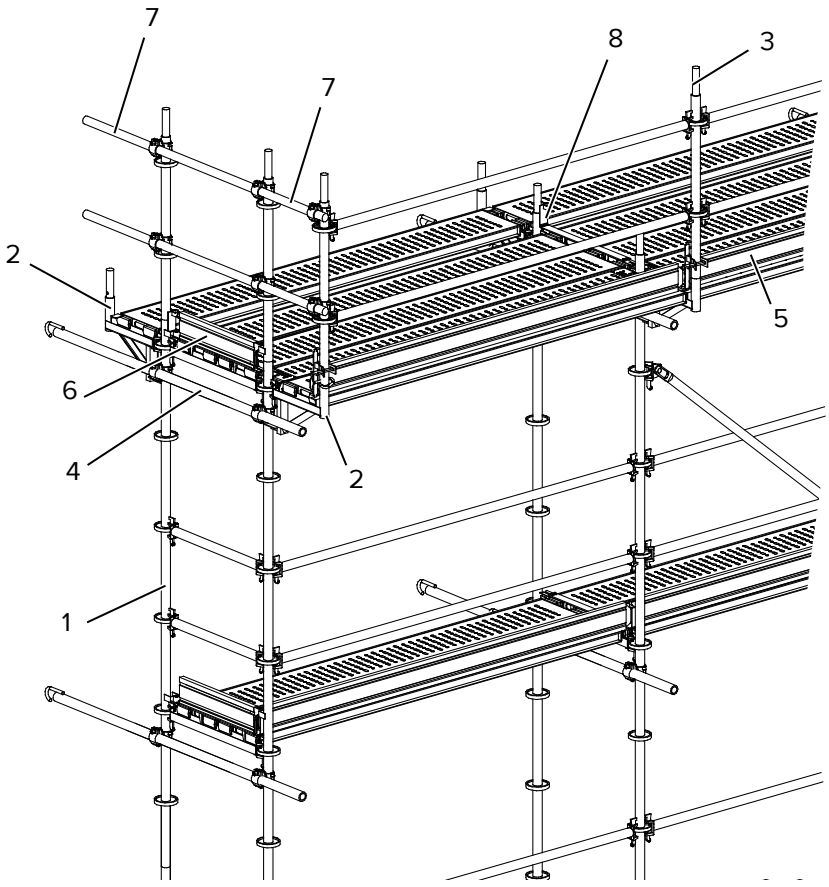
WARNING

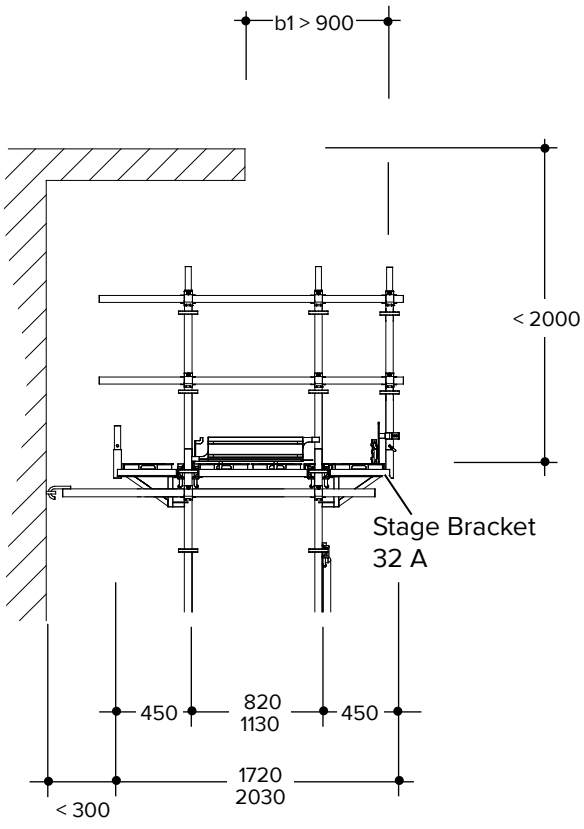
Safety note:

Risk of falling!

With Stage Bracket 32 A on the interior and exterior

Use a Stage Bracket 32 A on both sides to increase the width of the top platform by 146 cm or 177 cm.





1. Vertical Post
2. Stage Bracket 32 A
3. Vertical Post 100
4. Scaffold Retainer
5. Steel Plank
6. Steel Plank Trans
7. Scaffold tube

Unless stated otherwise, all dimensions in mm.

WARNING

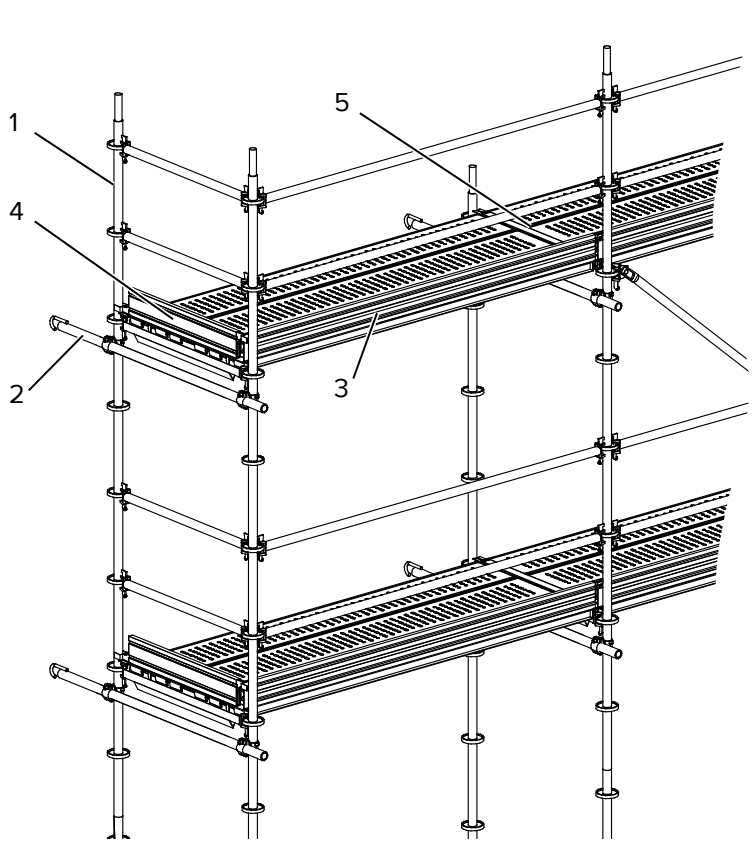
Safety note:
Use a Bolt M12x75 with nut or a Ø 12 Frame Pin to secure the Vertical Post 100!

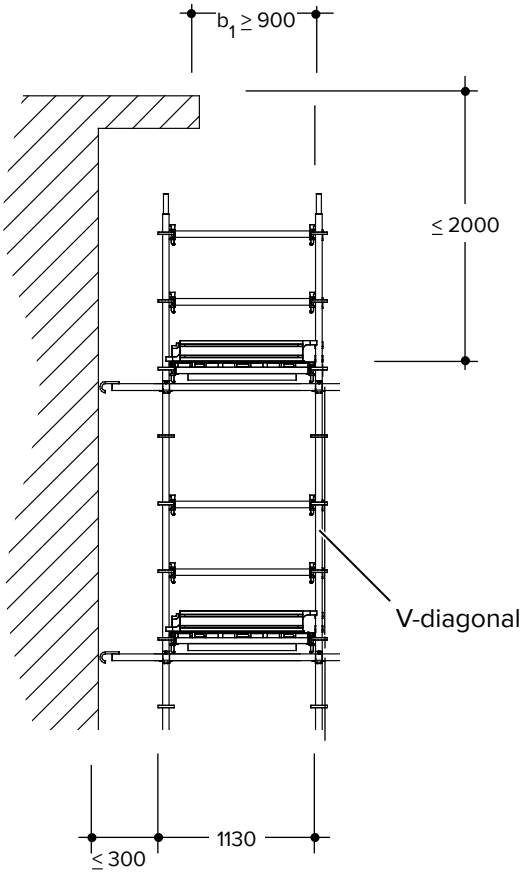
WARNING

Safety note:
Risk of falling!

Without Stage Bracket on the interior and exterior

Use Lifting Retainers to secure the planks. When it is needed, the longitudinal side protection is comprised of a Vertical Post 100, Tube Ledgers and Toe Boards. The end of the scaffold is secured by two Tube Ledgers with a Steel Toe Board Trans.





1. Vertical Post
2. Scaffold Retainer
3. Steel Plank
4. Steel Plank Trans
8. Lifting Retainer

WARNING

Safety note:
If the edge of the building has an overhang, the distance b1 between

the edge of the building and the interior side of the side protection must be at least 0.90 m.

9.7 Protective roof scaffold with safety net

When using the MODEX scaffold as a protective roof scaffold, the vertical distance between the eaves and the uppermost platform may not exceed 1.50 m. And the distance b_1 between the eaves and the interior side of the side protection must be at least 0.70 m. The protective wall has to protrude beyond the eaves by at least h_1 = 1.50 m - b_1 [specified in m]. Comply with regulations on occupational health and safety when using the scaffold as a protective roof scaffold. Safety nets may be used with the protective roof scaffold. Bay lengths up to 3.0 m can be achieved when safety nets are used. Connect three Tube Ledgers to the top, middle and bottom MODEX Rosette of the Vertical Post to then attach the safety nets. Install a Toe Board between the Tube Ledger and the plank to close the gap. Safety nets with a maximum mesh size of 100 mm have to fulfil the requirements of EN 1263, Parts 1 and 2, “Safety nets; safety requirements, test methods.” Thread the safety net onto the upper and lower guard rail, one loop at a time.

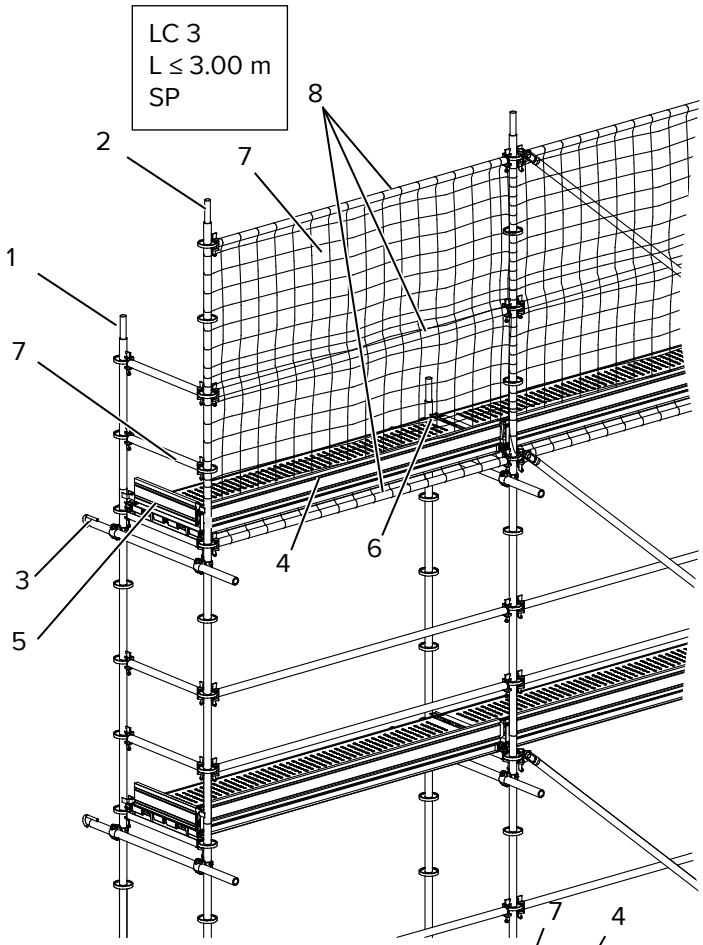
Not widening the scaffold

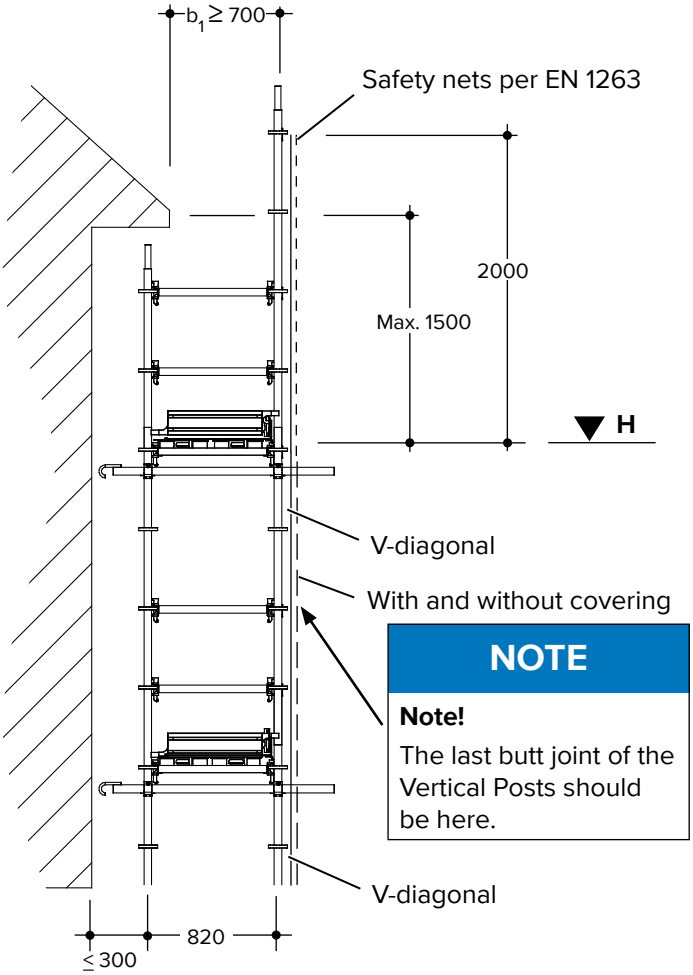
Secure the top level of the scaffold by attaching side protection consisting of a 2.00 m high wall made of a MODEX Post with three Tube Ledgers and a safety net attached to it. Secure the ends of the scaffold with two Tube Ledgers and a Toe Board 82 or 113 Trans. Tie the scaffold completely at the top level and next-lower level.

WARNING

Safety note:

Risk of falling!

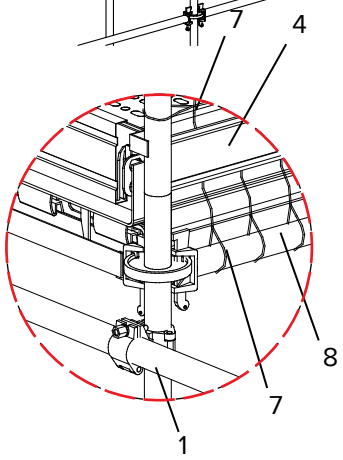




NOTE

Note!

The last butt joint of the Vertical Posts should be here.



Covering	Façade	Scaffold height H
Without		44.0 m
With net		44.0 m
With tarp		52.0 m

Standard tying:

- Without covering and with nets, 4.00 m continuous, V-diagonals in lowest frame.
- With tarp, 2.00 m continuous

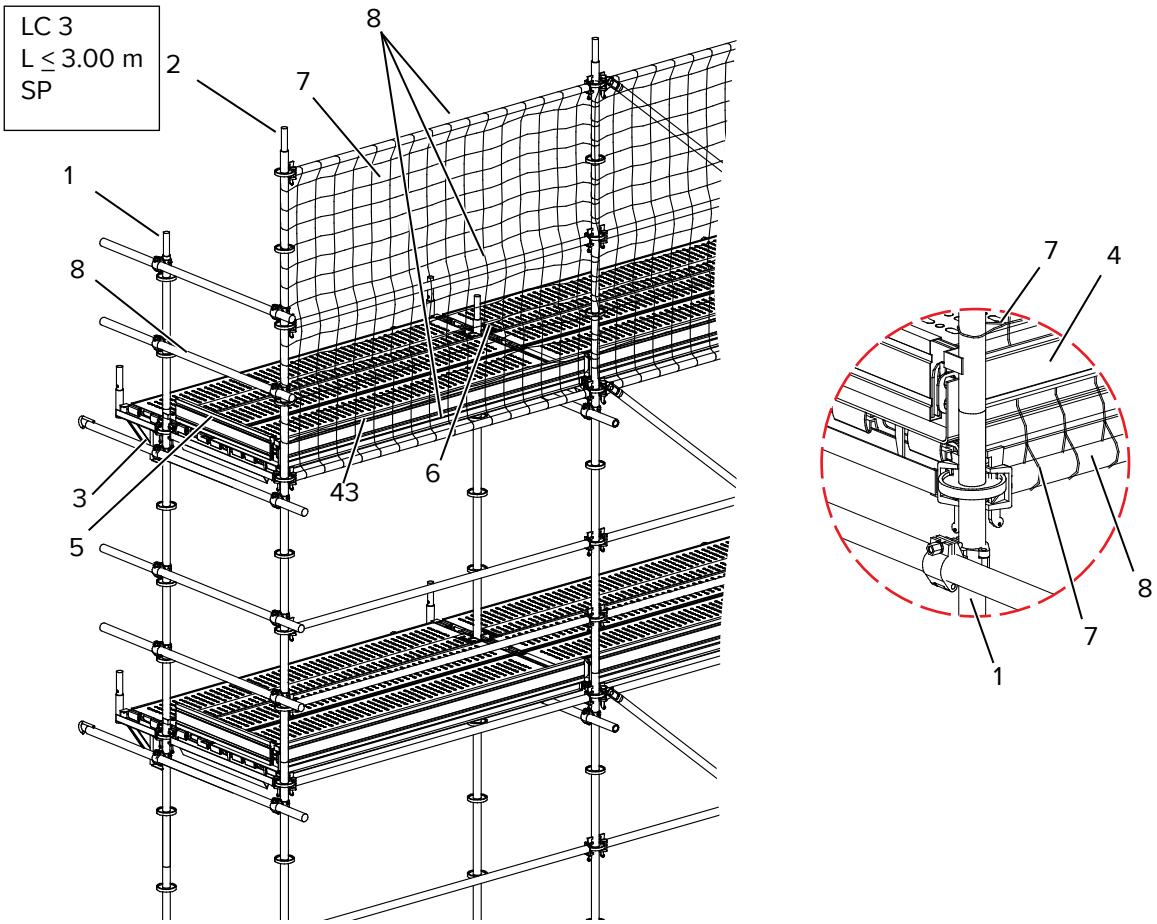
1. Vertical Post
2. Vertical Post 300
3. Scaffold Retainer
4. Steel Plank
5. Steel Plank Trans
6. Lifting Retainer
7. Safety net
8. Tube Ledger

Unless stated otherwise, all dimensions in mm.

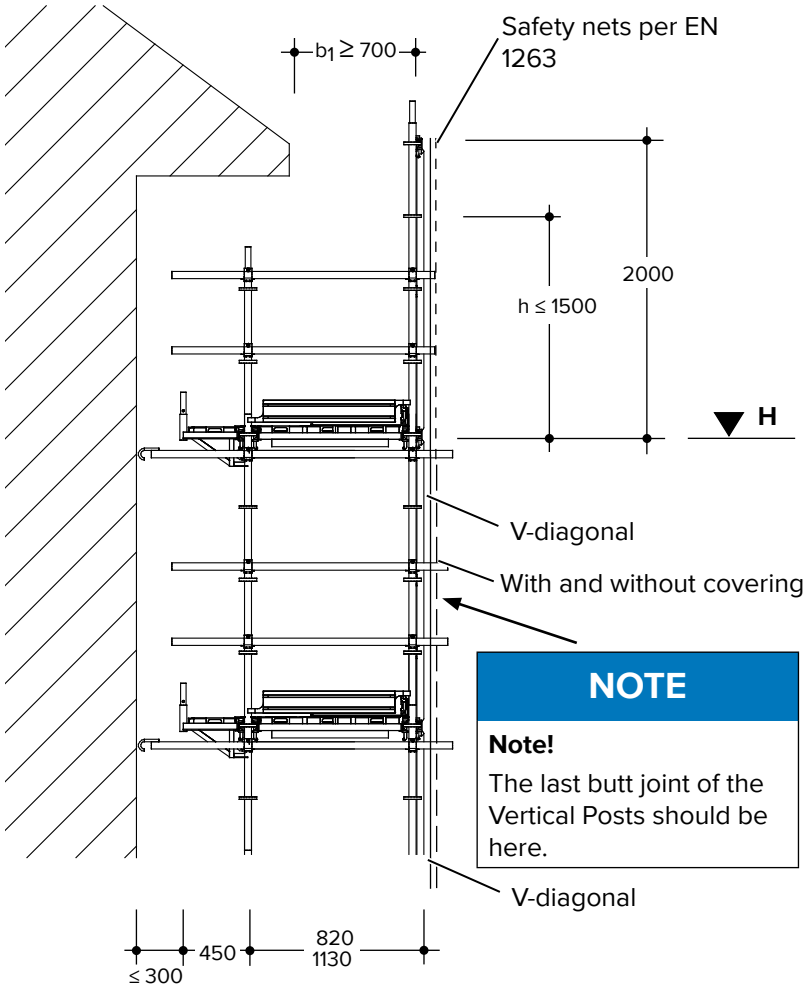
With Stage Bracket 32 A on the interior

Because the eaves protrude beyond the edge of the building, the uppermost platform has to be widened in order to maintain the minimum distance of 70 cm between the eaves and the protective wall. Use the Stage Bracket 32 A to extend the uppermost platform to be able to accommodate overhangs up to 118 cm. Install the Stage Bracket facing the building wall to increase the platform width to 158 cm. Install a protective wall, 2.00 m high at the uppermost scaffold deck to serve as side protection. The wall is comprised of a MODEX Post to which three Tube Ledgers with safety nets are attached.

Secure the ends of the scaffold with two Tube Ledgers and a Toe Board 113 Trans. Secure the end of the scaffold with two Tube Ledgers, a Steel Toe Board 113 and two tubes 50 with one coupler[1)] each. Tie the scaffold completely at the top level and next-lower level.



Unless stated otherwise, all dimensions in mm.



Covering	Façade	Scaffold height H
Without		44.0 m
With net		44.0 m
With tarp		52.0 m

NOTE

Note!

The last butt joint of the Vertical Posts should be here.

Standard tying:

- Without cover and with nets, 4.00 m continuous, V-diagonals in lowest frame.
- With tarp, 2.00 m continuous

WARNING

Safety note:

Risk of falling!

[1] Use only couplers that comply with EN 74-1.

With Stage Bracket 82 A on the exterior

When the overhang (eaves) is substantial, the scaffold may need to be widened to maintain the minimum distance dictated by DIN 4420. Use the Stage Bracket 82 A to extend the uppermost platform to be able to accommodate overhangs up to 155 cm.

Set up the 2.00 m high protective wall as described above. Use Lifting Retainers to hold the planks on the uppermost level in place. Side protection at the end of the scaffold is made up of four Tube Ledgers, one Steep Toe Board 113 and one Steel Toe Board 82.

In the roof protection area, tie the scaffold at the insertion and support points of the Stage Bracket.

WARNING

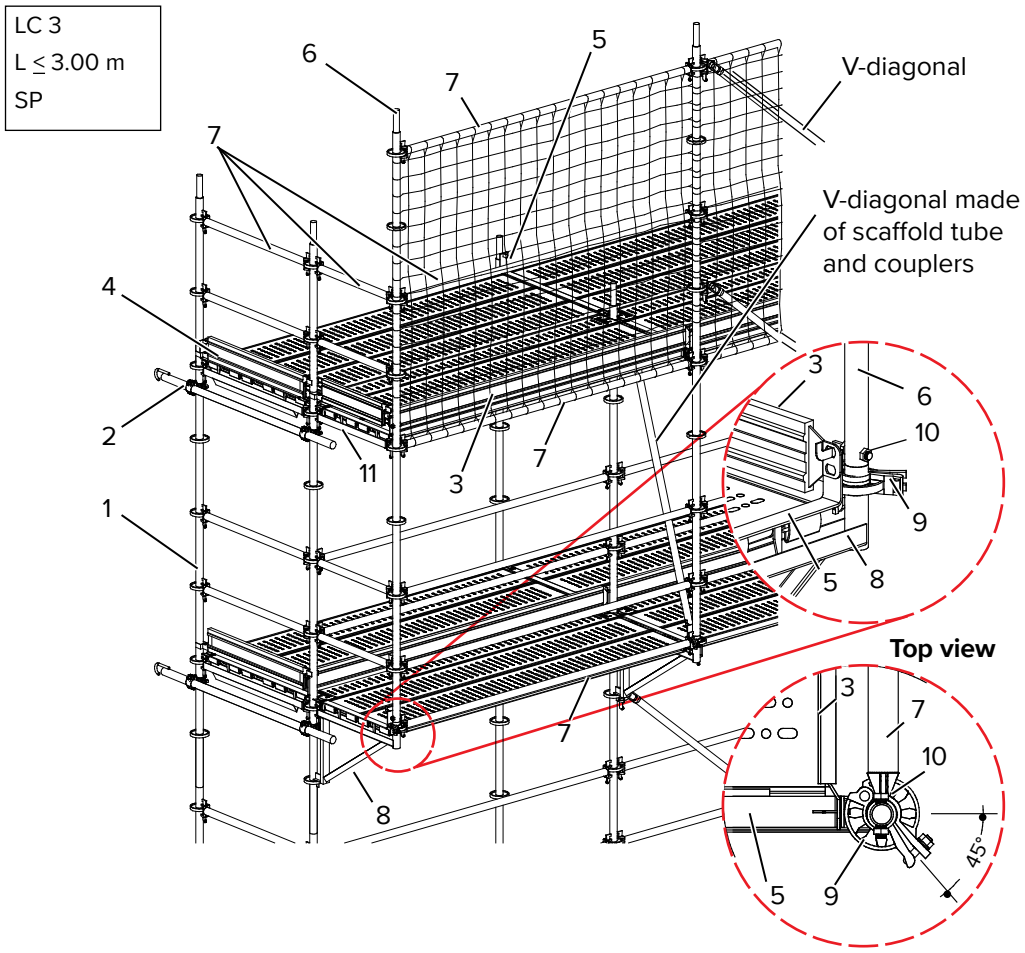
Safety note:

Risk of falling!

NOTE

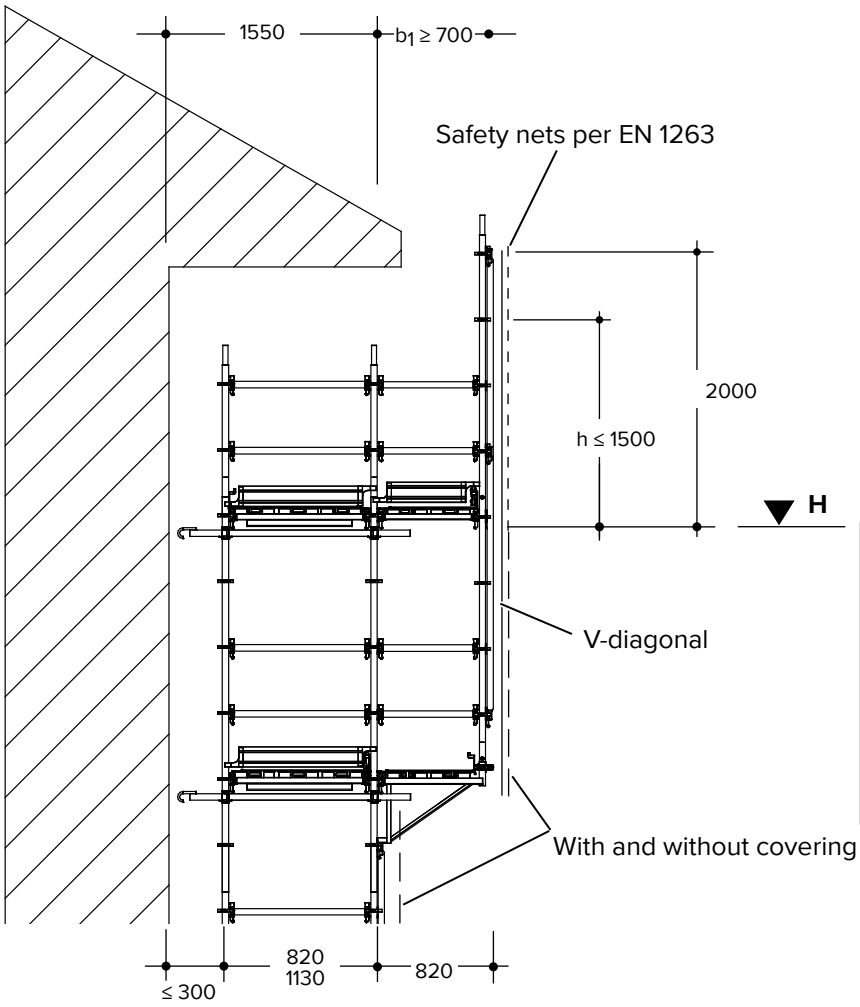
Note!

Rotate the Vario Attachment Plate 45°. (Refer to Detail, top view)!



1. Vertical Post
2. Scaffold Retainer
3. Steel Plank / Toe Board
4. Steel Plank Trans
5. Lifting Retainer 113
6. Vertical Post 400
7. Tube Ledger
8. Stage Bracket 82 A
9. Vario Attachment Plate
10. Bolt M12x75 (with nut)
11. Transom 82U

Unless stated otherwise, all dimensions in mm.



Covering	Façade	Scaffold height H
Without		28.0 m
With net		28.0 m
With tarp		44.0 m

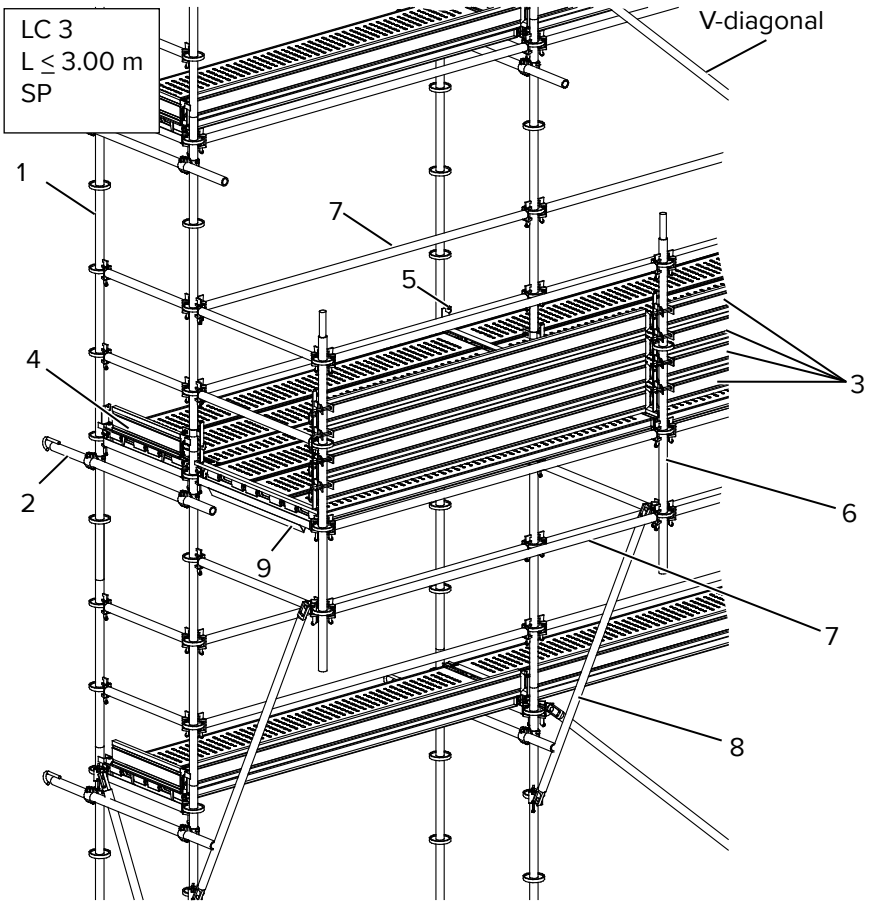
Standard tying:

- Without covering and with nets, 4.00 m continuous, V-diagonals in lowest frame.
- With tarp, 2.00 m continuous

9.8 Use as protective roof

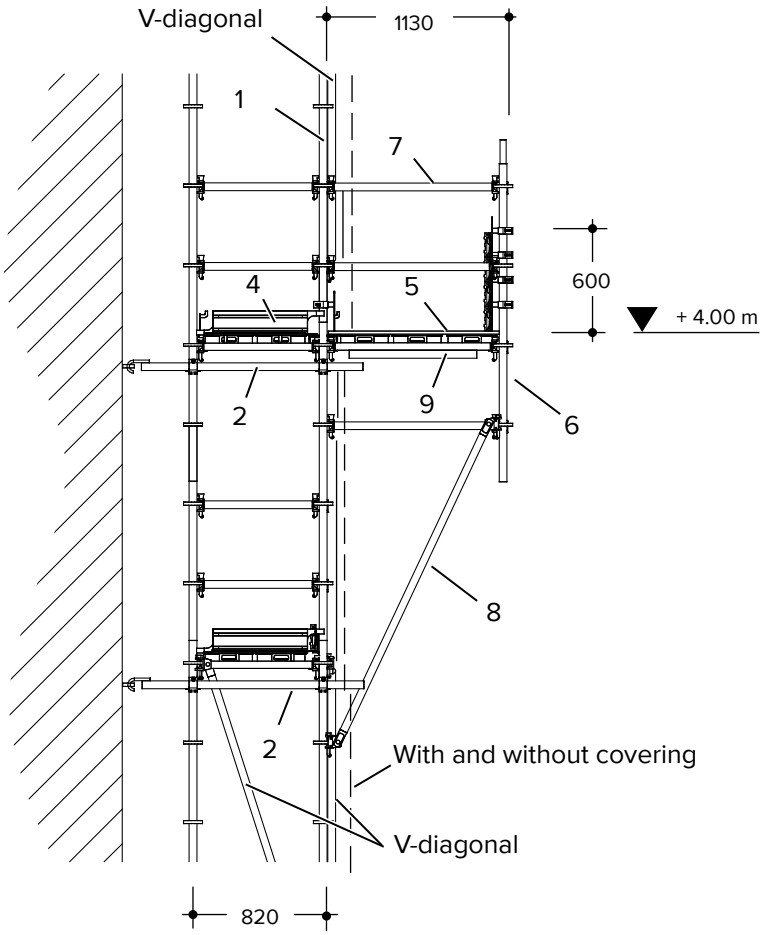
A protective roof can be installed on a MODEX scaffold at a height greater than 4.00 m to protect from falling objects.

The protective roof is not a working platform and must be separated from the scaffold. Connect the Transom 13/12.6 U to the Vertical Post and use a V-diagonal 200/113 to support it. The Vertical Post 200 connects the V-diagonal 200/113 to the Transom 113/12.6 U and, along with the Steel Toe Board, forms the side protection. Use Lifting Retainers to secure the planks. In the protective area, tie the scaffold at the insertion and support points.



1. Vertical Post
2. Scaffold Retainer
3. Steel Plank
4. Steel Plank Trans
5. Lifting Retainer
6. Vertical Post 200
7. Tube Ledger
8. V-diagonal 200/150
9. Transom 113/12.6 U

Unless stated otherwise, all dimensions in mm.



Covering	Façade	Scaffold height H
Without		44.0 m
		42.0 m
With net		44.0 m
With tarp		50.0 m

Standard tying:
- Without covering and with nets, 4.00 m continuous, V-diagonals in lowest frame.
- With tarp, 2.00 m continuous

WARNING

Safety note:
Risk of falling!

Unless stated otherwise, all dimensions in mm.

10 Industrial scaffolds

10.1 General information

The MODEX scaffold system is particularly well suited to the erection of birdcage scaffolds. And MODEX is ideal for industrial purposes. The following pages describe various ways to erect the standard MODEX scaffold for industrial purposes. Proof of the scaffold's structural integrity has already been provided for this type of erection.

The maximum erection height for the individual erection options is specified as a factor of the erection type, the load capacity and the bay length. The tying forces for the various ways in which the scaffold can be anchored are also indicated.

Refer to Table 10.1 for the specifications applicable to the various erection options. Proof as required pursuant to EN 12810 and EN 12811 is available on site.

WARNING

Safety note:

Always comply with the instructions regarding the use of Lifting Retainers contained in section 6.10!

Table 10.1 (All dimensions in [m])

	Erection option	Load	Bay length Bay width	Special features	H_{max}
Free-standing tower scaffold (10.2)	①	LC 3	L ≤ 2.50/2.50	Indoors	12
	②	LC 3	L ≤ 2.50/2.50	Outdoors	8
Free-standing tower scaffolds with cantilevers (10.3)	③	LC 3	L ≤ 2.50/a	k ≤ 2.50	8
	④	LC 3	L ≤ 2.50/a	k ≤ 0.82	8
Tower scaffold fixed at head (10.4)	⑤	LC 3	L ≤ 2.50/a		62
		LC 3	L ≤ 2.50/a		48
		LC 3	L ≤ 2.50/a		43
Scaffold towers bridged with lattice girders (10.5)	⑥	LC 3	L ≤ 2.50/a	Commercially available	4
	⑦	LC 3	L ≤ 2.50/a	System-oriented	4
Birdcage scaffold (10.6)	⑧	LC 3	L ≤ 2.50	Indoors	12
	⑨	LC 3	L ≤ 2.50	Outdoors	8

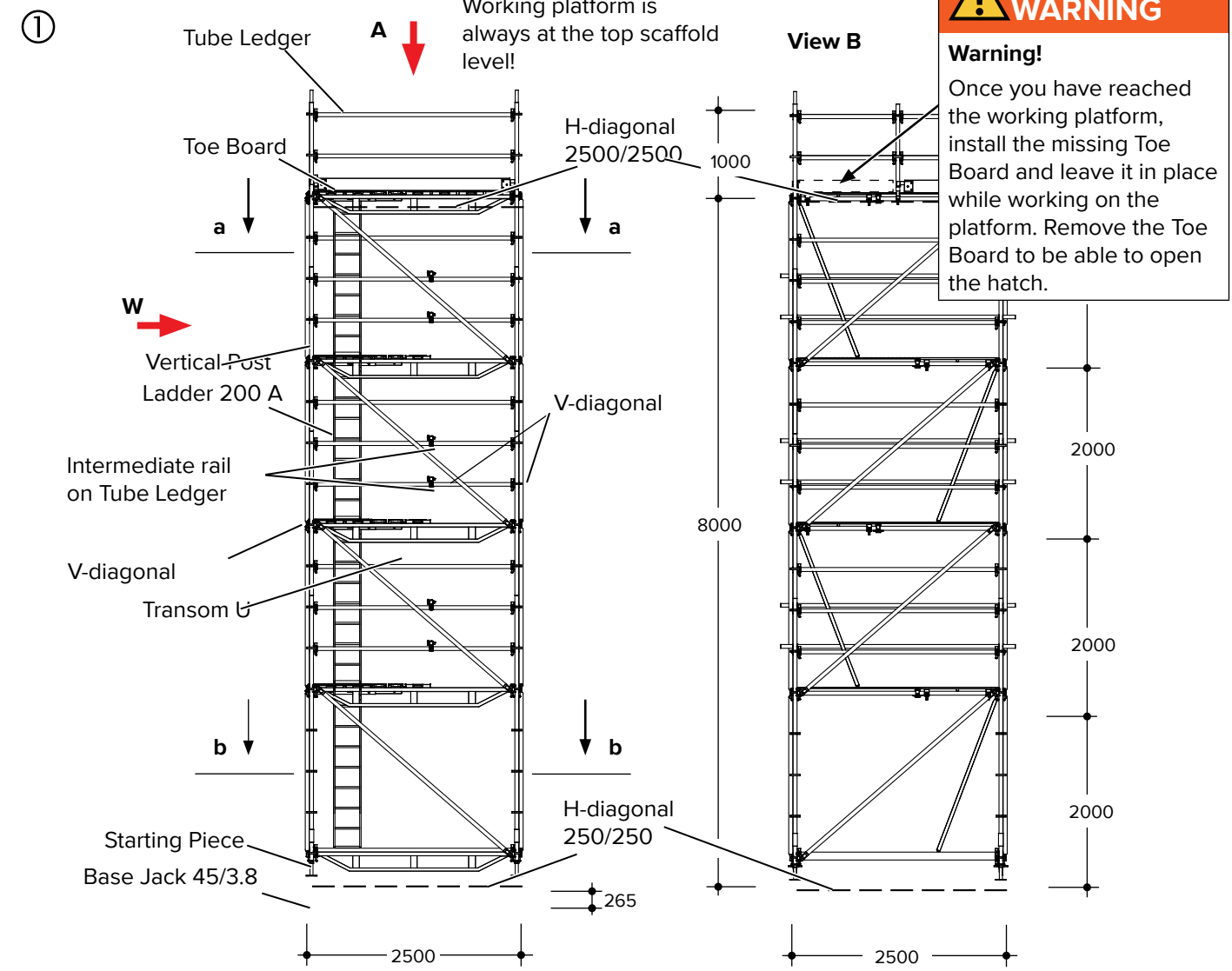
a = bay width
k = cantilever length

WARNING

Safety note:

Individual installation conditions should be examined separately!

10.2 Free-standing tower scaffolds ①

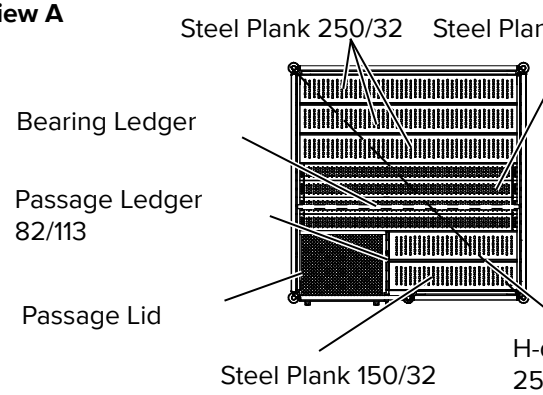


WARNING

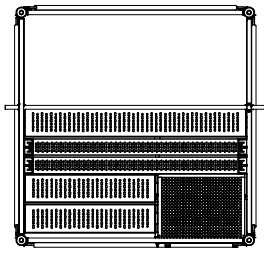
Warning!

Once you have reached the working platform, install the missing Toe Board and leave it in place while working on the platform. Remove the Toe Board to be able to open the hatch.

View A



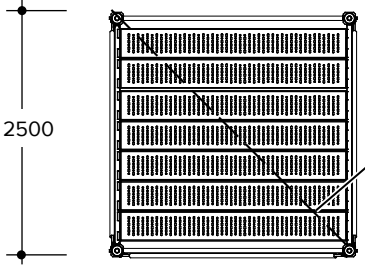
Cross-section a – a



Alternatively without intermediate rail, but access bay covered with steel planks.

Intermediate rail for interior ladder = Tube Ledger 48.3 x 3000 and rigid coupler

Cross-section b – b



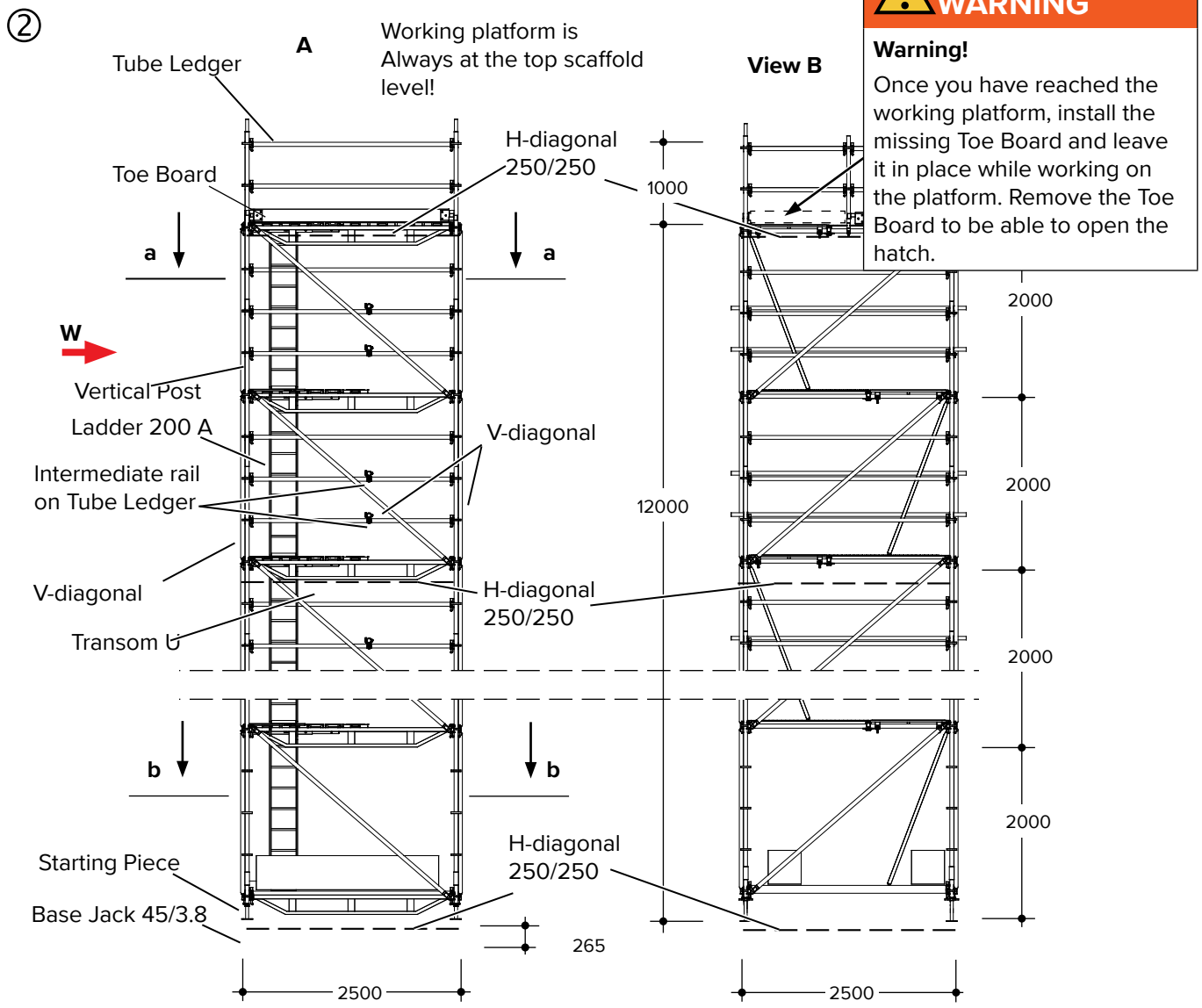
Indoors

Max. post load = 8.00 kN

LC 3
p = 2.00 kN/m²

Unless stated otherwise, all dimensions in mm.

10.3 Free-standing tower scaffolds ②

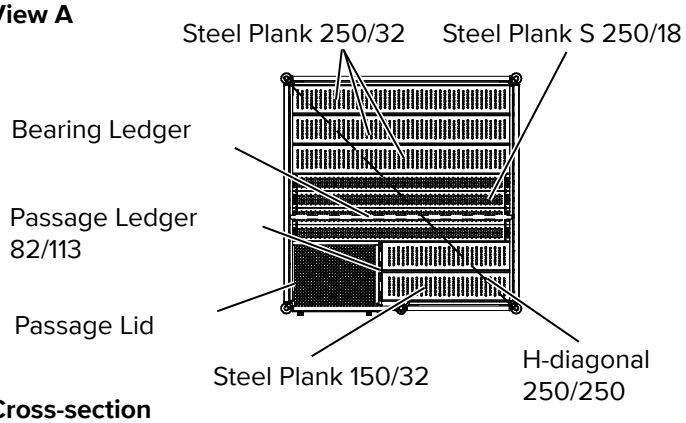


WARNING

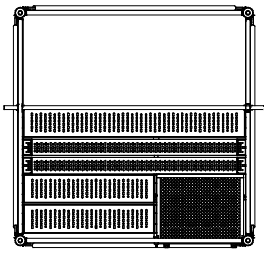
Warning!

Once you have reached the working platform, install the missing Toe Board and leave it in place while working on the platform. Remove the Toe Board to be able to open the hatch.

View A



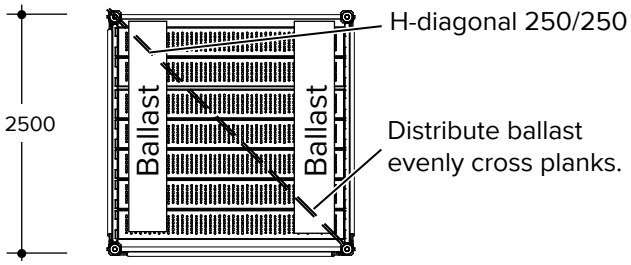
Cross-section a – a



Alternatively without intermediate rail, but access bay covered with steel planks.

Intermediate rail for interior ladder = Tube Ledger 48.3 x 3000 and ...

Cross-section b – b



Outdoors

Ballast = 22.5 kN
Max. post load = 8.00 kN

LC 3
p = 2.00 kN/m²

Unless stated otherwise, all dimensions in mm.

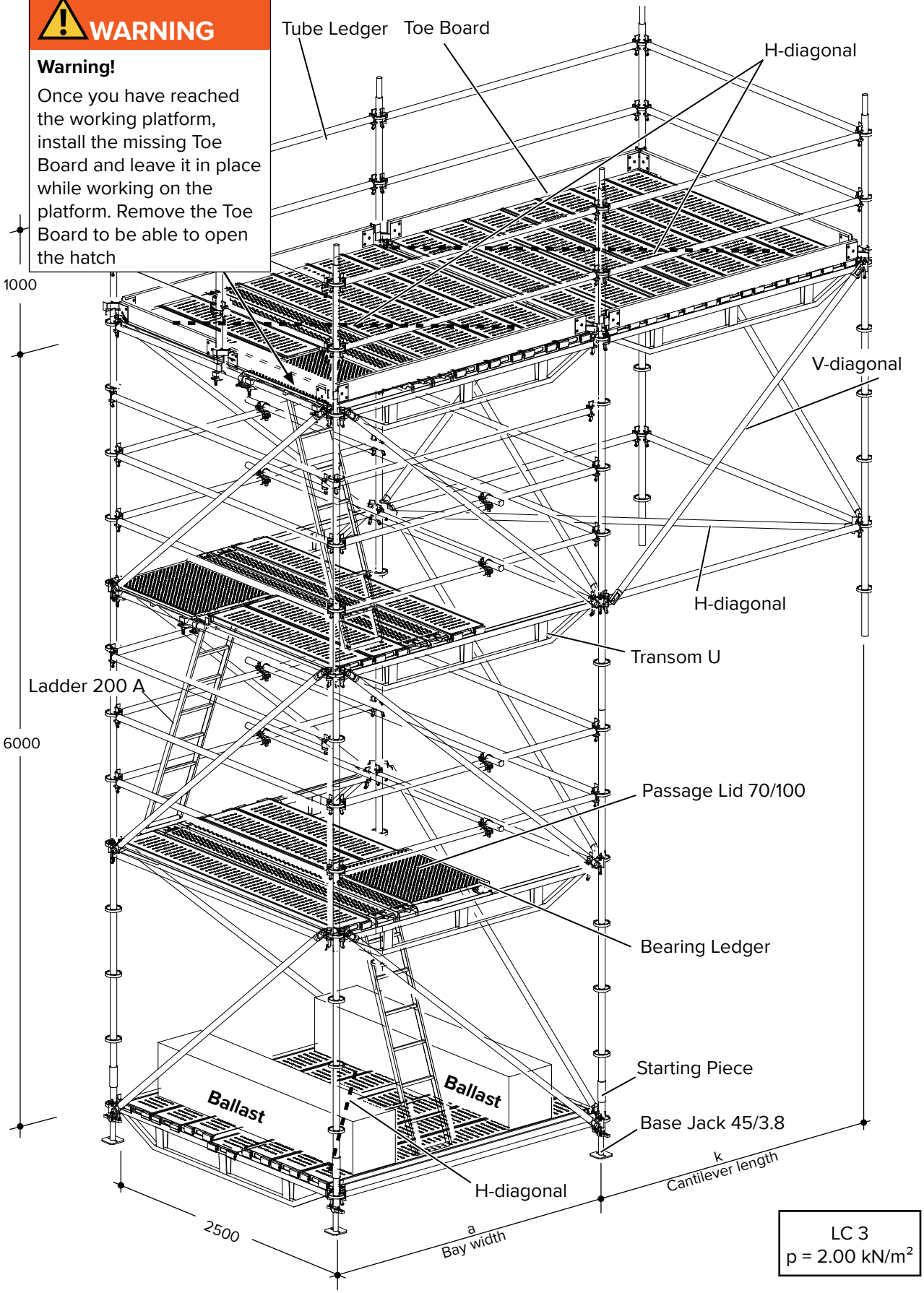
10.4 Free-standing tower scaffolds with cantilever ③

③

WARNING

Warning!

Once you have reached the working platform, install the missing Toe Board and leave it in place while working on the platform. Remove the Toe Board to be able to open the hatch



Unless stated otherwise, all dimensions in mm.

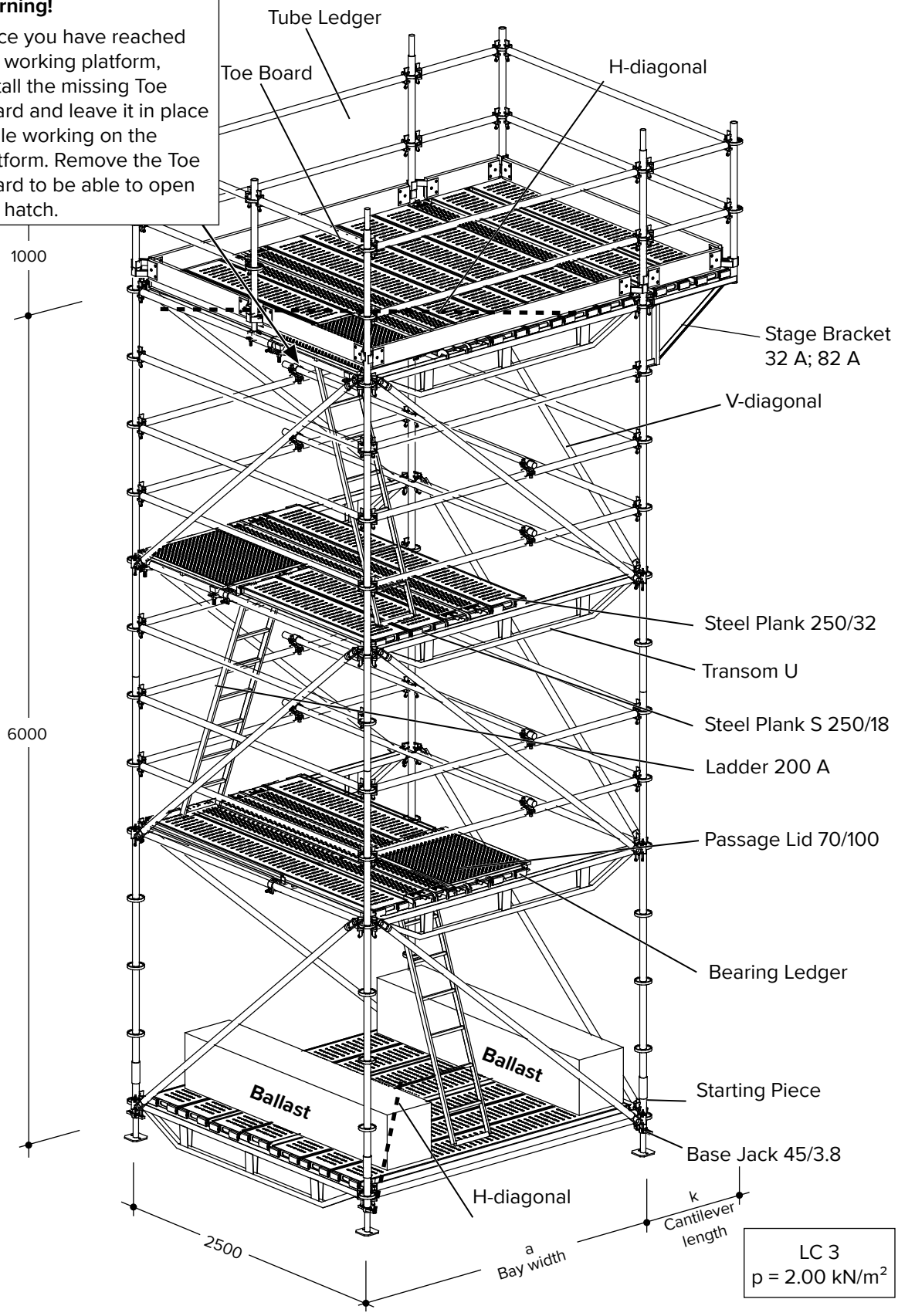
10.5 Free-standing tower scaffolds with cantilever ④

④

WARNING

Warning!

Once you have reached the working platform, install the missing Toe Board and leave it in place while working on the platform. Remove the Toe Board to be able to open the hatch.



Unless stated otherwise, all dimensions in mm.

10.6 Free-standing tower scaffolds with cantilever and ballast

Ballast [kN]				Max. permissible cantilever length
Bay length L = 2.50 m				
a [m]	k [m]	Outdoors[1)]	Indoors[2)]	k_{max} [m]
1.50	**0.45** **0.82**	**27.57** **28.84**	**0.00** **0.00**	0.82
2.00	**0.45** **0.82** **1.13** **1.50**	**17.46** **18.41** **19.84** **22.14**	**0.00** **0.00** **0.00** **1.42**	1.50
2.50	**0.45** **0.82** **1.13** **1.50** **2.00** **2.50**	**10.98** **11.75** **12.89** **14.73** **17.52** **22.41**	**0.00** **0.00** **0.00** **0.00** **4.89** **13.49**	2.50
a = bay width k = cantilever length				
Max. bearing force P = 21.50 kN				

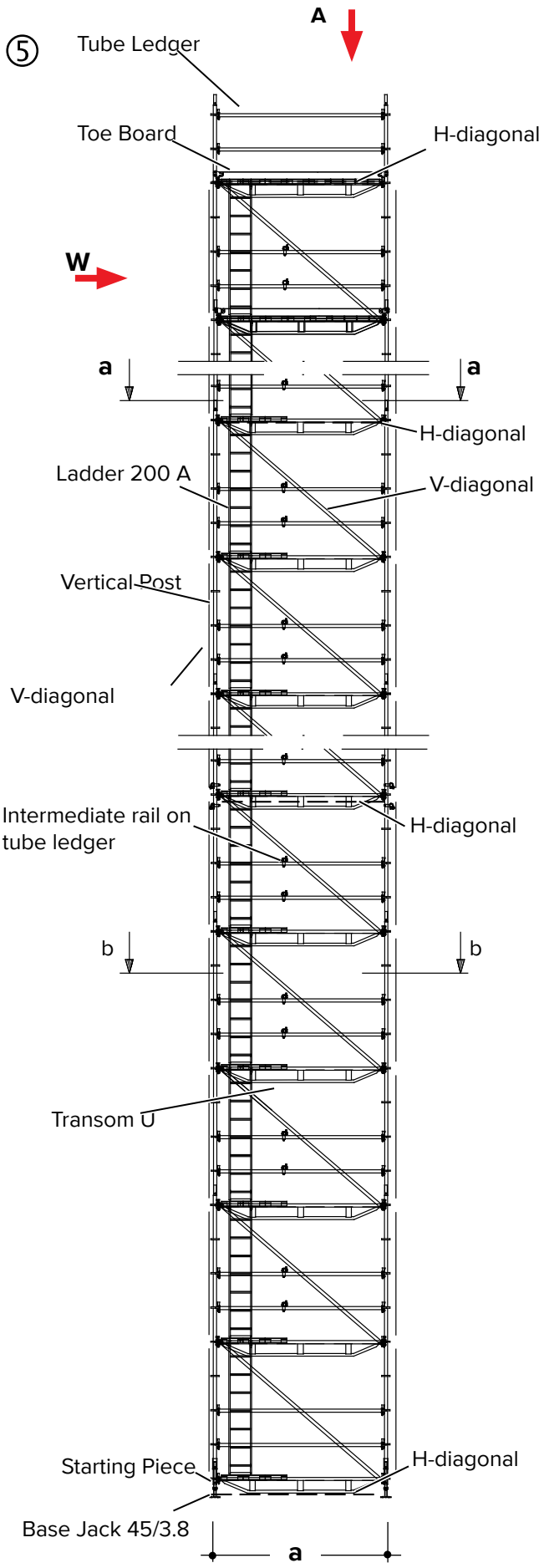
WARNING

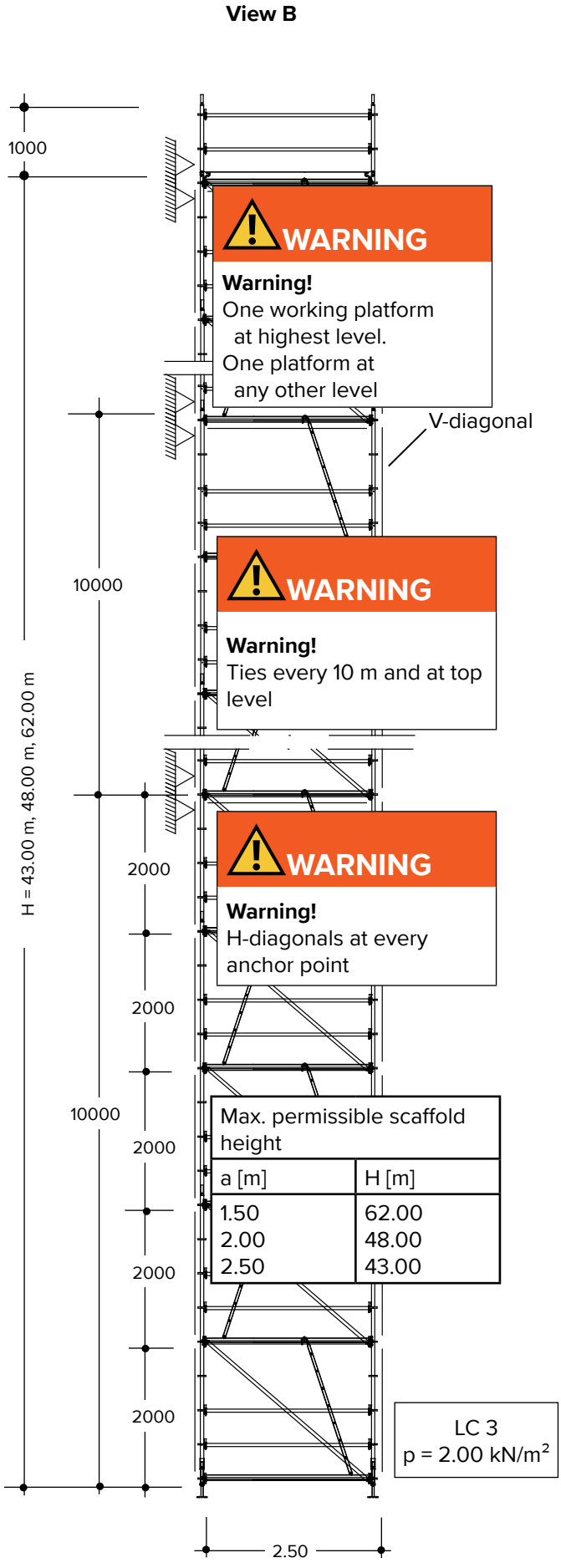
Safety note:

[1)] Max. jack extension 20.0 cm

[2)] Max. jack extension 26.5 cm

10.7 Tower scaffolds fixed at head ⑤

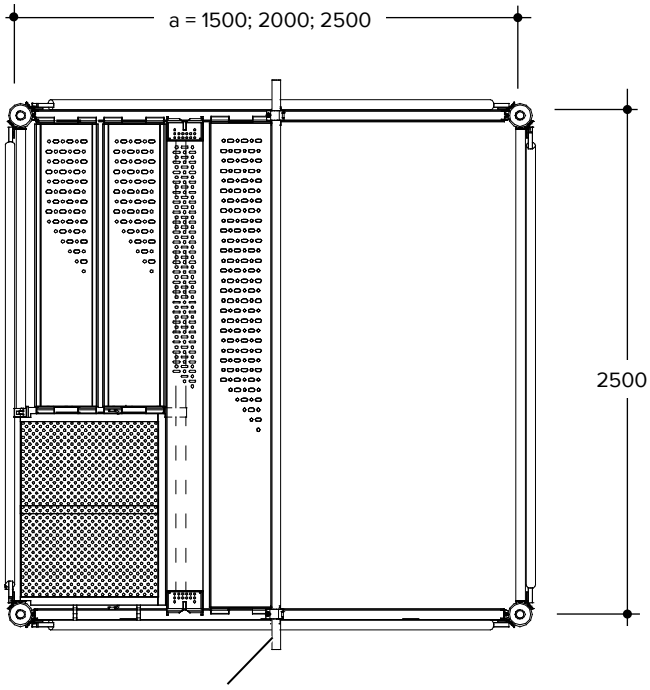




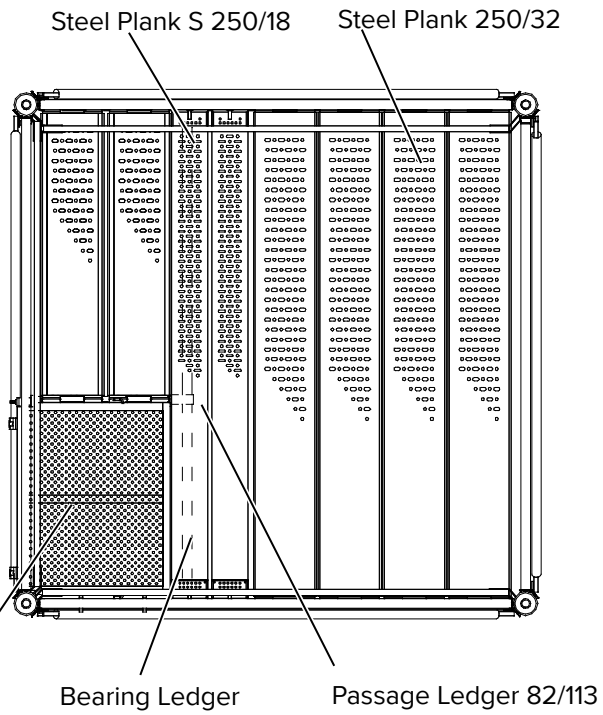
Unless stated otherwise, all dimensions in mm.

⑤

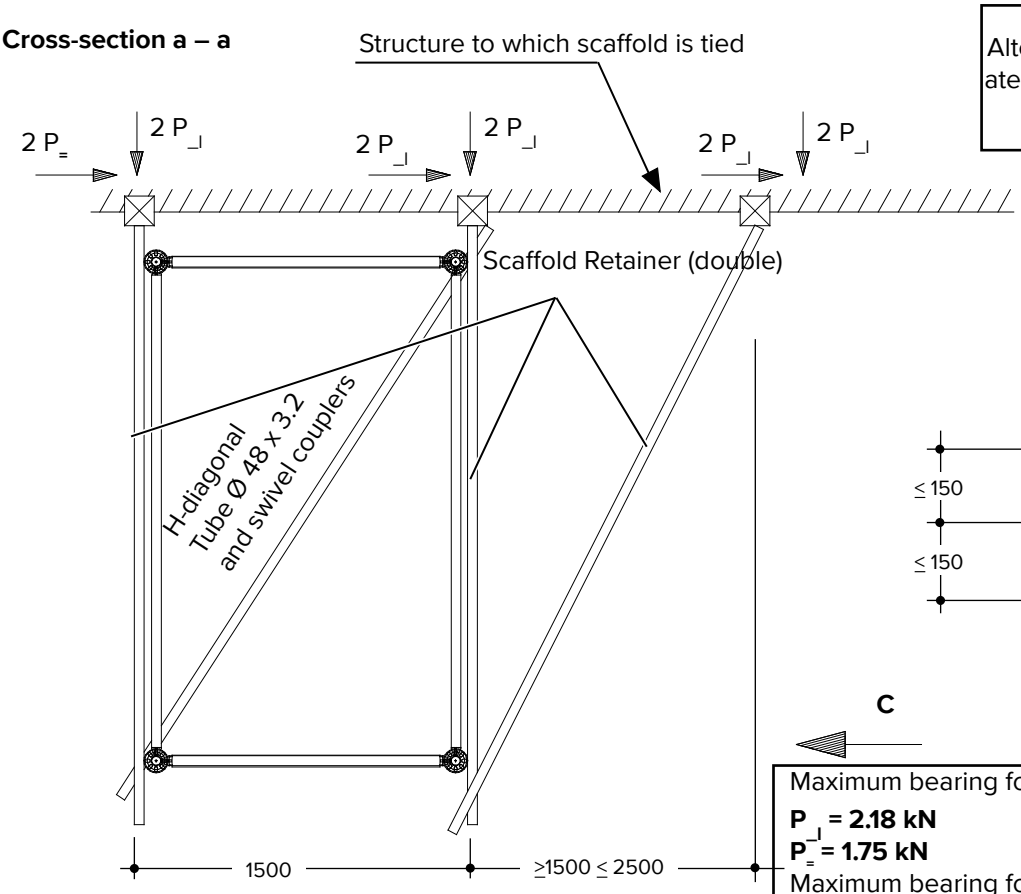
View A



Cross-section b – b

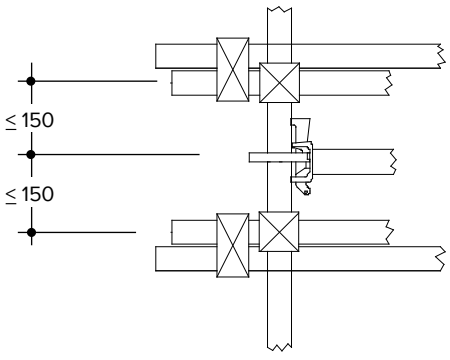


Cross-section a – a



Alternatively without intermediate rail, but access bay covered with steel planks.

View C

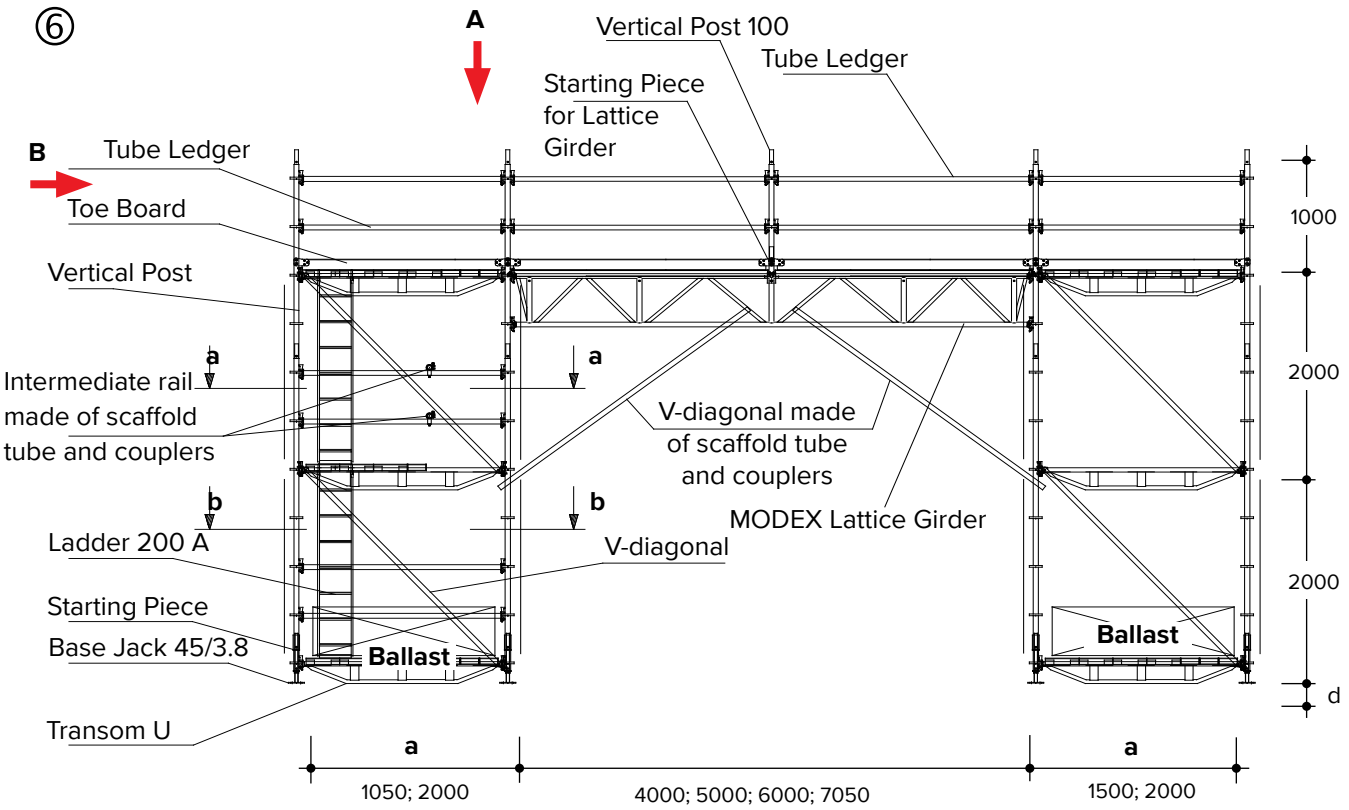


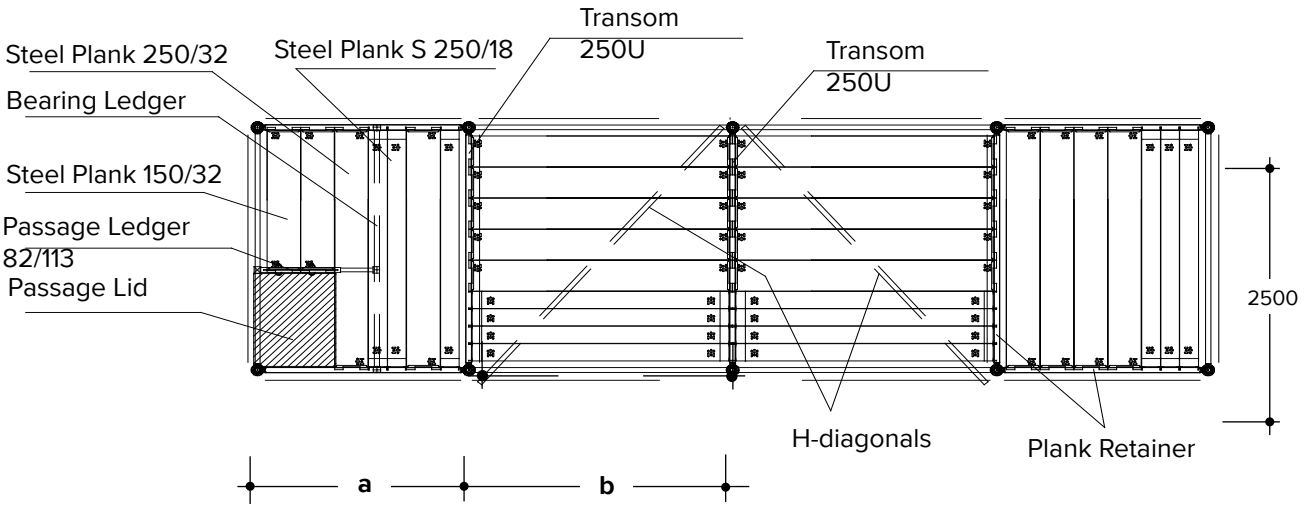
C

Maximum bearing forces per tying point
$P_{⌊}$ = 2.18 kN
$P_{=}$ = 1.75 kN
Maximum bearing force at
base point **P = 25.71 kN**

The tying pattern shown here is the worst-possible case: Tying on the narrow side. Depending on the local conditions, ties on the longitudinal sides l = 2.50 m result in lower bearing forces.

10.8 Scaffold towers bridged with MODEX Lattice Girders ⑥

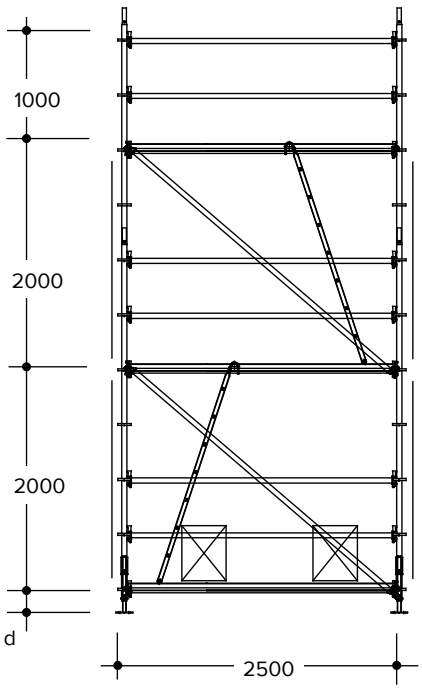




LC 3
p = 2.00 kN/m²

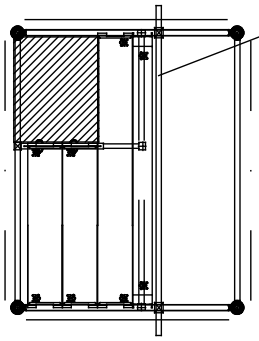
Unless stated otherwise, all dimensions in mm.

View B



Lattice Girder 6.00 m d = 20 cm
Lattice Girder 7.50 m d = 10 cm

Cross-section a – a



Intermediate rail for interior ladder

NOTE

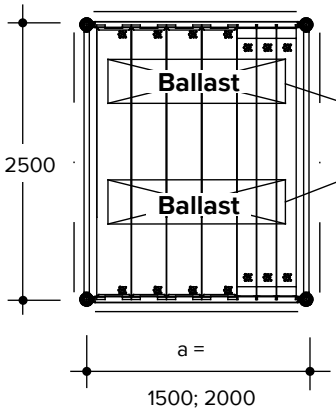
Note!

Alternatively without intermediate rail, but access bay covered with steel planks.

WARNING

Warning!

Distribute ballast evenly across steel planks.

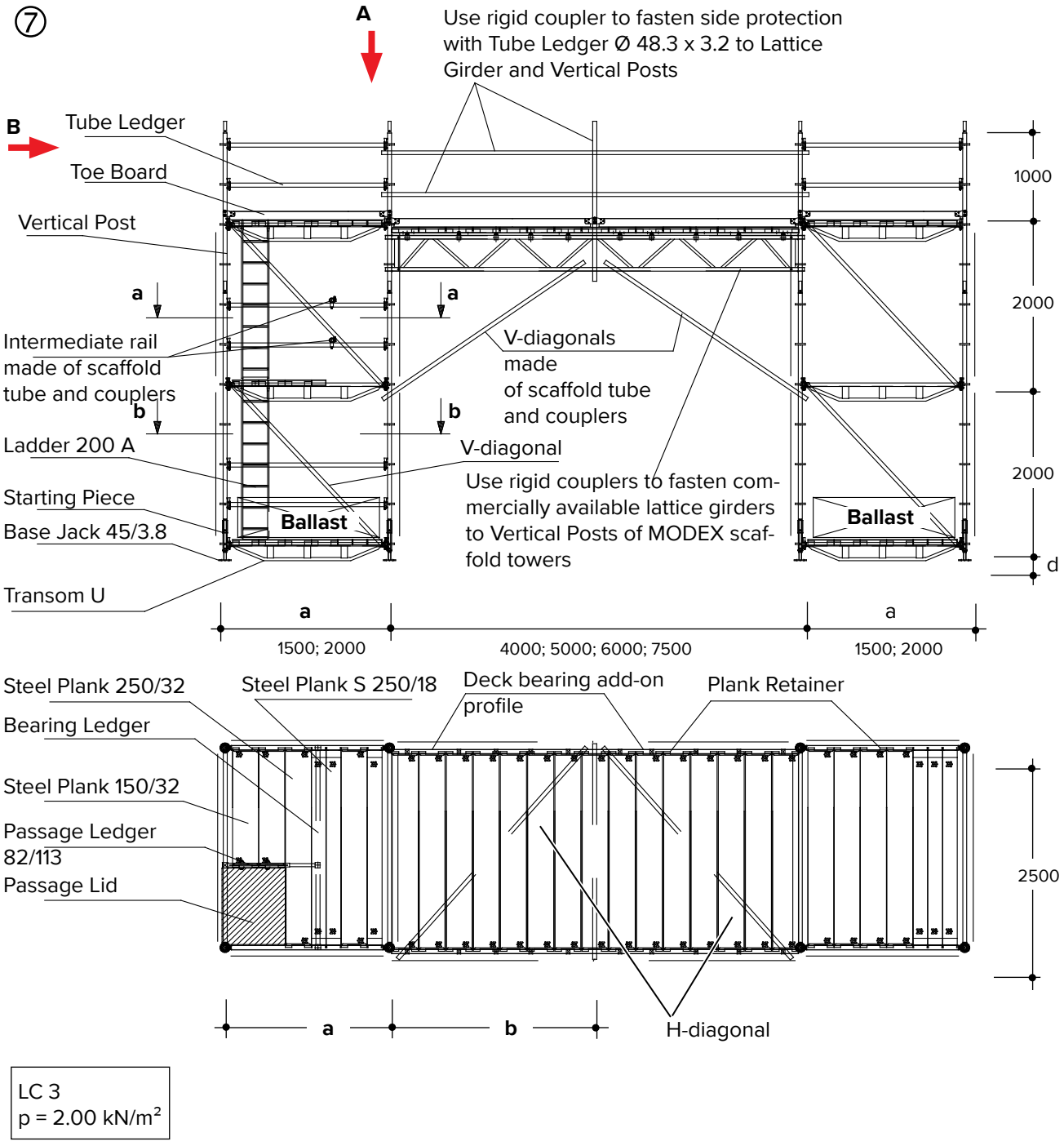


Cross-section b – b

Table 10.3 **All dimensions in [m]**

Outdoor use **Ballast [kN] per tower** **Bay length = 2.50 m**			
Scaffold width a [m]	Lattice Girder	b	Ballast
1.50	**4.00**	**2.00**	**9.47**
	5.00	**2.50**	**11.78**
	6.00	**3.00**	**13.90**
	7.50	**2.50**	**17.09**
2.00	**4.00**	**2.00**	**10.50**
	5.00	**2.50**	**12.81**
	6.00	**3.00**	**14.95**
	7.50	**2.50**	**18.12**
Distribute the ballast evenly across the planks. No ballast is needed when the scaffold is used indoors.			
B = Spacing of stiffeners at upper chord of Lattice Girder			

10.9 Scaffold towers bridged with commercially available lattice girders ⑦

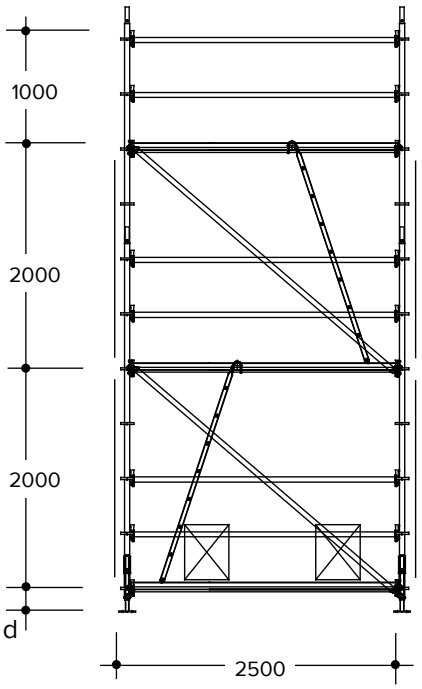


LC 3
p = 2.00 kN/m²

Unless stated otherwise, all dimensions in mm.

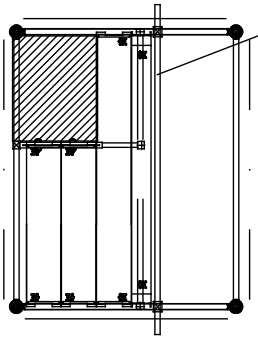
⑦

View B



Lattice Girder 6.00 m d = 20 cm
Lattice Girder 7.50 m d = 10 cm

Cross-section a – a



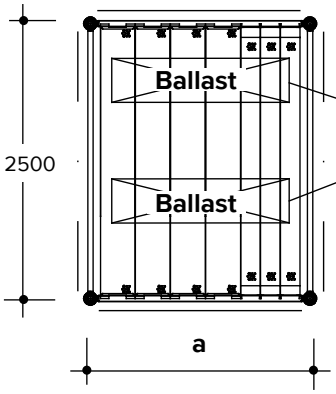
Intermediate rail for interior ladder

NOTE

Note!

Alternatively without intermediate rail, but access bay covered with steel planks.

Cross-section b – b



WARNING

Warning!

Distribute ballast evenly across steel planks.

Table 10.4 **All dimensions in [m]**

Outdoor use **Ballast [kN] per tower** **Bay length = 2.50 m**			
Scaffold width a [m]	Lattice Girder	b	Ballast
1.50	4.00 5.00 6.00 7.50	2.00 2.50 3.00 1.50	9.47 11.78 13.90 17.09
2.00	4.00 5.00 6.00 7.50	2.00 2.50 3.00 1.50	10.50 12.81 14.95 18.12
Distribute the ballast evenly across the planks. No ballast is needed when the scaffold is used indoors.			
Max. post load P = 21.60 kN			
B = Spacing of stiffeners at upper chord of Latice Girder			

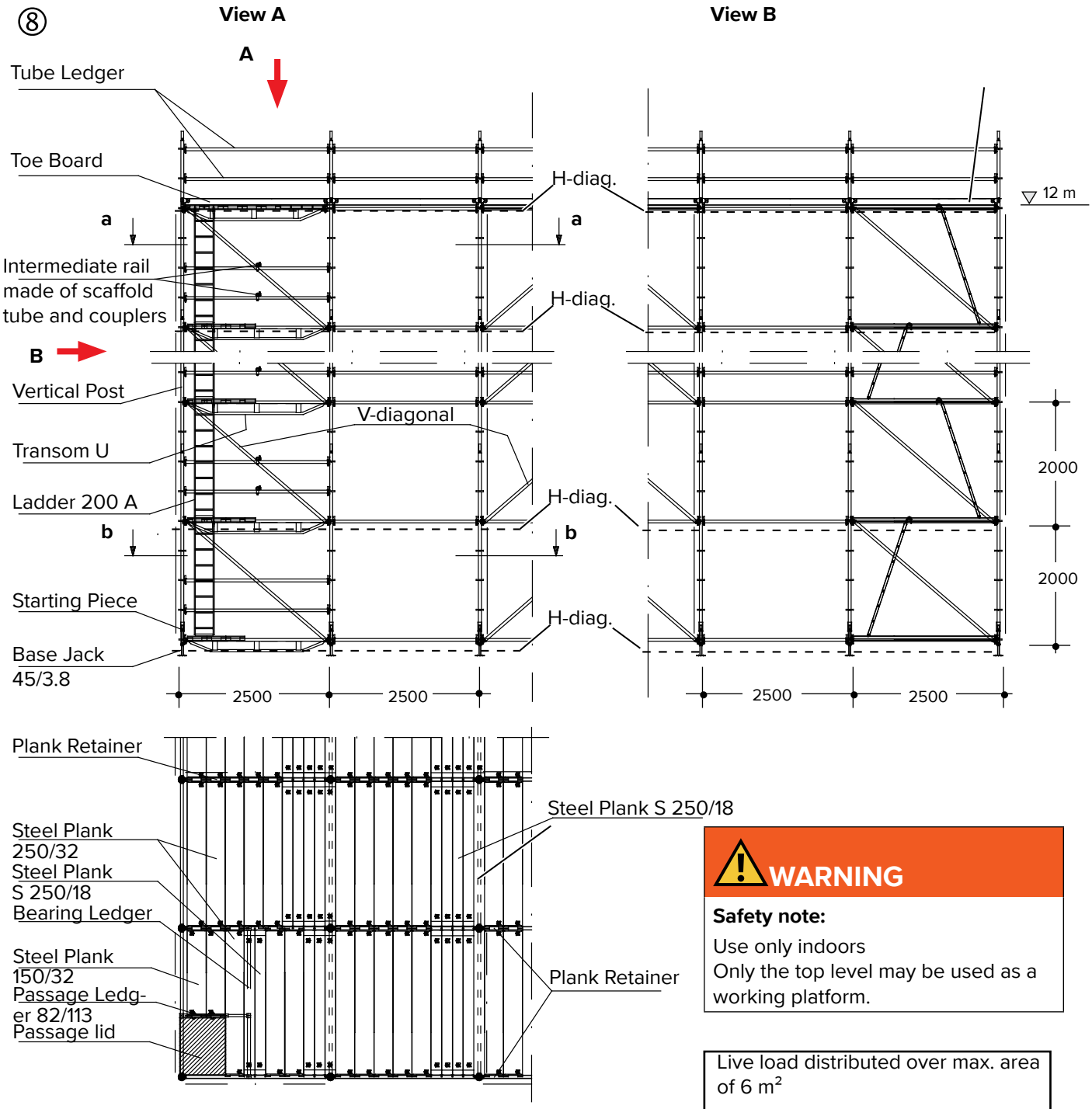
10.10 Birdcage scaffolds ⑧ + ⑨

WARNING

Safety note:

Once you have reached the working platform, install the missing Toe Board and leave it in place while working on the platform. Remove the Toe Board to be able to open the hatch (Passage Lid).

⑧



WARNING

Safety note:

Use only indoors
Only the top level may be used as a working platform.

Live load distributed over max. area of 6 m^2

Max. post load = 23.00 kN

LC 3
p = 2.00 kN/m^2

WARNING

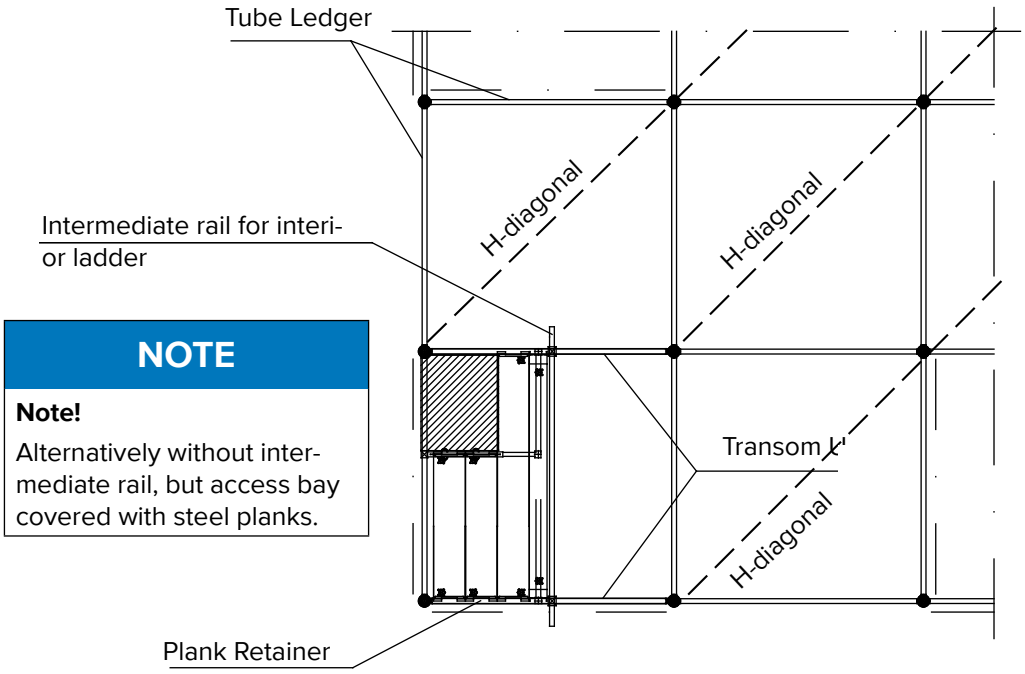
Safety note:

Use only indoors.

Unless stated otherwise, all dimensions in mm.

⑧

Cross-section a – a

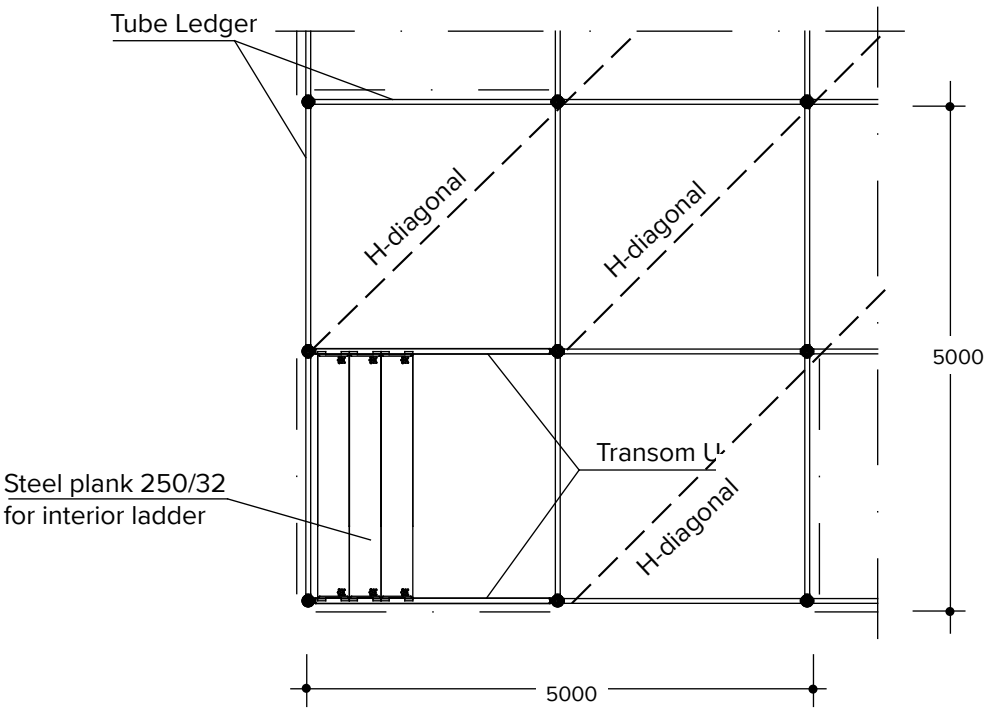


NOTE

Note!

Alternatively without intermediate rail, but access bay covered with steel planks.

Cross-section b – b

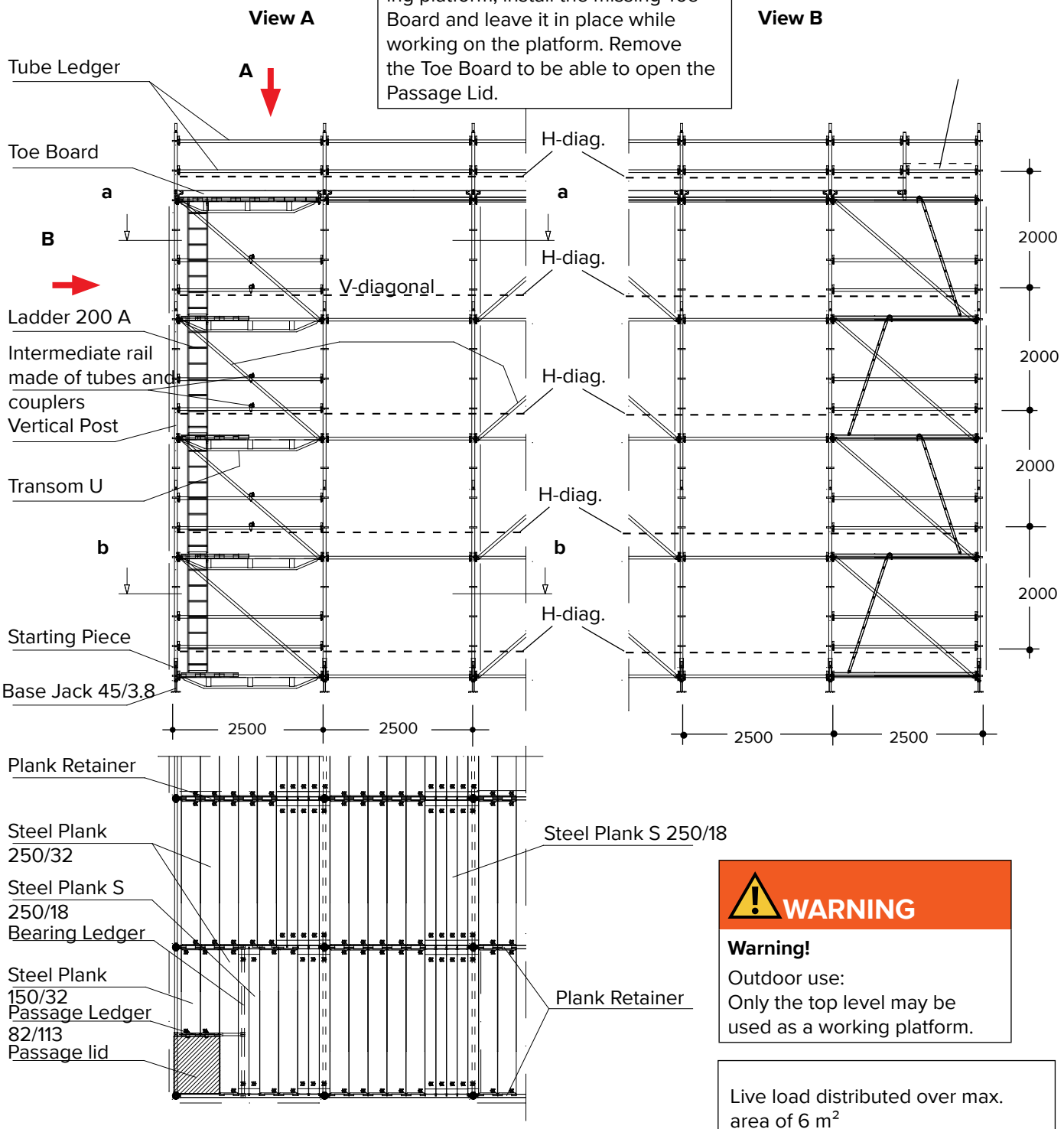


⑨

WARNING

Warning!

Once you have reached the working platform, install the missing Toe Board and leave it in place while working on the platform. Remove the Toe Board to be able to open the Passage Lid.



WARNING

Warning!

Outdoor use:
Only the top level may be used as a working platform.

Live load distributed over max. area of 6 m^2

Max. post load = 8.00 kN

LC 3
p = 2.00 kN/m^2

Unless stated otherwise, all dimensions in mm.

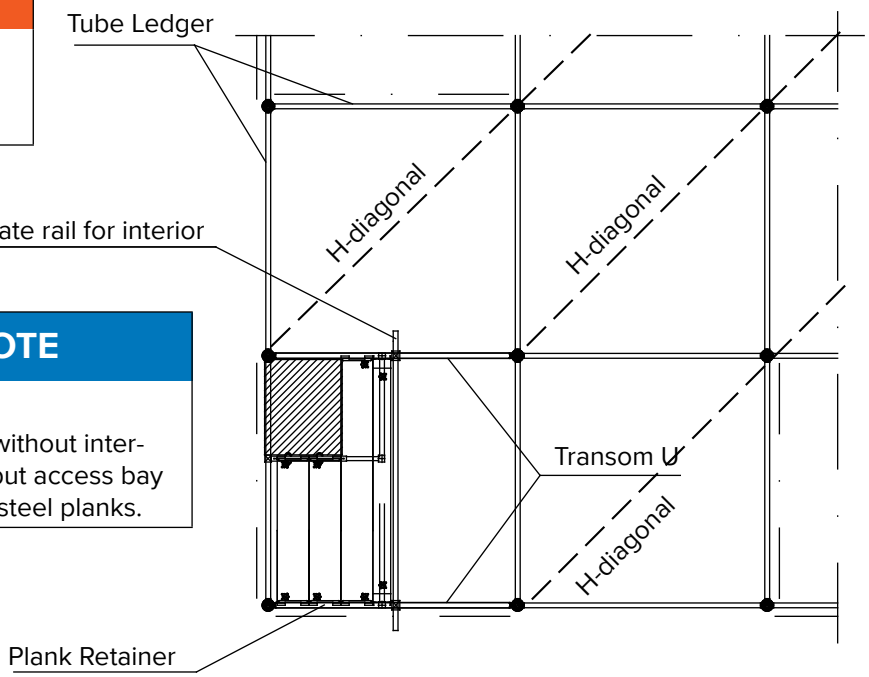
⑨

WARNING

Warning!

Outdoor
use only.

Cross-section a – a

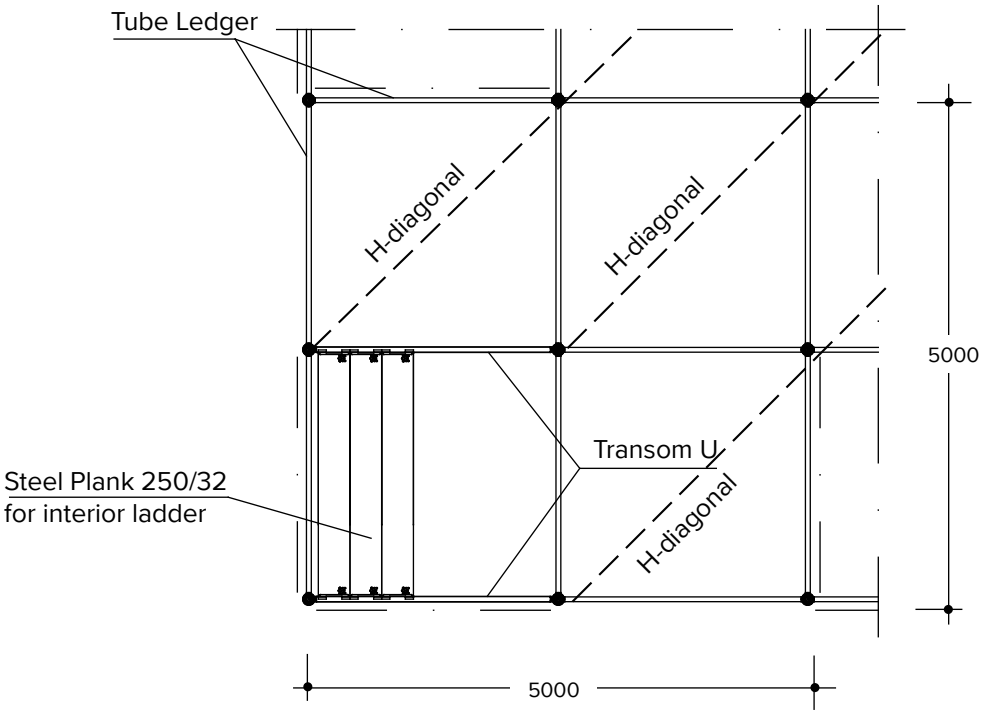


NOTE

Note!

Alternatively without intermediate rail, but access bay covered with steel planks.

Cross-section b – b



10.11 Reinforcement scaffolds

Table 10.5

Type	Interior side protection	Height	Length	Width	Load capacity
1	**without**	2000	5000	820	LC 3
2	with	2000	5000	820	LC 3
3	**without**	2000	5000	1130	LC 3
4	with	2000	5000	1130	LC 3
5	**without**	4000	5000	820	LC 3
6	with	4000	5000	820	LC 3
7	**without**	4000	5000	1130	LC 3
8	with	4000	5000	1130	LC 3

All of the reinforcement scaffolds mentioned here can be moved with hoisting equipment.

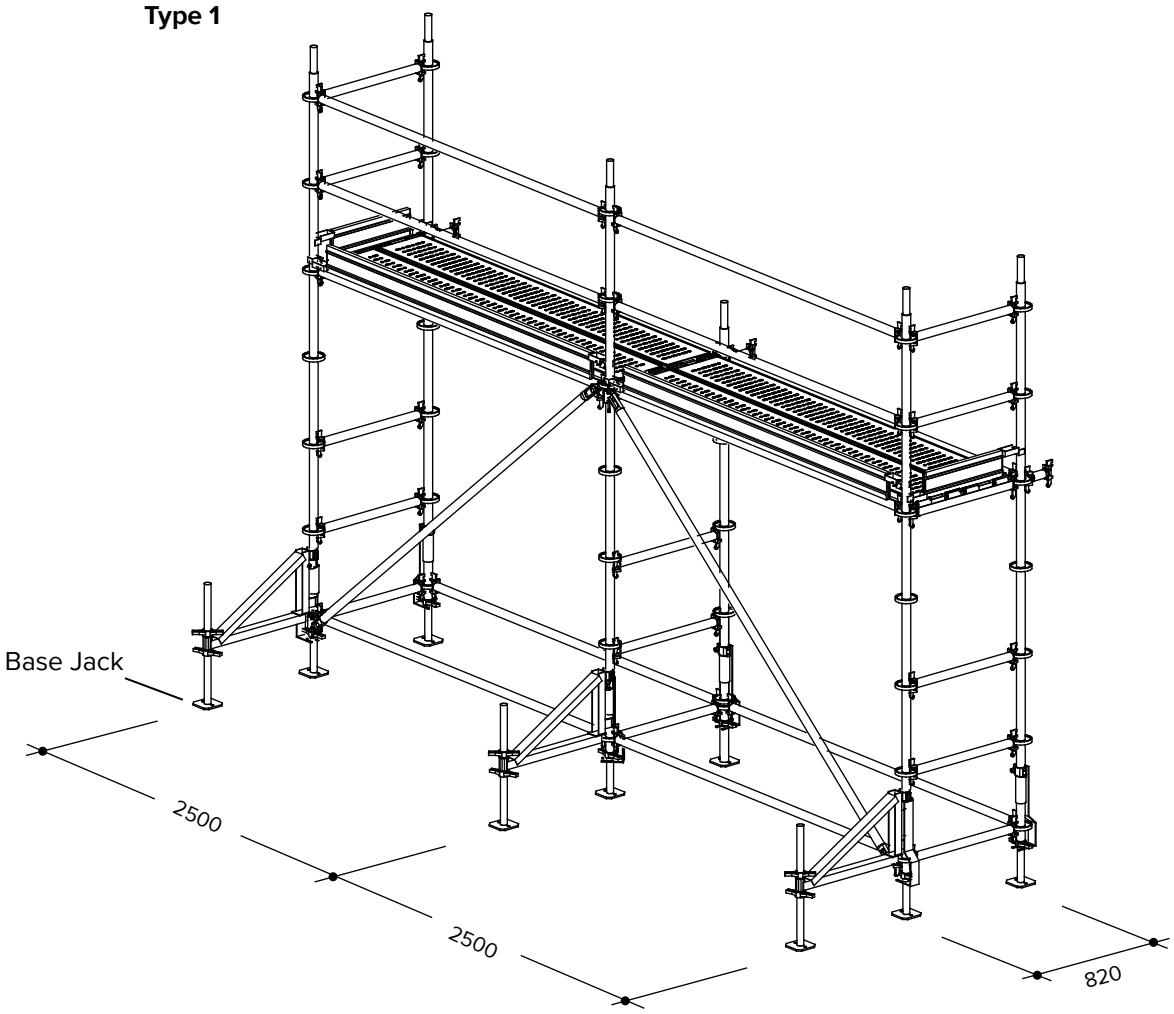
WARNING

Warning!

When moving the scaffold with lifting equipment, all post joints have to be secured with bolts. Secure the Base Jacks with the Base Jack Securing Devices. Secure the Base Jacks used on support brackets with wing nuts.

Unless stated otherwise, all dimensions in mm.

Type 1



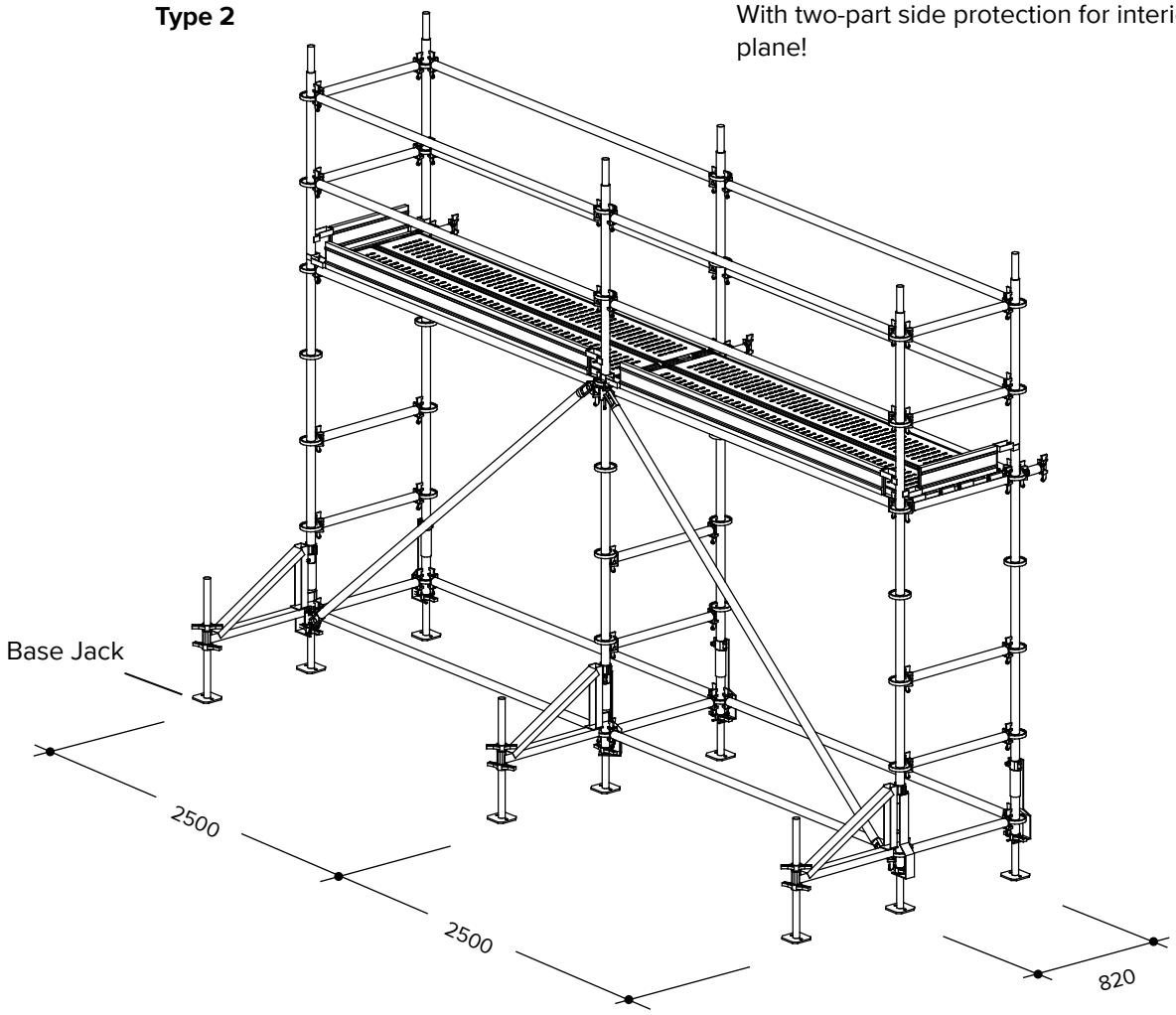
Required materials:					
Part code	**Component**	**Quantity**	**Part code**	**Component**	**Quantity**
470907	Vertical Post 300	5	651742	Steel Plank 82/15 Trans	2
470892	Vertical Post 200	1	470962	Transom 82U	3
470940	Tube Ledger 250	12	479047	Lifting Retainer 82*	3
470930	Tube Ledger 82	13	424226	Stage Bracket 70	3
577863	Tube Ledger 25	3	651762	Base Plate Securing Device	6
470973	V-diagonal 200/250	2	540575	Base Jack 70/3.8	9
427973	Steel Plank 250/32	4	426545	Wing nut 30/150	3
531448	Steel Plank 250/15	2	470929	Starting Piece	6

* Alternative:

Lifting Retainer Tube 82 (part code: 651430) and 2no. Connection Parts (part code: 651440)

Type 2

With two-part side protection for interior plane!



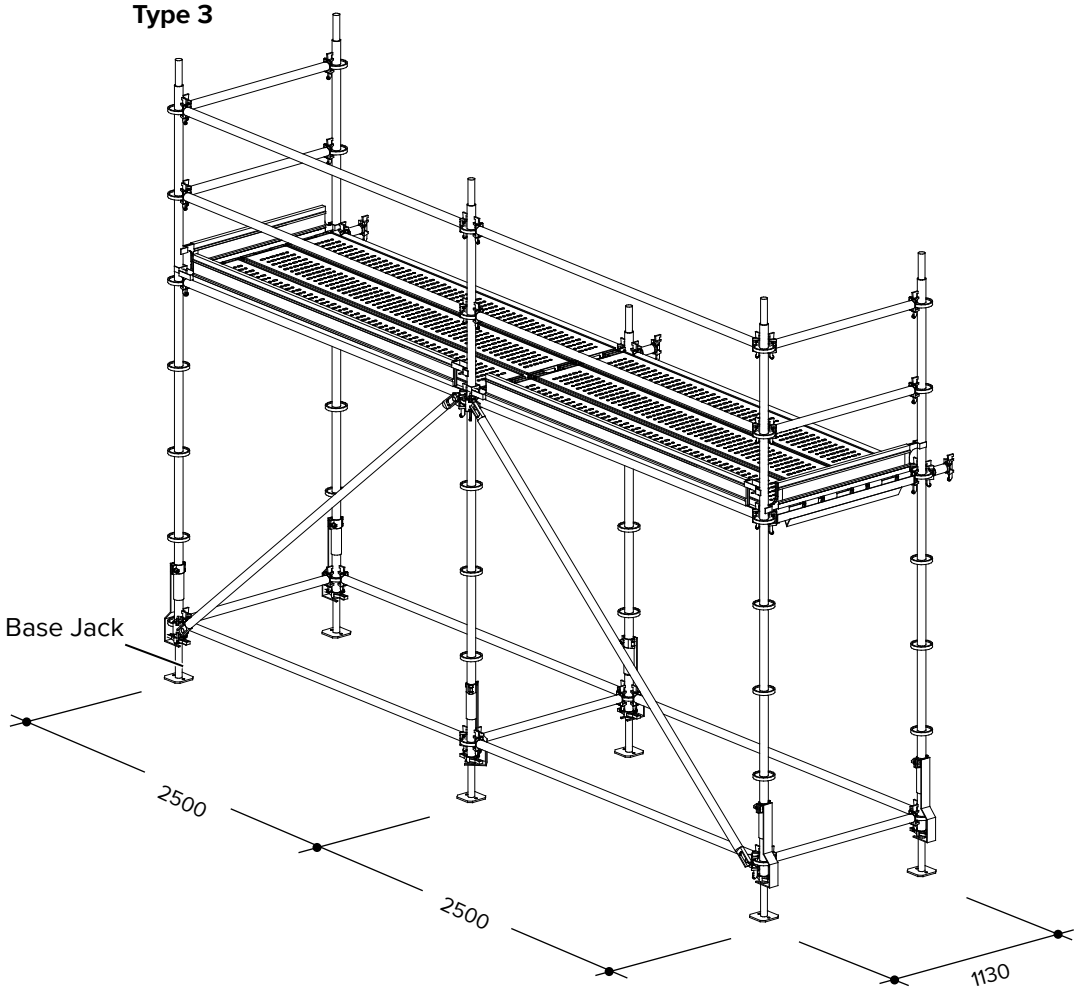
Required materials:					
Part code	**Component**	**Quantity**	**Part code**	**Component**	**Quantity**
470907	Vertical Post 300	6	651742	Steel Plank 82/15 Q	2
470892	Vertical Post 200	-	470962	Transom 82U	3
470940	Tube Ledger 250	16	479047	Lifting Retainer 82*	3
470930	Tube Ledger 82	13	424226	Stage Bracket 70	3
577863	Tube Ledger 25	3	651762	Base Plate Securing Device	6
470973	V-diagonal 200/250	2	540575	Base Jack 70/3.8	9
427973	Steel Plank 250/32	4	426545	Wing nut 30/150	3
531448	Steel Plank 250/15	2	470929	Starting Piece	6

* Alternative:

Lifting Retainer Tube 82 (part code: 651430) and 2no. Connection Parts (part code: 651440)

Unless stated otherwise, all dimensions in mm.

Type 3



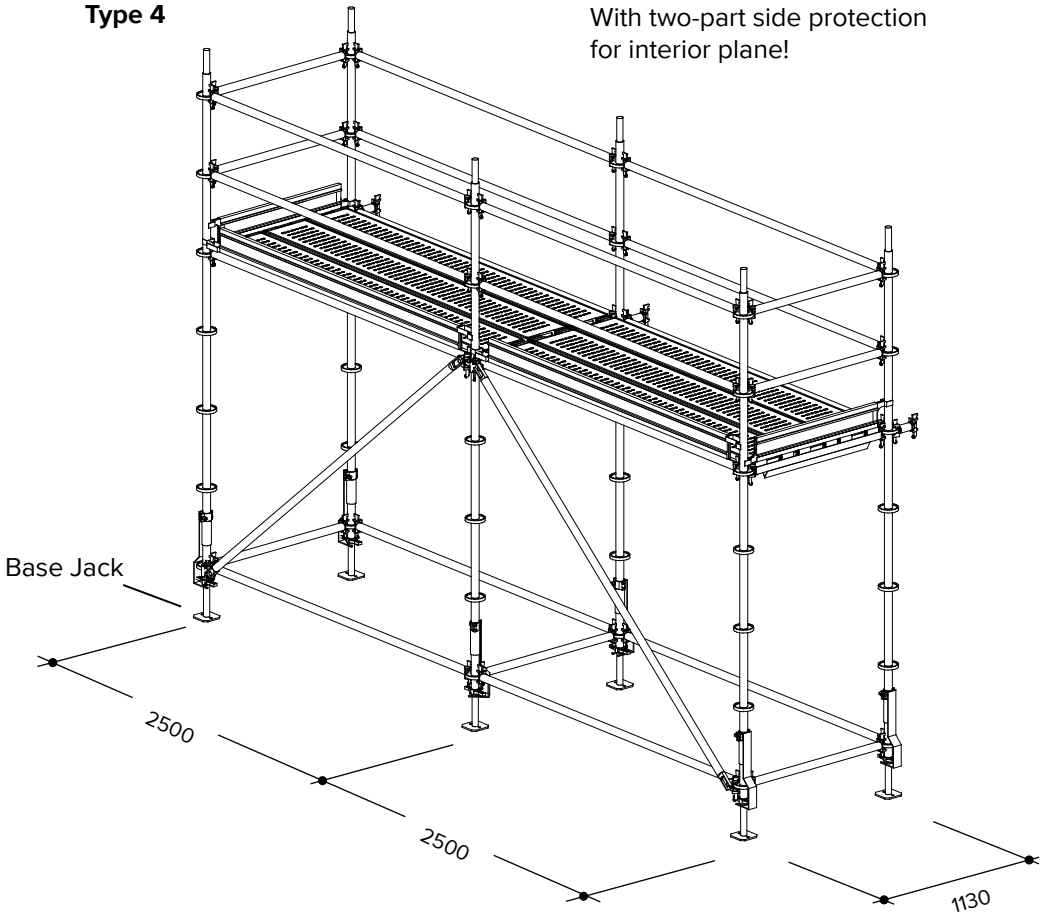
Required materials:					
Part code	**Component**	**Quantity**	**Part code**	**Component**	**Quantity**
470907	Vertical Post 300	5	651741	Steel Plank 113/15 Q	2
470892	Vertical Post 200	1	476043	Transom 113U	3
470940	Tube Ledger 250	12	479091	Lifting Retainer 113*	3
475760	Tube Ledger 113	7	424226	Stage Bracket 70	3
577863	Tube Ledger 25	3	651762	Base Plate Securing Device	6
470973	V-diagonal 200/250	2	540575	Base Jack 70/3.8	9
427973	Steel Plank 250/32	6	426545	Wing nut 30/150	3
531448	Steel Plank 250/15	2	470929	Starting Piece	6

* Alternative:

Lifting Retainer Tube 82 (part code: 651430) and 2no. Connection Parts (part code: 651440)

Type 4

With two-part side protection for interior plane!

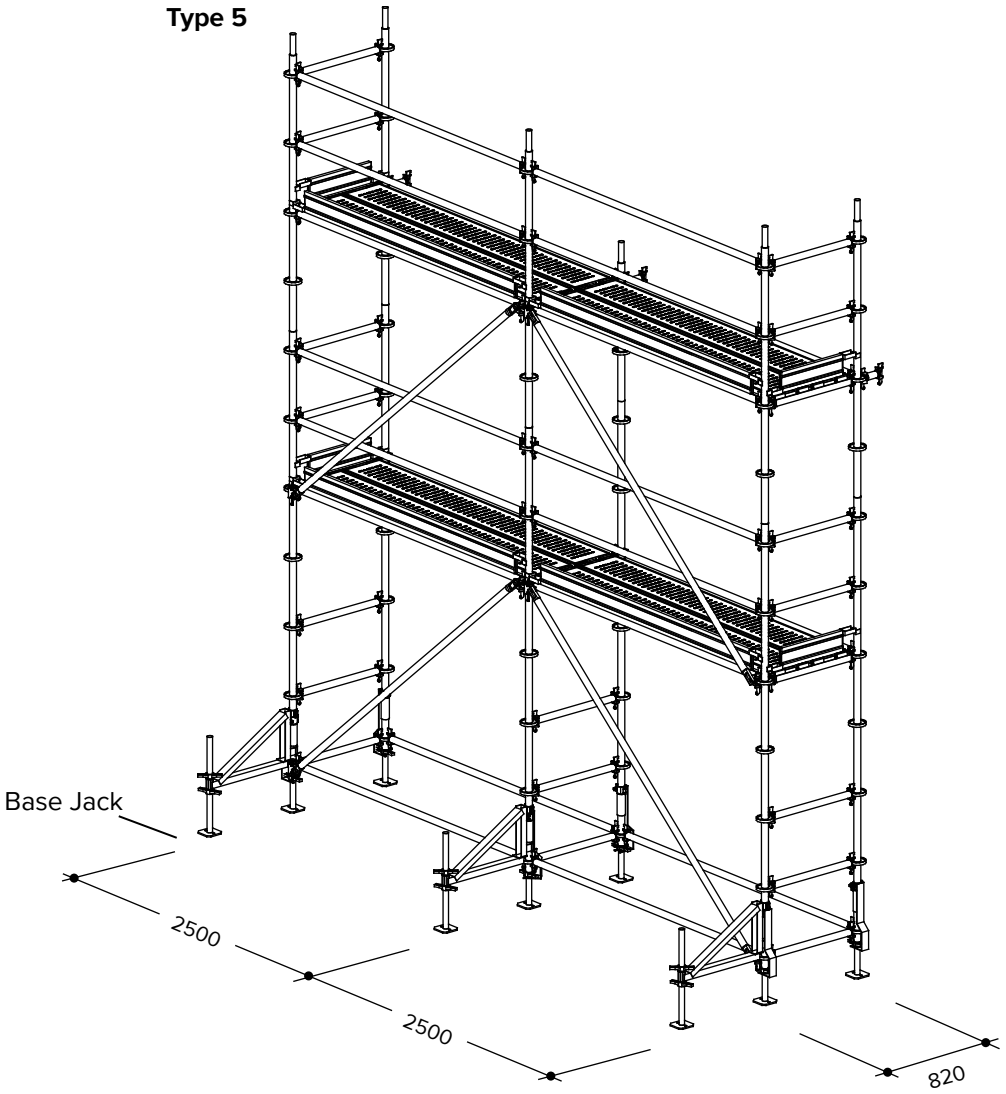


Required materials:					
Part code	**Component**	**Quantity**	**Part code**	**Component**	**Quantity**
470907	Vertical Post 300	6	651741	Steel Plank 113/15 Trans	2
470892	Vertical Post 200	-	476043	Transom 113U	3
470940	Tube Ledger 250	16	479091	Lifting Retainer 113*	3
475760	Tube Ledger 113	7	424226	Stage Bracket 70	-
577863	Tube Ledger 25	3	651762	Base Plate Securing Device	6
470973	V-diagonal 200/250	2	540575	Base Jack 70/3.8	6
427973	Steel Plank 250/32	6	426545	Wing nut 30/150	-
531448	Steel Plank 250/15	2	470929	Starting Piece	6

* Alternative:

Lifting Retainer Tube 82 (part code: 651430) and 2no. Connection Parts (part code: 651440)

Type 5



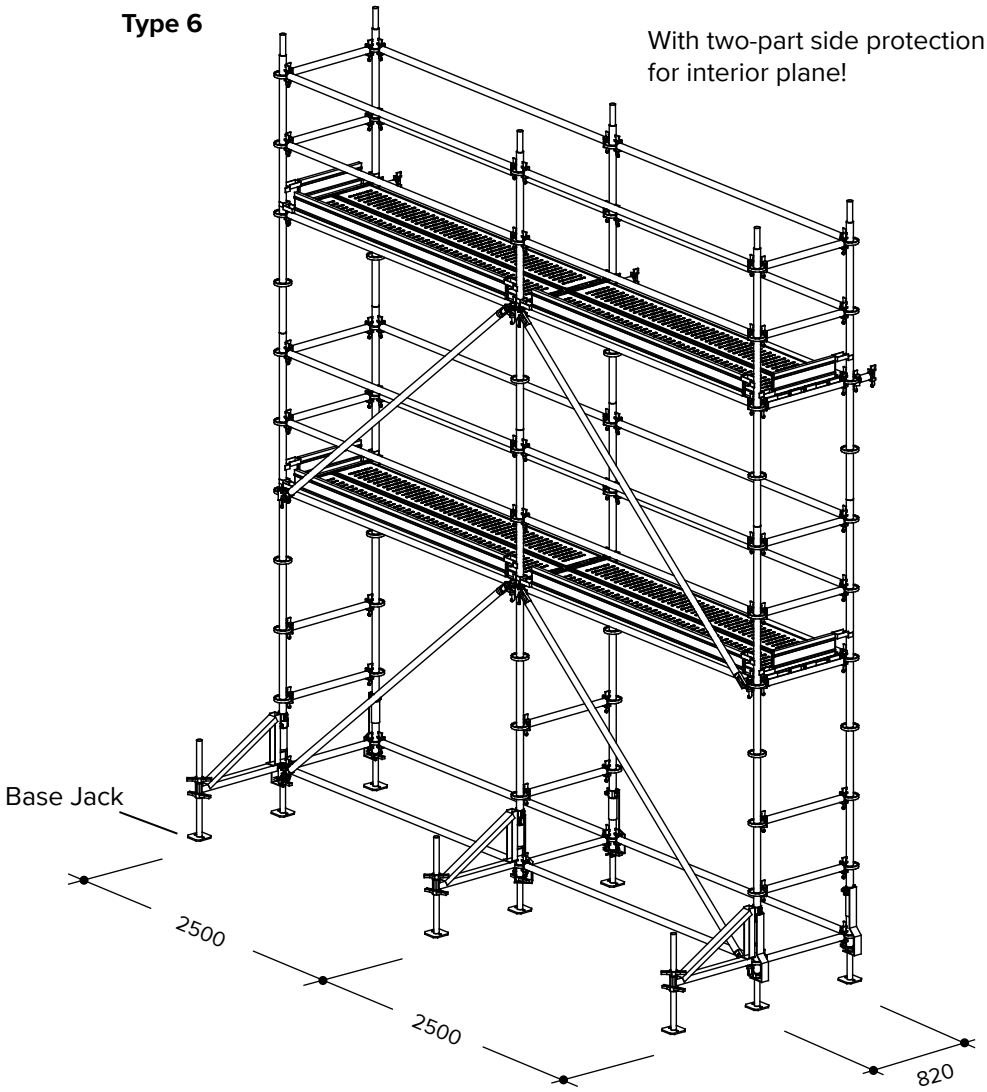
Required materials:					
Part code	**Component**	**Quantity**	**Part code**	**Component**	**Quantity**
470918	Vertical Post 400	1	651742	Steel Plank 82/15 Trans	4
470907	Vertical Post 300	5	470962	Transom 82U	6
470892	Vertical Post 200	5	479047	Lifting Retainer 82*	6
470940	Tube Ledger 250	20	424226	Stage Bracket 70	3
470930	Tube Ledger 82	17	651762	Base Plate Securing Device	6
577863	Tube Ledger 25	3	540575	Base Jack 70/3.8	9
470973	V-diagonal 200/250	4	426545	Wing nut 30/150	3
427973	Steel Plank 250/32	8	554710	Bolt M12x75 (with nut) 4.6	5
531448	Steel Plank 250/15	4	470929	Starting Piece	6

* Alternative:

Lifting Retainer Tube 82 (part code: 651430) and 2no. Connection Parts (part code: 651440)

Type 6

With two-part side protection for interior plane!



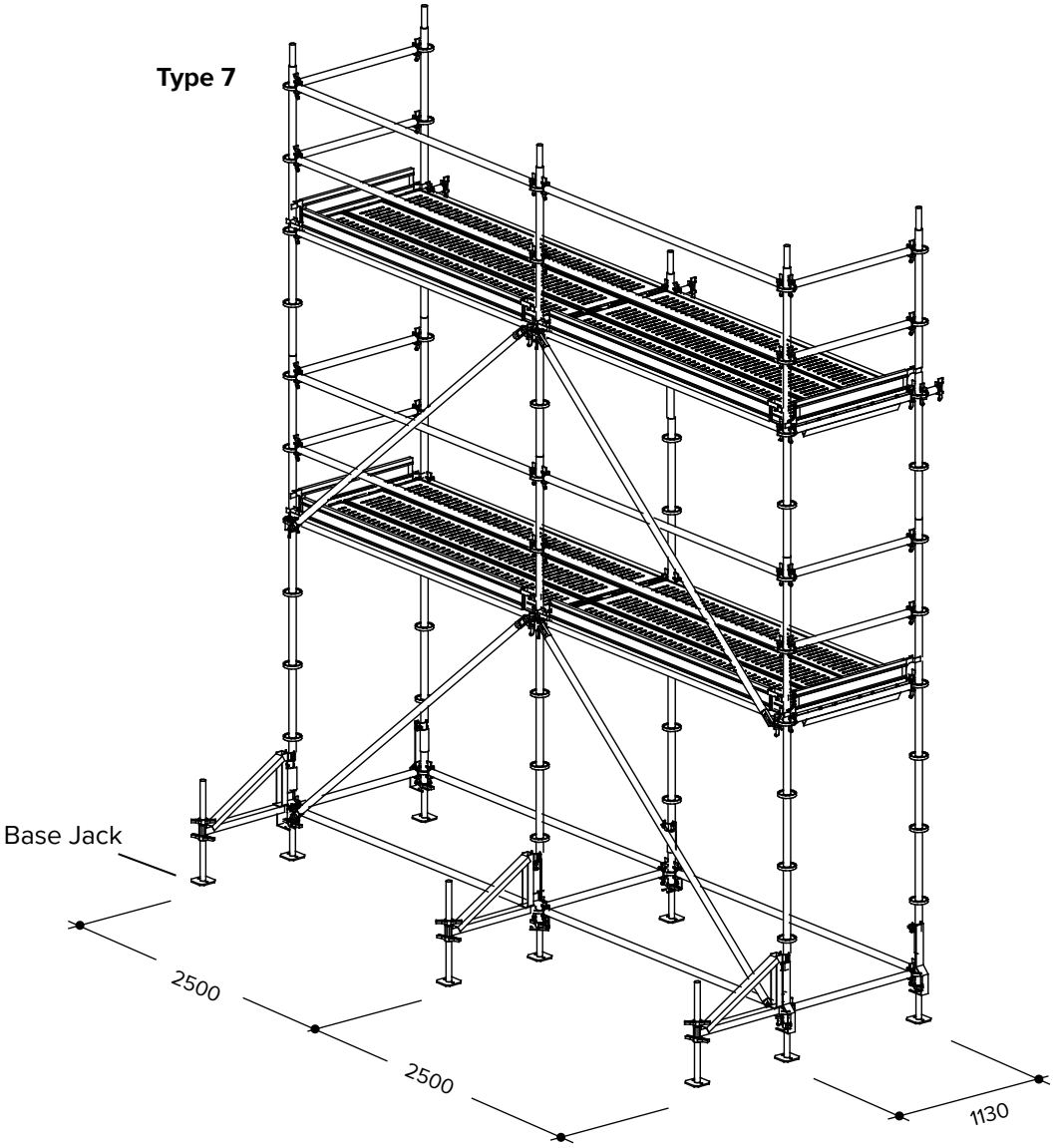
Required materials:					
Part code	**Component**	**Quantity**	**Part code**	**Component**	**Quantity**
470918	Vertical Post 400	-	651742	Steel Plank 82/15 Trans	4
470907	Vertical Post 300	6	470962	Transom 82U	6
470892	Vertical Post 200	6	479047	Lifting Retainer 82*	6
470940	Tube Ledger 250	28	424226	Stage Bracket 70	3
470930	Tube Ledger 82	17	651762	Base Plate Securing Device	6
577863	Tube Ledger 25	3	540575	Base Jack 70/3.8	9
470973	V-diagonal 200/250	4	426545	Wing nut 30/150	3
427973	Steel Plank 250/32	8	554710	Bolt M12x75 (with nut) 4.6	6
531448	Steel Plank 250/15	4	470929	Starting Piece	6

* Alternative:

Lifting Retainer Tube 82 (part code: 651430) and 2no. Connection Parts (part code: 651440)

Unless stated otherwise, all dimensions in mm.

Type 7



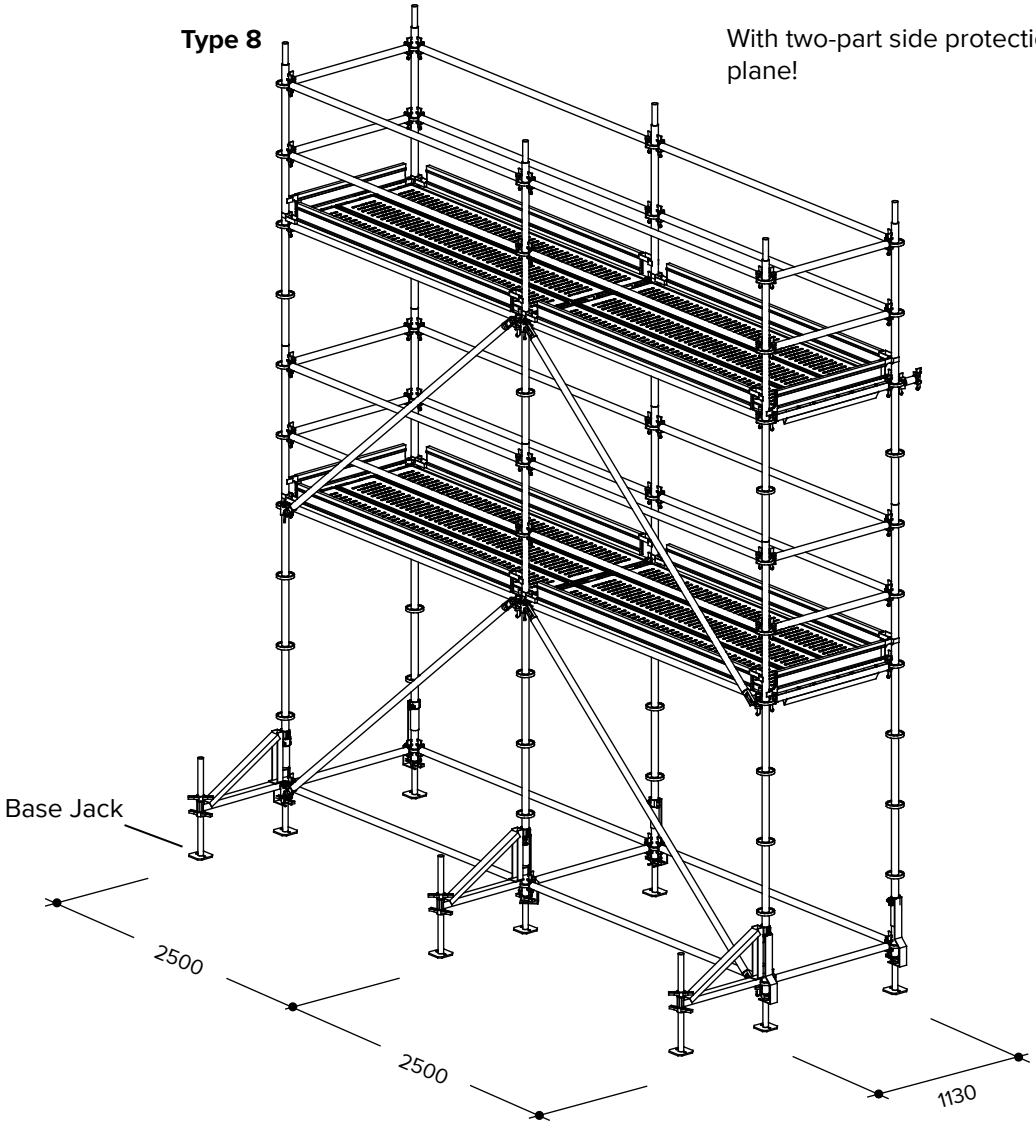
Required materials:					
Part code	**Component**	**Quantity**	**Part code**	**Component**	**Quantity**
470918	Vertical Post 400	1	651741	Steel Plank 113/15 Trans	4
470907	Vertical Post 300	5	476043	Transom 113U	6
470892	Vertical Post 200	5	479091	Lifting Retainer 113	6
470940	Tube Ledger 250	20	424226	Stage Bracket 70	3
470960	Tube Ledger 113	11	651762	Base Plate Securing Device	6
577863	Tube Ledger 25	3	540575	Base Jack 70/3.8	9
470973	V-diagonal 200/250	4	426545	Wing nut 30/150	3
427973	Steel Plank 250/32	12	554710	Bolt M12x75 (with nut) 4.6	5
531448	Steel Plank 250/15	4	470929	Starting Piece	6

* Alternative:

Lifting Retainer Tube 82 (part code: 651430) and 2no. Connection Parts (part code: 651440)

Type 8

With two-part side protection for interior plane!



Required materials:					
Part code	**Component**	**Quantity**	**Part code**	**Description**	**Quantity**
470918	Vertical Post 400	-	651741	Steel Plank 113/15 Trans	4
470907	Vertical Post 300	6	476043	Transom 113U	6
470892	Vertical Post 200	6	479091	Lifting Retainer 113*	6
470940	Tube Ledger 250	28	424226	Stage Bracket 70	3
475760	Tube Ledger 113	11	651762	Base Plate Securing Device	6
577863	Tube Ledger 25	3	540575	Base Jack 70/3.8	9
470973	V-diagonal 200/250	4	426545	Wing nut 30/150	3
427973	Steel Plank 250/32	12	554710	Bolt M12x75 (with nut) 4.6	6
531448	Steel Plank 250/15	4	470929	Starting Piece	6

* Alternative:

Lifting Retainer Tube 82 (part code: 651430) and 2no. Connection Parts (part code: 651440)

Unless stated otherwise, all dimensions in mm.

10.12 Advertising sign scaffold

Table 10.6

Type	Height [m]	Width [m]	Depth [m]
1	10.00	4.00	2.50
2	10.00	2.00	2.50
3	8.00	4.00	2.50
4	8.00	2.00	2.50

A proper foundation is essential to stabilising advertising sign scaffolds. Scaffold material is partly cast in and is lost.

Secure all of the post joints with bolts.

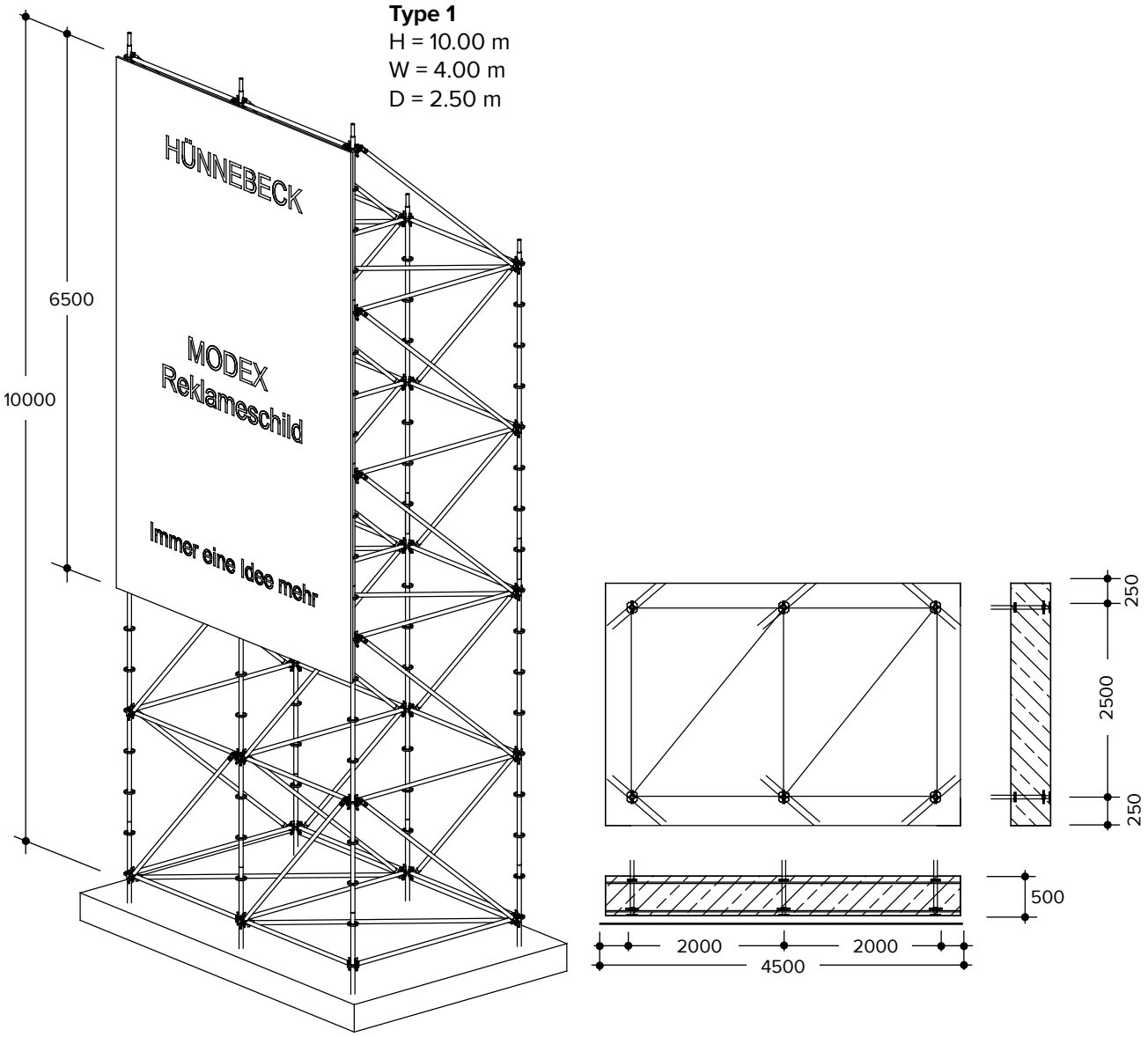
These scaffolds can accommodate signs up to 6.50 m high and 4.00 m wide.

WARNING

Safety note:

Always use a Bolt M12x75with nut, class 8.8 for connection of the Posts!

Type 1
H = 10.00 m
W = 4.00 m
D = 2.50 m



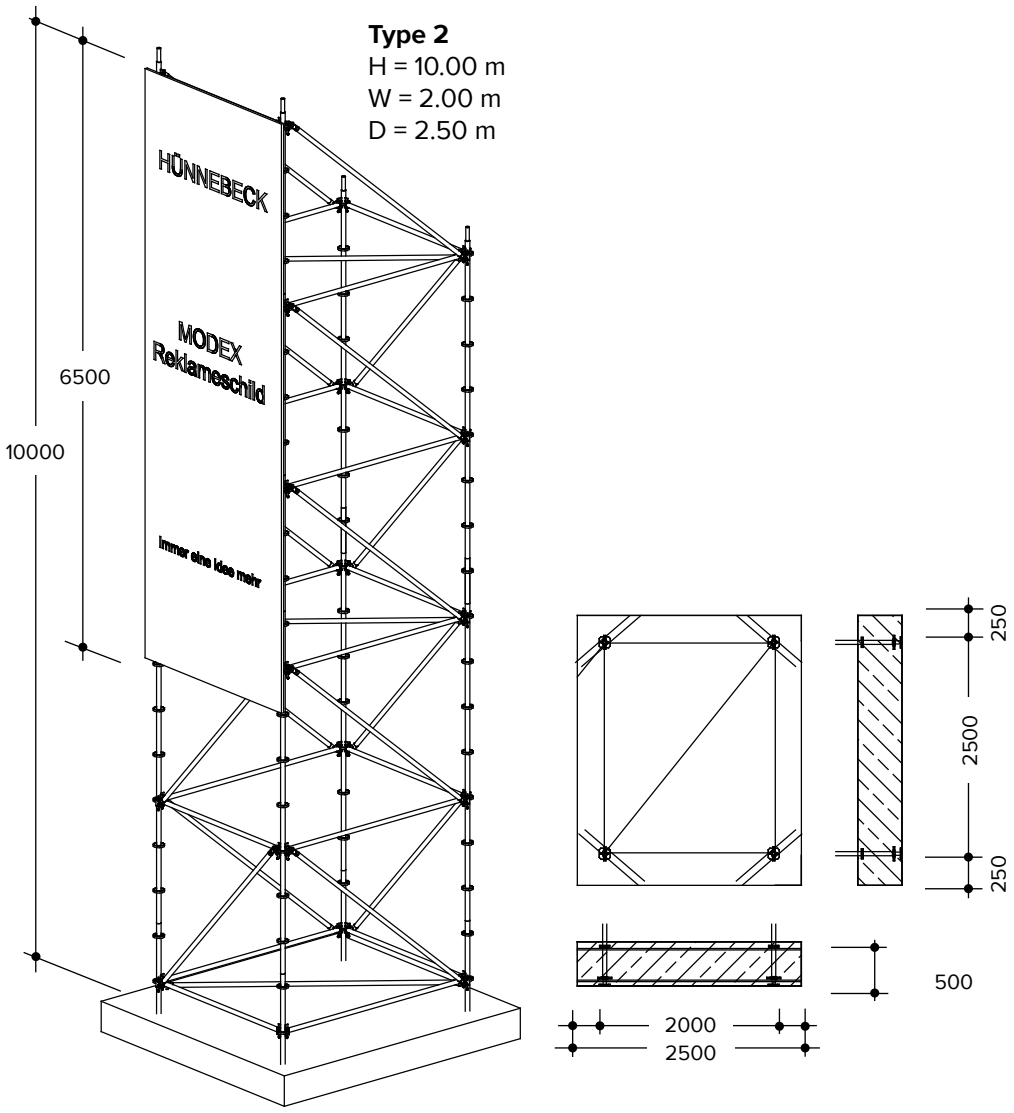
Required materials:		
Part code	**Description**	**Quantity**
470918	Vertical Post 400	12
470892	Vertical Post 200	3
470940	Tube Ledger 250	15
475781	Tube Ledger 200	22
470973	V-diagonal 200/250	15
470910	V-diagonal 200/200	18
484809	H-diagonal 250/200	6
on site	Bolt M12x75 (with nut) 8.8	15
Wasted material:		
470918	Vertical Post 100	6
551234	Base Jack 45/3.8	6

NOTE

Note!
The sign and the required fasteners are not included in the delivery!

Unless stated otherwise, all dimensions in mm.

Type 2
H = 10.00 m
W = 2.00 m
D = 2.50 m



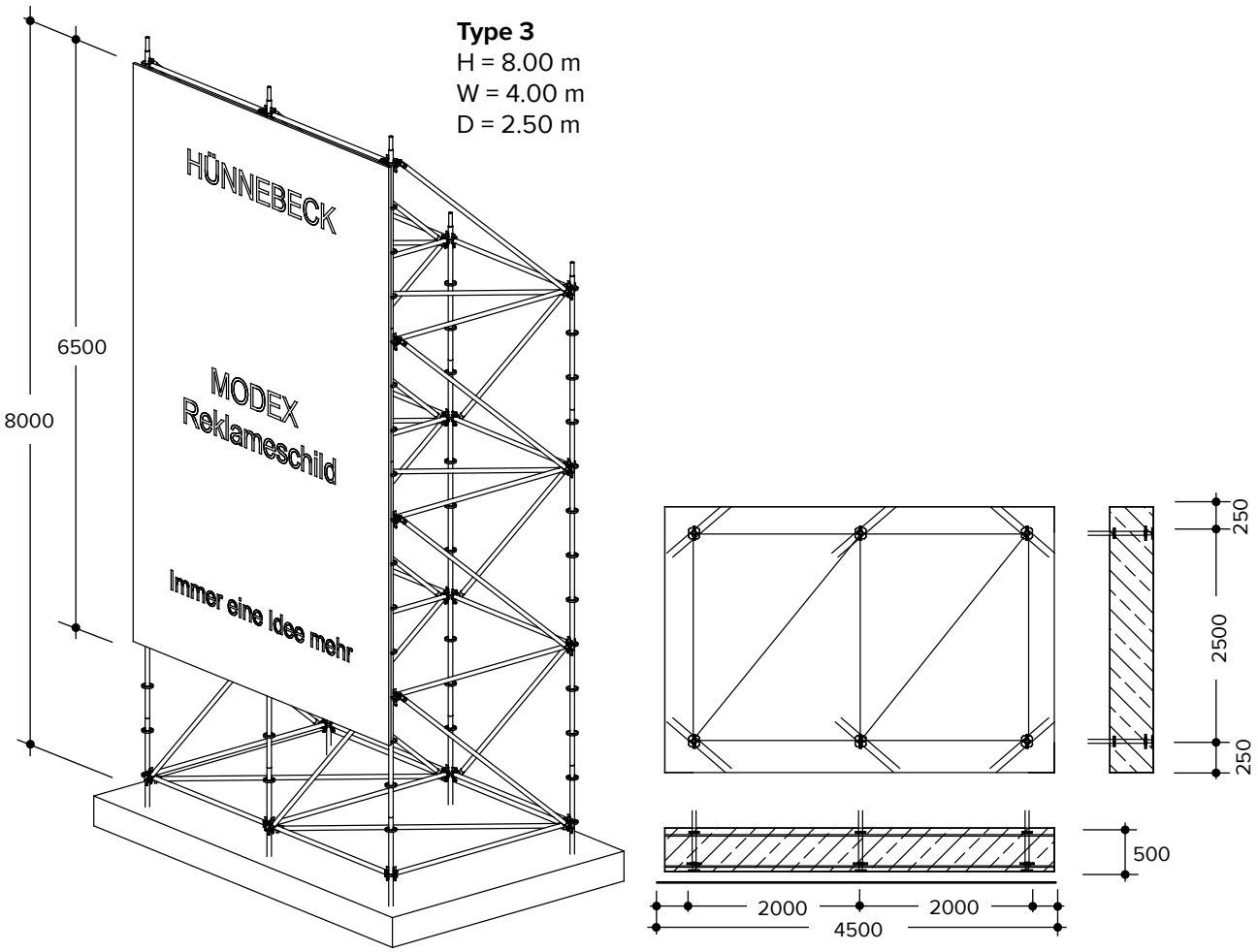
Required materials:		
Part code	**Description**	**Quantity**
470918	Vertical Post 400	8
470892	Vertical Post 200	2
470940	Tube Ledger 250	10
475781	Tube Ledger 200	11
470973	V-diagonal 200/250	10
470910	V-diagonal 200/200	9
484809	H-diagonal 250/200	3
on site	Bolt M12x75 (with nut) 8.8	10
Wasted material:		
470 918	Vertical Post 100	4
551 234	Base Jack 45/3.8	4

NOTE

Note!
The sign and the required fasteners are not included in the delivery!

Unless stated otherwise, all dimensions in mm.

Type 3
H = 8.00 m
W = 4.00 m
D = 2.50 m



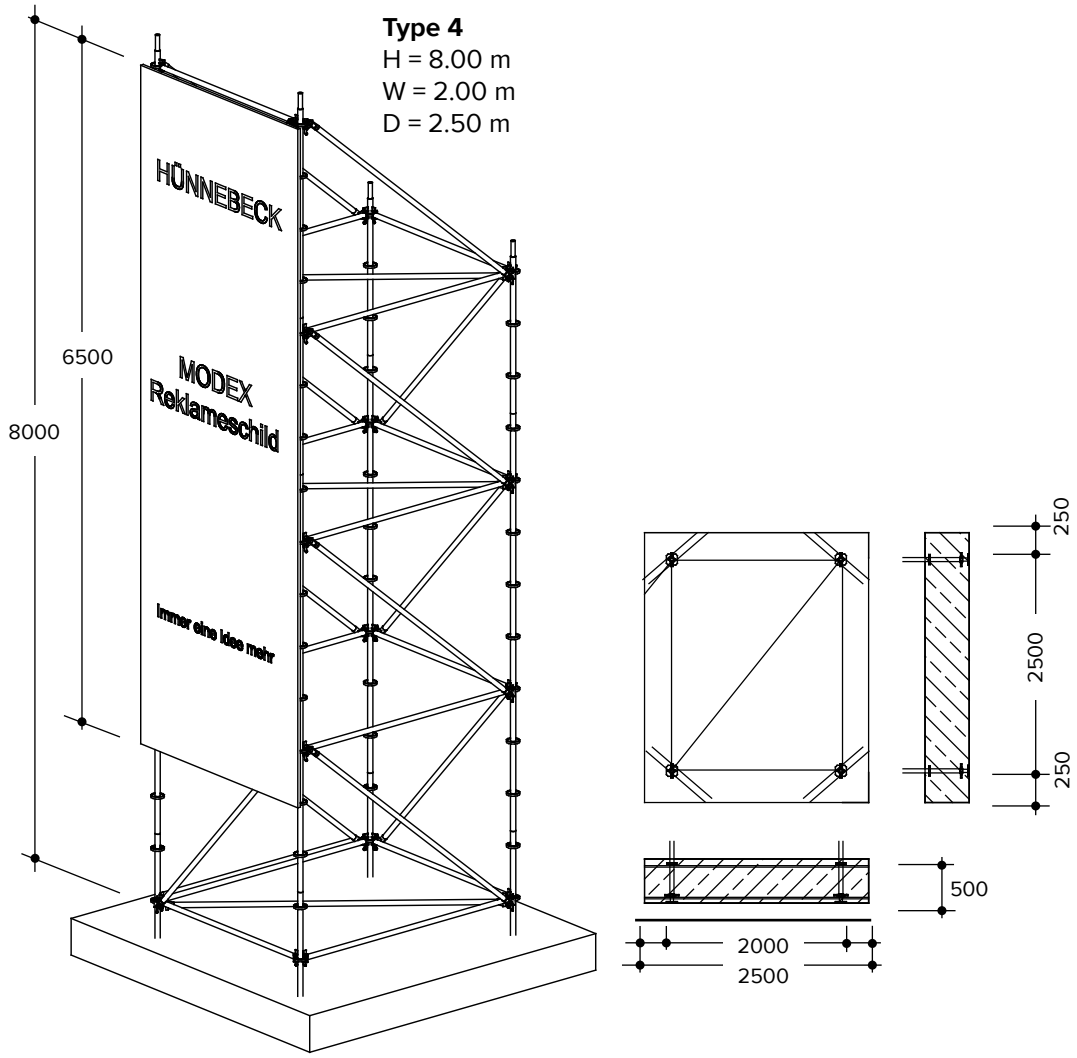
Required materials:		
Part code	**Description**	**Quantity**
470918	Vertical Post 400	9
470892	Vertical Post 200	3
470940	Tube Ledger 250	12
475781	Tube Ledger 200	18
470973	V-diagonal 200/250	12
470910	V-diagonal 200/200	14
484809	H-diagonal 250/200	6
on site	Bolt M12x75 (with nut) 8.8	12
Wasted material:		
470 918	Vertical Post 100	6
551 234	Base Jack 45/3.8	6

NOTE

Note!
The sign and the required fasteners are not included in the delivery!

Unless stated otherwise, all dimensions in mm.

Type 4
H = 8.00 m
W = 2.00 m
D = 2.50 m



Required materials:		
Part code	**Description**	**Quantity**
470918	Vertical Post 400	6
470892	Vertical Post 200	2
470940	Tube Ledger 250	8
475781	Tube Ledger 200	9
470973	V-diagonal 200/250	8
470910	V-diagonal 200/200	7
484809	H-diagonal 250/200	3
on site	Bolt M12x75 (with nut) 8.8	8
Wasted material:		
470918	Vertical Post 100	4
551234	Base Jack 45/3.8	4

NOTE

Note!
The sign and the required fasteners are not included in the delivery!

Unless stated otherwise, all dimensions in mm.

11 Suspended scaffolds

11.1 General information

All MODEX components are suitable for suspended scaffolds. However, certain special aspects should be kept in mind.

WARNING

Safety note:

Only non-flammable support material may be used to mount suspended scaffolds from components capable of bearing the load. Always avoid oscillation in any direction. If hooks are used to hang the suspended structure, take appropriate precautions to prevent the hooks from opening or detaching. If suspended scaffolds are used as fall protection, only the planks may be made of wood.

The various ways in which the standard MODEX suspended scaffold can be erected are described on the following pages. Only Steel Planks are used. Only scaffold tubes and rigid couplers may be used for the standard suspended structure. Proof of the scaffold's structural integrity has already been provided for this type of erection.

All of the erection options can accommodate a maximum load of p = 2.00 kN/m² (LC 3). The maximum bay dimensions are specified for the various erection options. The tying forces for the various ways in which the scaffold can be tied are also indicated.

Refer to Table 11.1 for the specifications applicable to the various erection options. The required certificates are issued pursuant to EN 12810 and EN 12811.

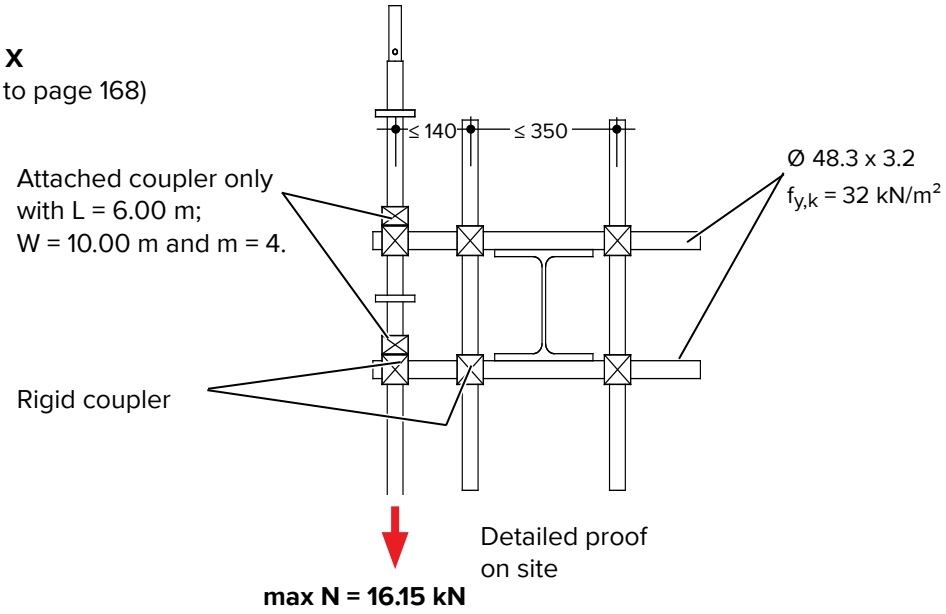
Table 11.1

Suspended scaffold combinations L/W Load class 3; p = 2.00 kN/m²						
Bay length L [m] = n x l [m]			**Bay width B [m] = m x w [m]**			
			b [m]			
			1.13	**1.50**	**2.00**	**2.50**
			m_{max}			
			10	**7**	**5**	**4**
L [m]	**l [m]**	**n**	**B_{max} [m]**	**B_{max} [m]**	**B_{max} [m]**	**B_{max} [m]**
4.00	2.00	2	11.30	10.50	10.00	10.00
5.00	2.50	2	11.30	10.50	10.00	10.00
6.00	2.00	3	11.30	10.50	10.00	10.00[1)]
7.50	2.50	3	11.30	10.50	O	O
O = Erection not possible						
[1)] Use two rigid couplers with two attached couplers to connect to girders						

l = Tube Ledger length n = Number of Tube Ledgers

b = Transom U length m = Number of Transoms

Detail X
(Refer to page 168)

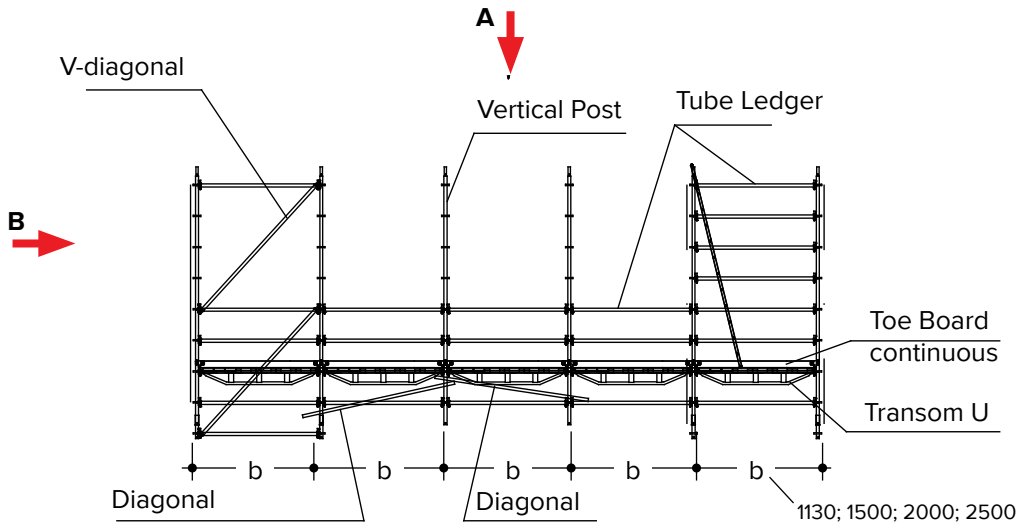


NOTE

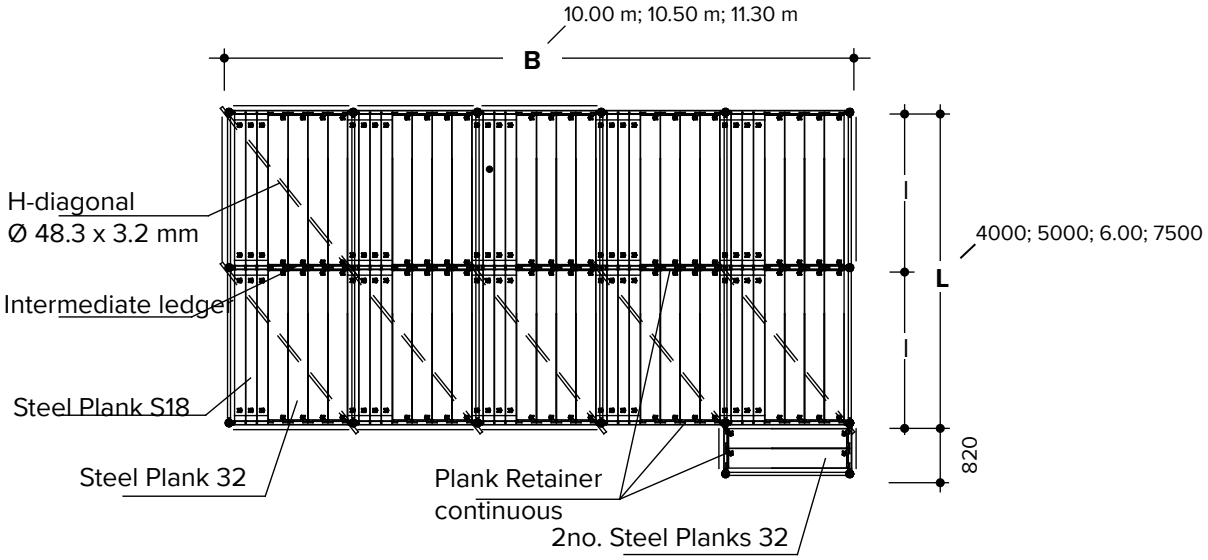
Note!

When attaching the suspended scaffold as shown in Detail X, a certificate must be issued on site.

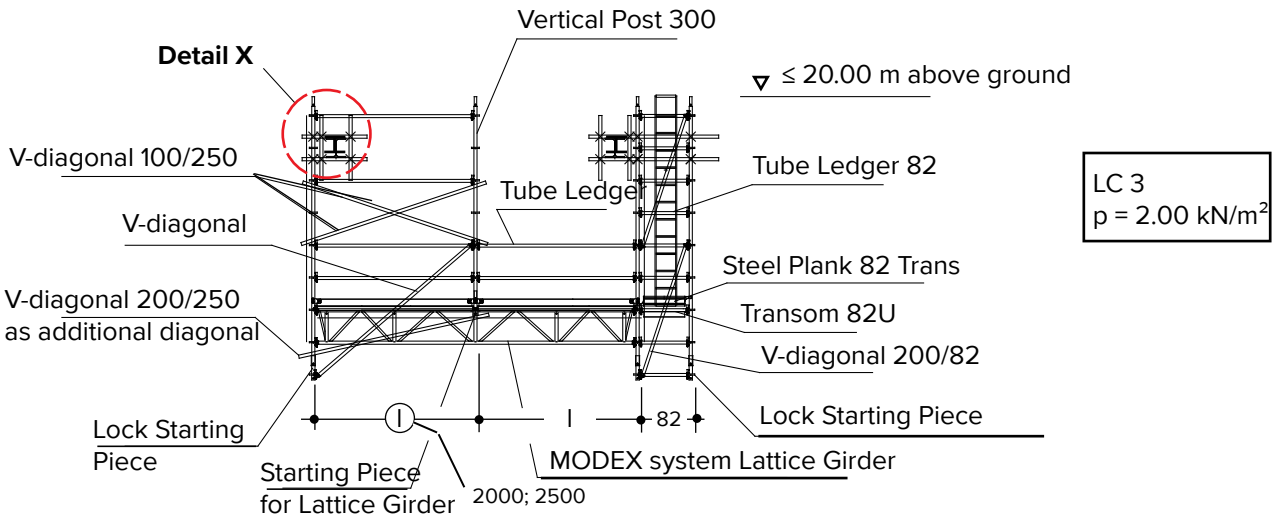
11.2 Standard design



View A



View B



LC 3
p = 2.00 kN/m²

NOTE

Note!
Secure all plug connections with a Joint Securing Bolt M12x75.

Unless stated otherwise, all dimensions in mm.

12 Heavy-duty shore

12.1 General information

The MODEX heavy-duty shore is a lightweight support with a footprint of only 25 x 25 cm and can be erected without having to use a crane. The permissible load capacity of a single shore depends on the height of the support, but can be up to 215 kN.

The shore components and design are essentially the same as a MODEX modular scaffold.

The MODEX shore is made up of two MODEX Shore Jacks and four MODEX Posts, connected and braced by Tube Ledgers, 25 cm long (four per scaffold level). The MODEX Shore Jack can be placed at the top as well as the bottom of the shore. Each jack extends 30 cm, which means a support can be adjusted for extension up to 60 cm. The jack can be pivoted and rotated up to 10°. The Base Plate as well as the side posts have holes (Ø 23 mm) for attaching additional components, such as half couplers 48/M20 that comply with EN 74-2.

The required shore height is achieved through the different lengths of MODEX Vertical Posts and the maximum jack extension of 60 cm of the MODEX Shore Jacks. Supports ranging in length from 1.90 m to 10.0 m can be built. Certified design calculations are available for these heights (higher shores available upon request). Individual shores can easily be set up in a single row or laid out as a square to form scaffold towers. This is achieved by using Tube Ledgers of various lengths and the MODEX Vario Attachment Plate,
The illustrations in this user guide are merely examples. All relevant regulations pertaining to occupational safety must be complied with. Always comply with the locally applicable ordinance on industrial health and safety.

WARNING

Safety note:

Only flawless materials may be used.
Immediately replace damaged components. Always use only original HÜNNEBECK components.

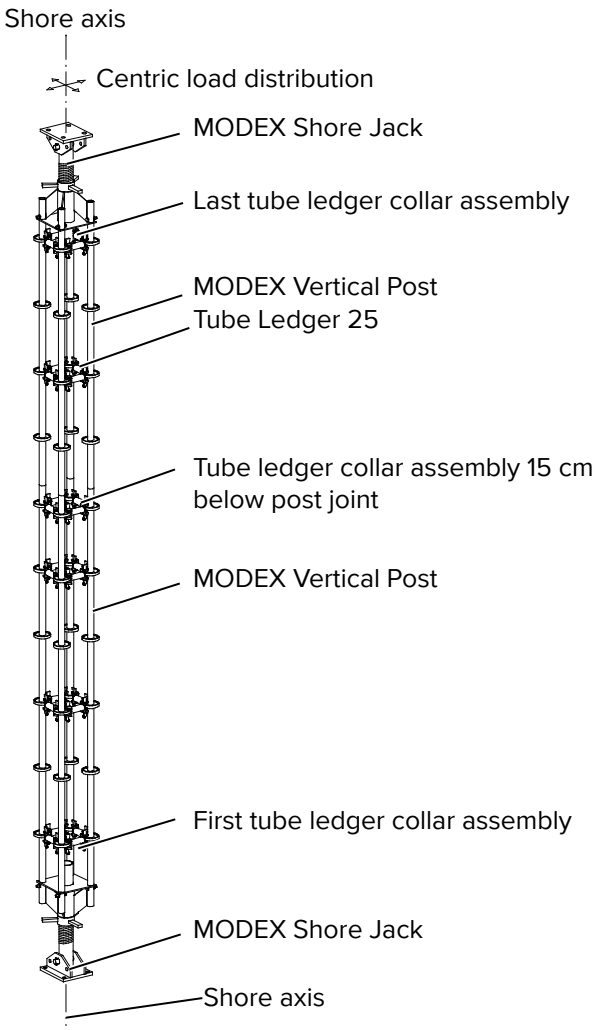
WARNING

Safety note:

Notes on assembly:

When the shore is erected, no more than three MODEX Vertical Posts may be connected vertically to assemble a single shore. The longest Vertical Post has to be in the centre of the structure.
A Shear Force Securing Device (Refer to page 172) has to be installed at each Tube Ledger connection of the MODEX shore. If additional connections are used, this can be omitted.
When the Ledgers are spaces 100 cm apart, always install:
- One Tube Ledger collar assembly at the first Rosette on the lower end of the shore
- One Tube Ledger collar assembly at the last Rosette on the upper end of the shore
- One Tube Ledger at the Rosette located 15 cm below the post joint.

In the design calculation, a load eccentricity of 1.5 cm at the top and bottom as well as a buckling effect of e = L/500 are assumed.



12.2 Erection of heavy-duty shore

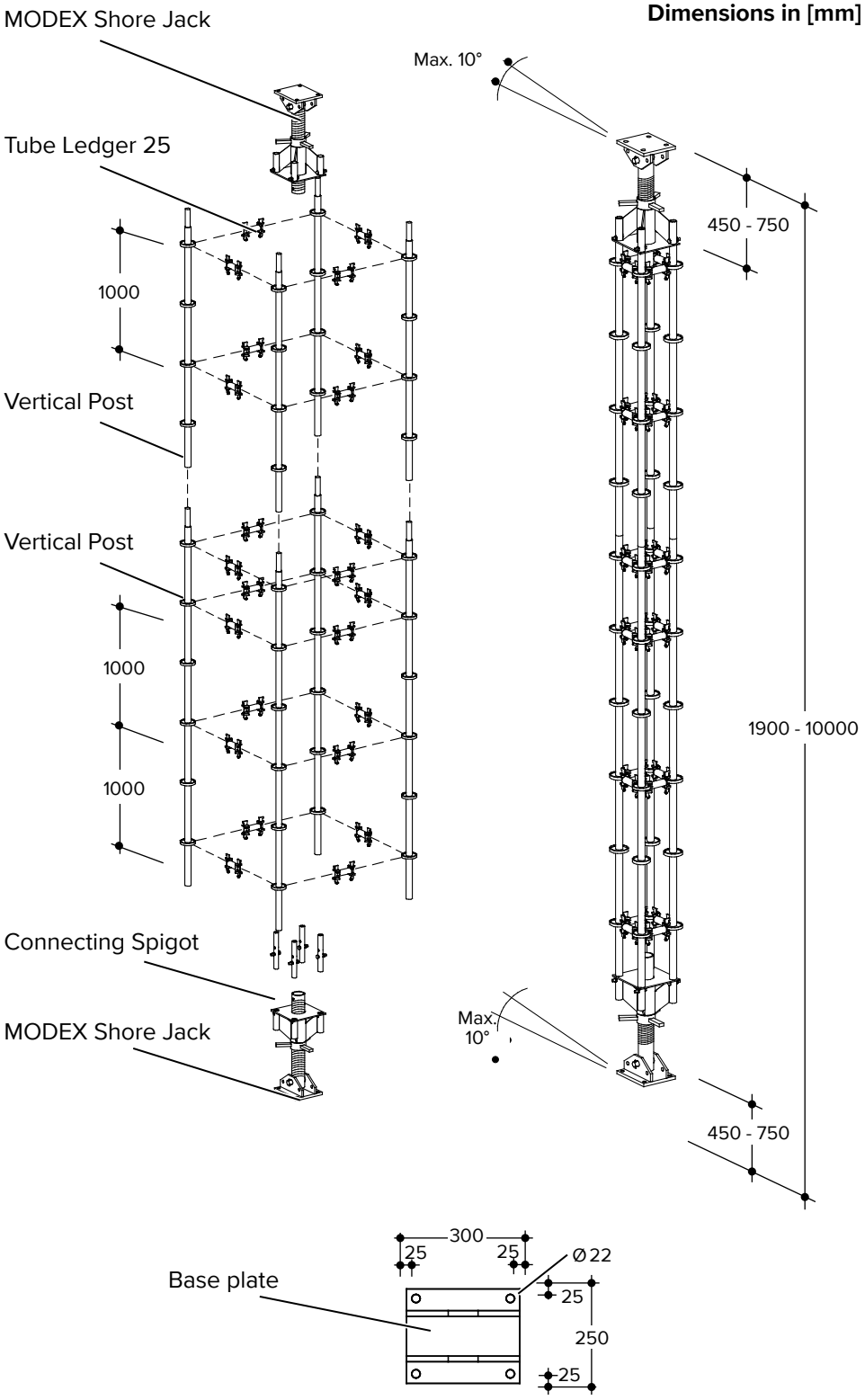
The shore has a footprint of 25 x 25 cm and be erected without hoisting equipment.

Heights from 1.90 m to 10.00 m are possible.

NOTE	**Note!** Refer to page 175 and page 174 for information on butt joints! Refer to page 172 for information on how to install the Shear Force Securing Device!

NOTE	**Note!** The base plate of the MODEX Shore Jack can be rotated up to 10°!

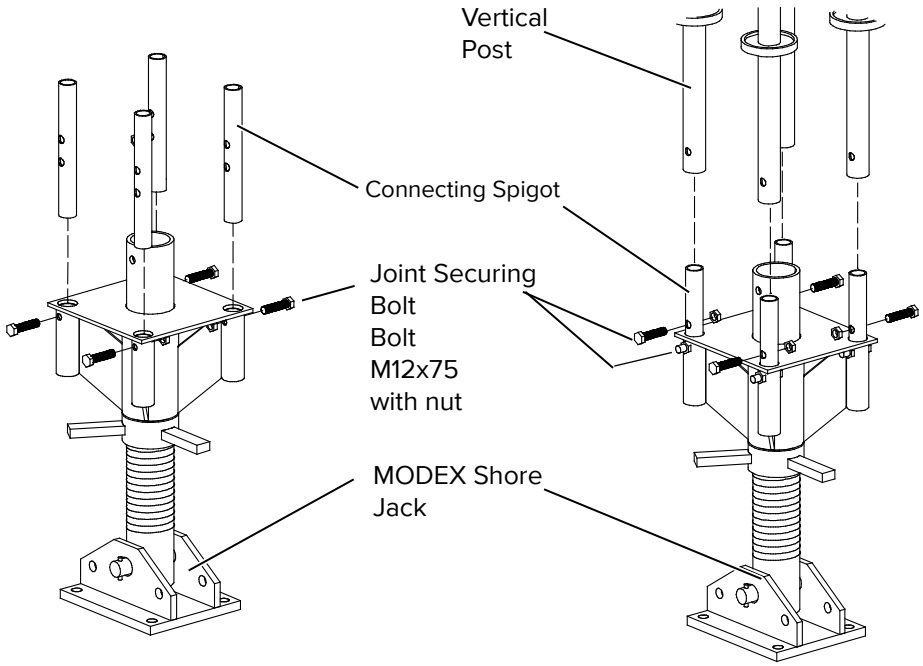
Dimensions in [mm]



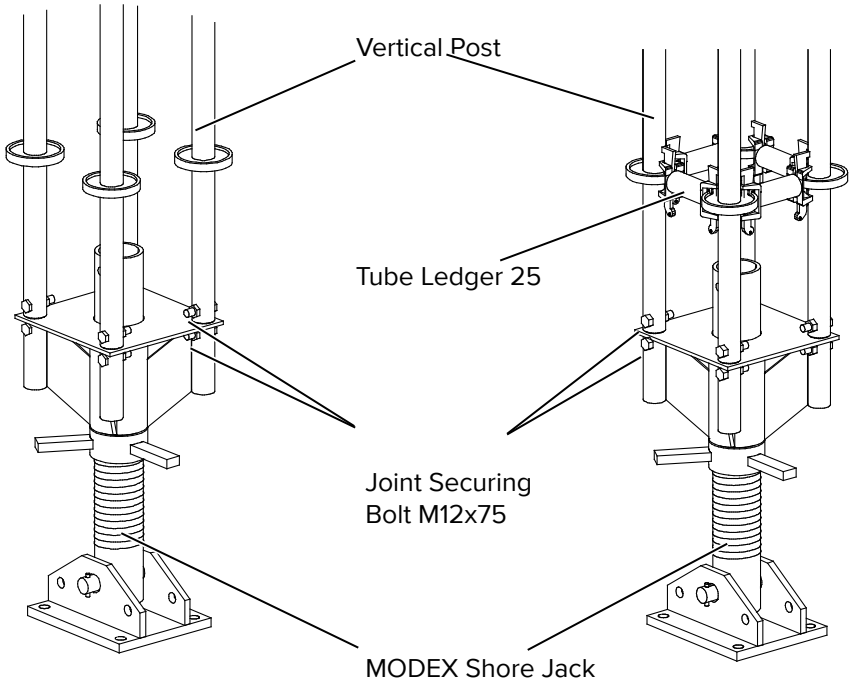
Butt joint on the lower end of the Shore Jack

Insert the Connecting Spigots into the MODEX Shore Jack and fasten with Bolts M12x75.

After securing the Connecting Spigots, attach the Vertical Posts to the Spigots and fasten them with the Joint Securing Bolt M12x75 (with nut).



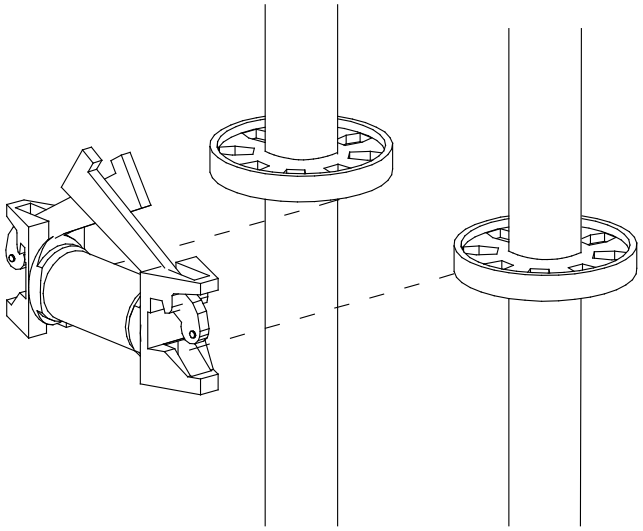
Install the first tube ledger collar assembly at the first Rosette on the Vertical Posts.
Install additional annuli at the required vertical distances.
(Refer to the next page for detailed assembly instructions).



Installation of Shear Force Securing Device

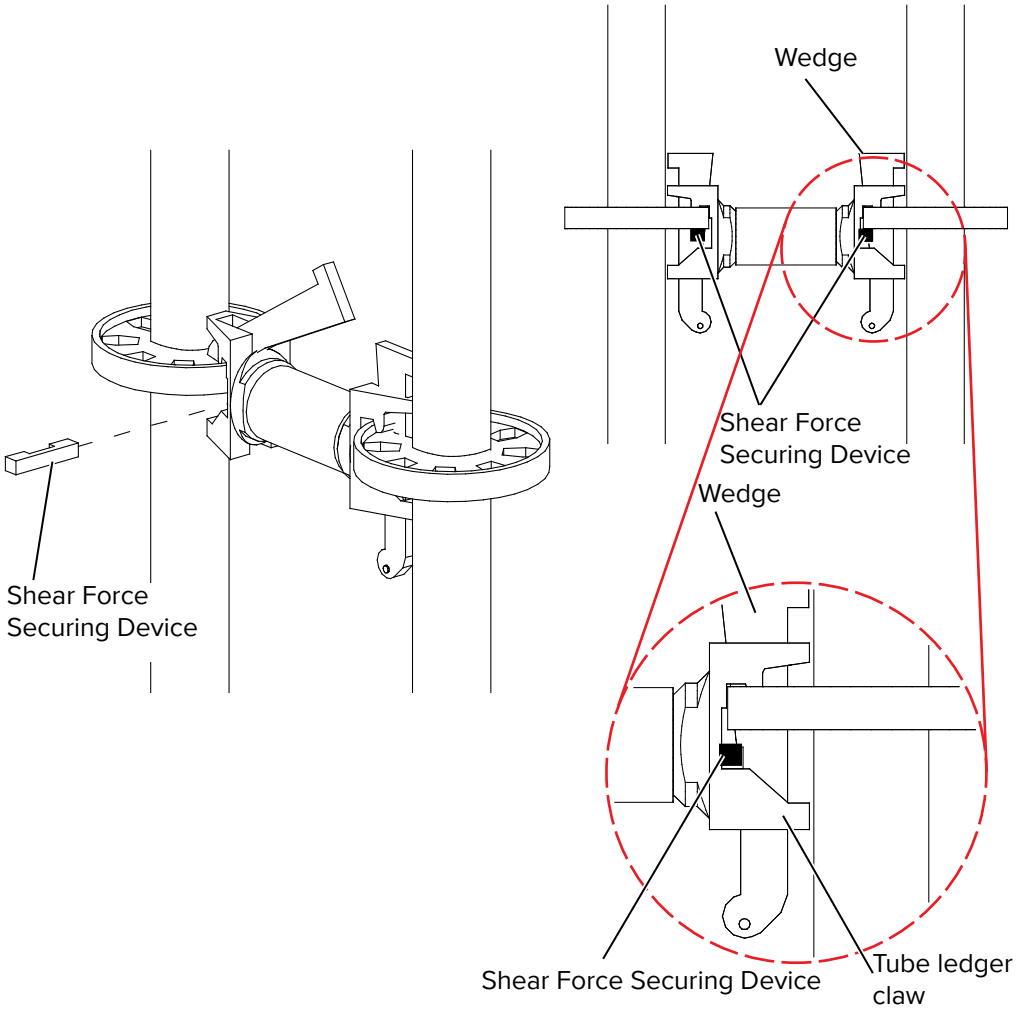
Wedge not in place

Push the Tube Ledgers between the Vertical Posts.



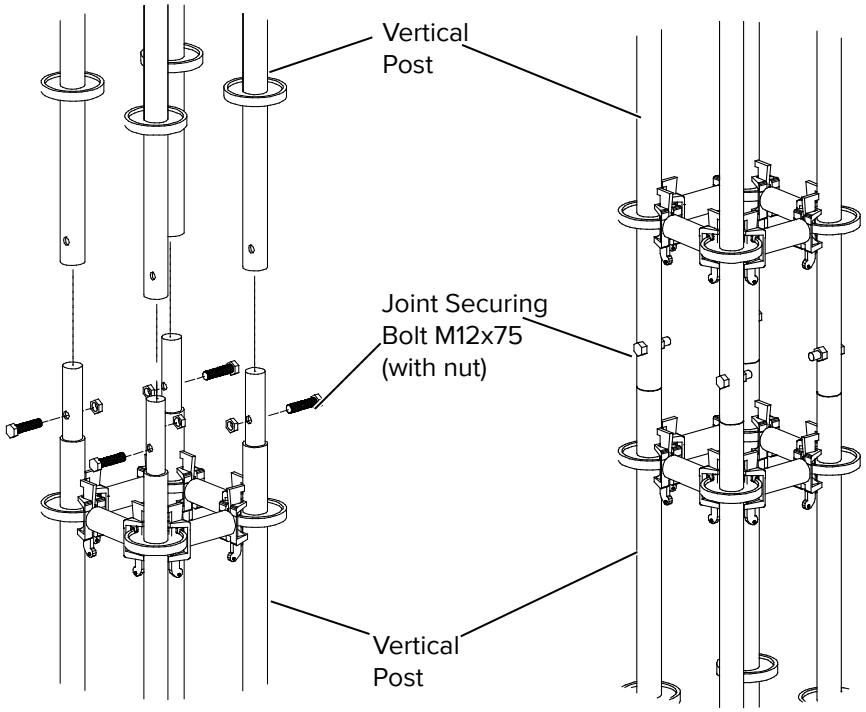
Wedge in place

Then put a Shear Force Securing Device between the MODEX Rosette and Tube Ledger claw. Now drive the wedge in.



Butt joint on the Vertical Posts

Stick together the Vertical Posts and secure them with the Joint Securing Bolt M12x75 (with nut). Install a tube ledger collar assembly at the Rosettes below the joint. Install additional annuli at the required distances.



WARNING

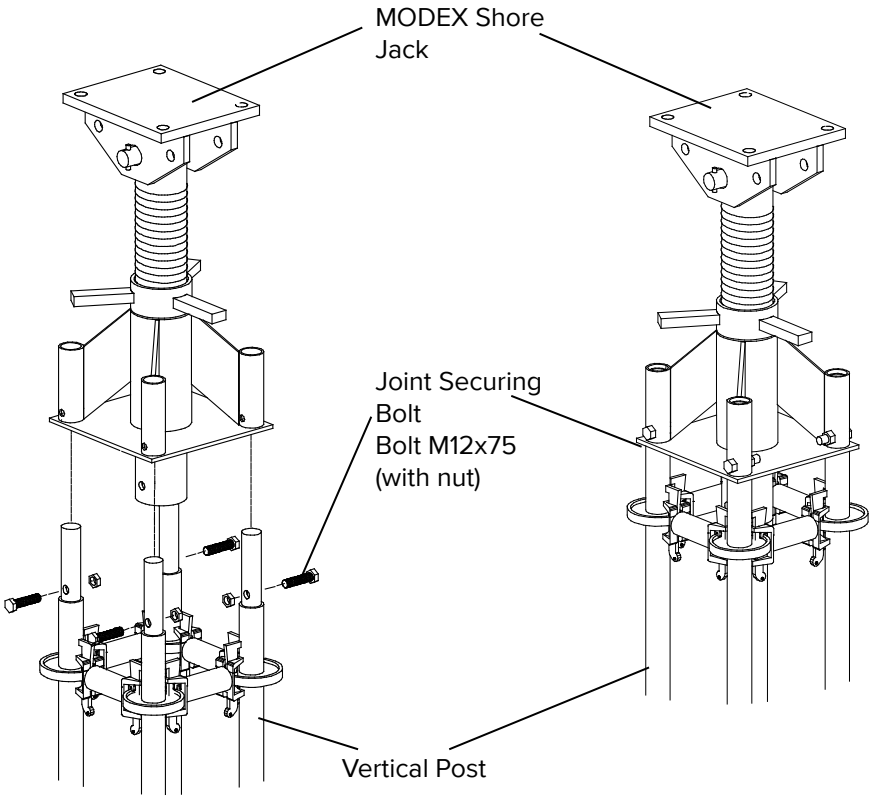
Safety note:

No more than three Vertical Posts may be connected vertically to one another.

Unless stated otherwise, all dimensions in mm.

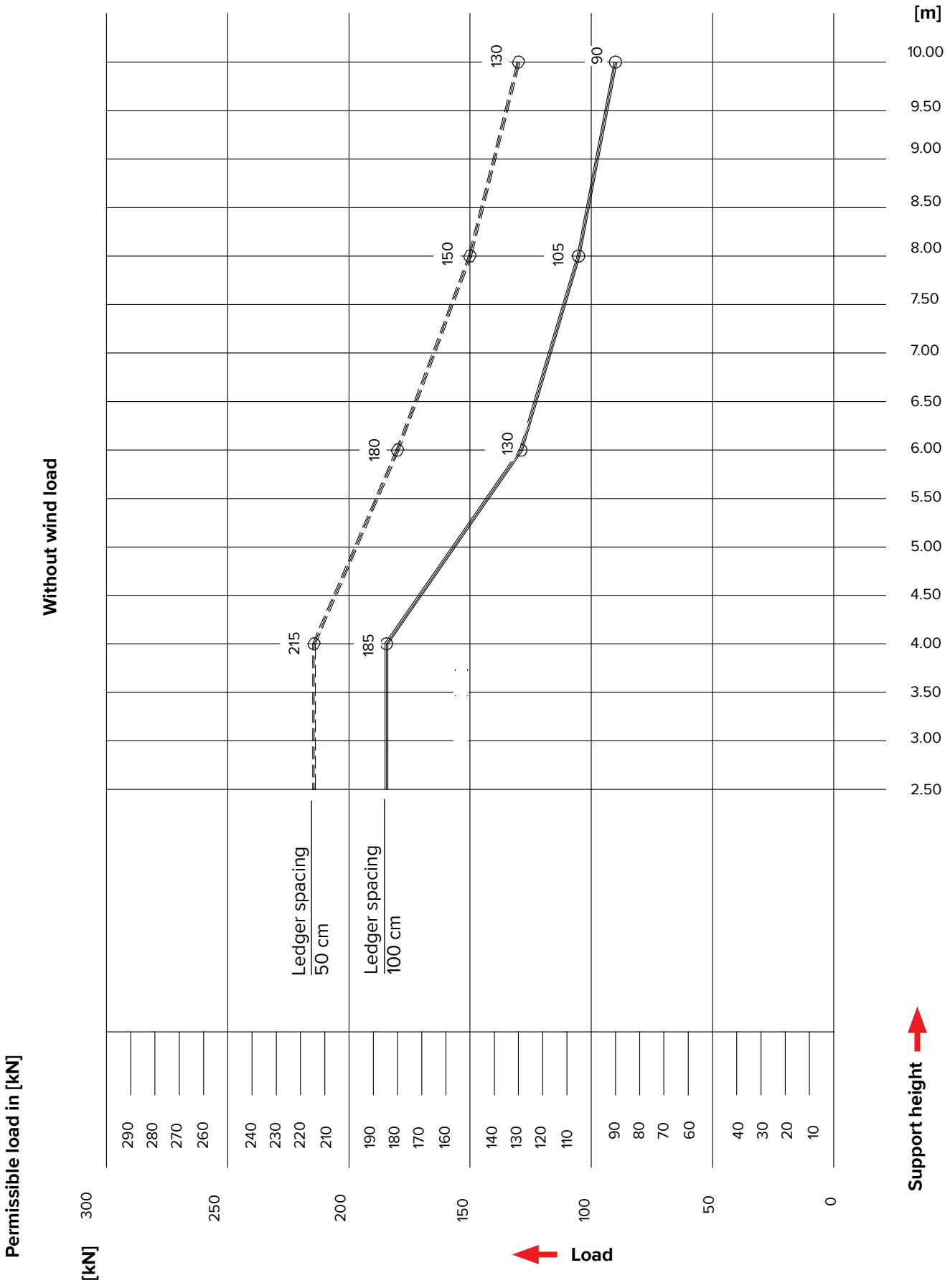
Butt joint on the upper end of the Shore Jack

Attach the last tube ledger collar assembly to the uppermost Rosette on the Vertical Posts. Put the MODEX Shore Jack in place and secure it with the Joint Securing Bolts M12x75.

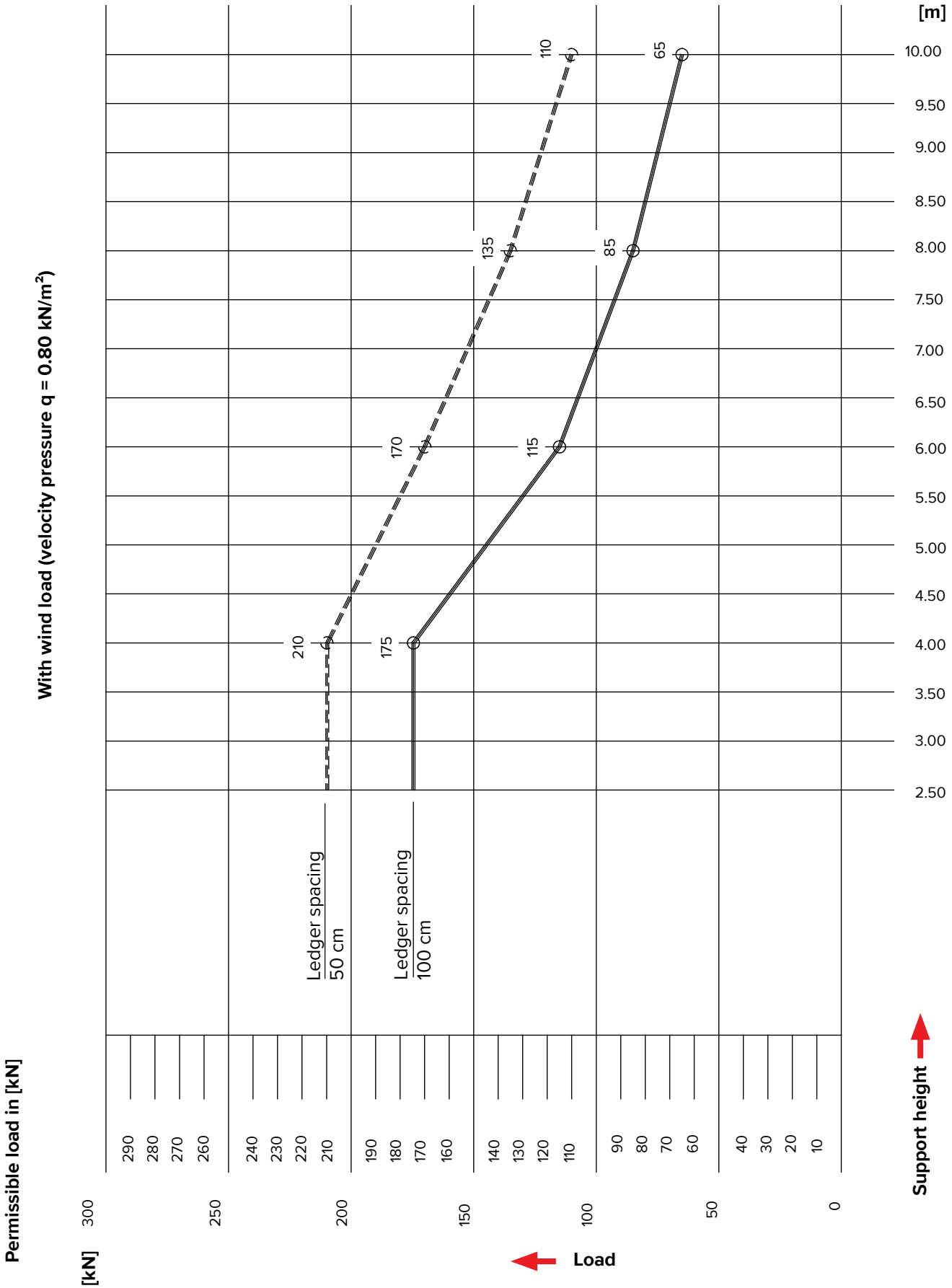


L min - L max cm	MODEX Shore Jack	Connecting Spigot	Joint Securing Bolt M12x75	Shear Force Securing Device	Vertical Post 100	Vertical Post 150	Vertical Post 200	Vertical Post 300	Vertical Post 400	Tube Ledger 25	Ledger spacing cm	Weight
	61.00 kg	0.86 kg	0.10 kg	0.10 kg	5.60 kg	8.00 kg	10.40 kg	15.30 kg	20.20 kg	1.60 kg		
	580 802	553 667	554 710	577 988	470 870	470 881	470 892	470 907	470 918	577 863		
190 - 250	2	4	8	16	4	0	0	0	0	8	50	163.04 kg
240 - 300	2	4	8	24	0	4	0	0	0	12	50	179.84 kg
	2	4	8	16	0	4	0	0	0	8	100	172.64 kg
290 - 350	2	4	8	32	0	0	4	0	0	16	50	196.64 kg
	2	4	8	16	0	0	4	0	0	8	100	182.24 kg
340 - 400	2	4	12	40	4	4	0	0	0	20	50	217.04 kg
	2	4	12	24	4	4	0	0	0	12	100	202.64 kg
390 - 450	2	4	8	48	0	0	0	4	0	24	50	230.64 kg
	2	4	8	24	0	0	0	4	0	12	100	209.04 kg
440 - 500	2	4	12	56	0	4	4	0	0	28	50	250.64 kg
	2	4	12	32	0	4	4	0	0	16	100	229.04 kg
490 - 550	2	4	8	64	0	0	0	0	4	32	50	264.64 kg
	2	4	8	32	0	0	0	0	4	16	100	235.84 kg
540 - 600	2	4	12	72	0	4	0	4	0	36	50	284.64 kg
	2	4	12	40	0	4	0	4	0	20	100	255.84 kg
590 - 650	2	4	12	80	0	0	4	4	0	40	50	301.44 kg
	2	4	12	40	0	0	4	4	0	20	100	265.44 kg
640 - 700	2	4	12	88	0	4	0	0	4	44	50	318.64 kg
	2	4	12	48	0	4	0	0	4	24	100	282.64 kg
690 - 750	2	4	12	96	0	0	4	0	4	48	50	335.44 kg
	2	4	12	48	0	0	4	0	4	24	100	292.24 kg
740 - 800	2	4	16	104	0	4	4	4	0	52	50	355.44 kg
	2	4	16	56	0	4	4	4	0	28	100	312.24 kg
790 - 850	2	4	12	112	0	0	0	4	4	56	50	369.44 kg
	2	4	12	56	0	0	0	4	4	28	100	319.04 kg
840 - 900	2	4	16	120	0	4	4	0	4	60	50	389.44 kg
	2	4	16	64	0	4	4	0	4	32	100	339.04 kg
890 - 950	2	4	12	128	0	0	0	0	8	64	50	403.44 kg
	2	4	12	64	0	0	0	0	8	32	100	345.84 kg
940 - 1000	2	4	16	136	0	4	0	4	4	68	50	423.44 kg
	2	4	16	72	0	4	0	4	4	36	100	365.84 kg

12.4 Technical data



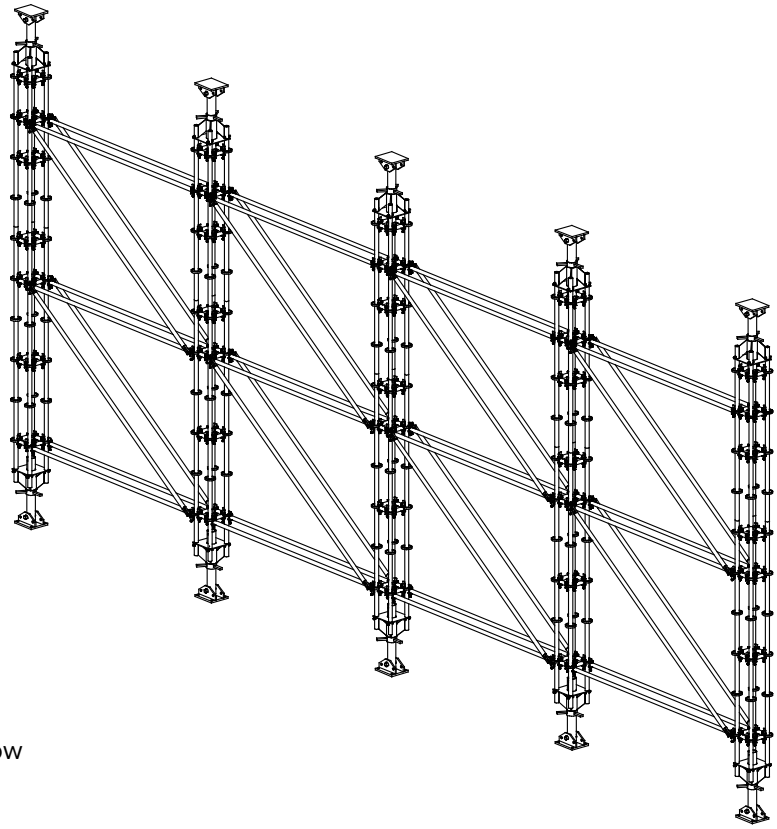
Heavy-duty shore



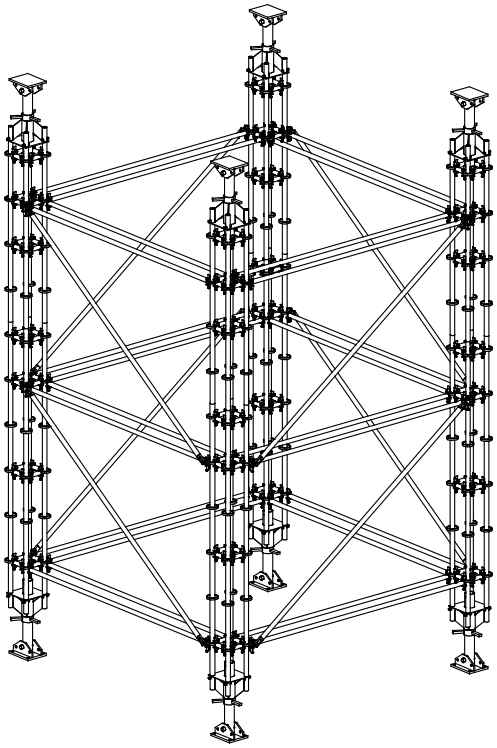
Unless stated otherwise, all dimensions in mm.

12.5 Examples of applications

MODEX Shore Jack used in...



... a single row



... a scaffold tower

NOTE	**Note!** When proper certification is provided, greater loads than those stated on pages 177 and 178 are possible in certain cases!

13 Shoring towers – MODEX as support scaffold

13.1 Description and potential uses

The MODEX scaffold system made by HÜNNEBECK is a modular scaffold characterised by its wide range of potential uses wherever scaffolding is needed. Shoring towers are temporary site structures that

- Absorb the load of freshly poured concrete until the structure itself reaches a sufficient load capacity
- Absorb the load of components, systems and equipment used to erect, maintain, modify or tear down buildings and other structures
- Can be used for temporary storage of constructions materials, components and equipment.

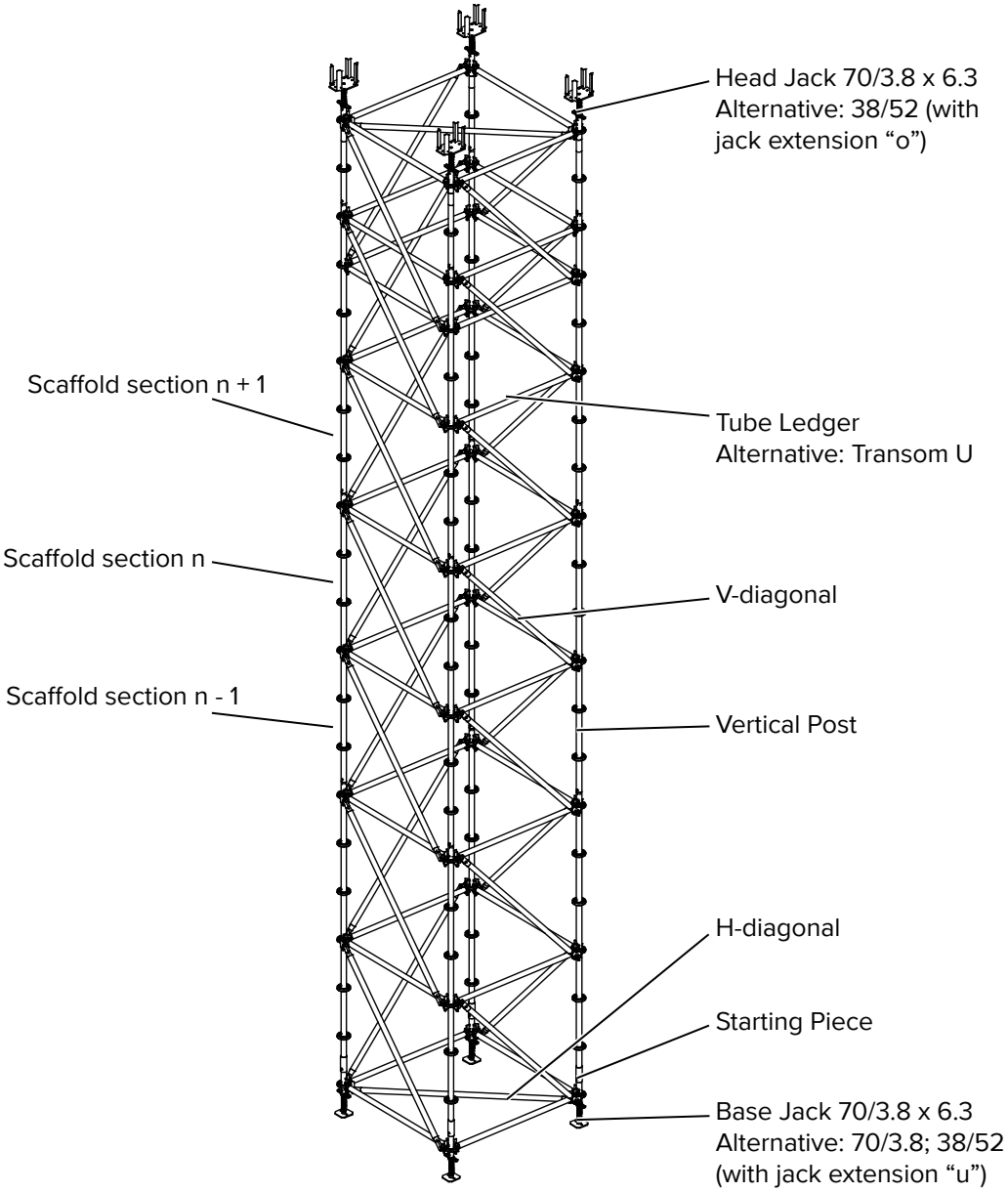
For diverting vertical loads:

- Shoring towers fixed at head (i.e. cannot be moved) with heights ranging from H = 2.825 m (system 300) to H = 21.375 m (system 2100), with all footprint dimensions shown in Section *Shoring tower footprints* on page 183 and a double Vertical Diagonal at the top.
- Shoring towers fixed at head (i.e. cannot be moved), with intermediate supports.

The height $H_{min/max}$ is measured from the bottom of the base plate to the top of the upper plate.

A shoring tower is considered to be fixed at head when the formwork or load cannot be moved laterally.

The MODEX scaffold system can be used to set up other kinds of shoring towers, as long as there is proof of structural integrity or type tests confirm the stability.



NOTE	**Note!** The safety rules issued by the German trade associations and applicable regulations regarding occupational health and safety must always be complied with when using shoring towers. The German ordinance on industrial safety and health (BetrSichV) and the German technical rules on operational safety (TRBS 1203, TRBS 2121, TRBS 2140) are particularly important.

System components of the MODEX shoring tower

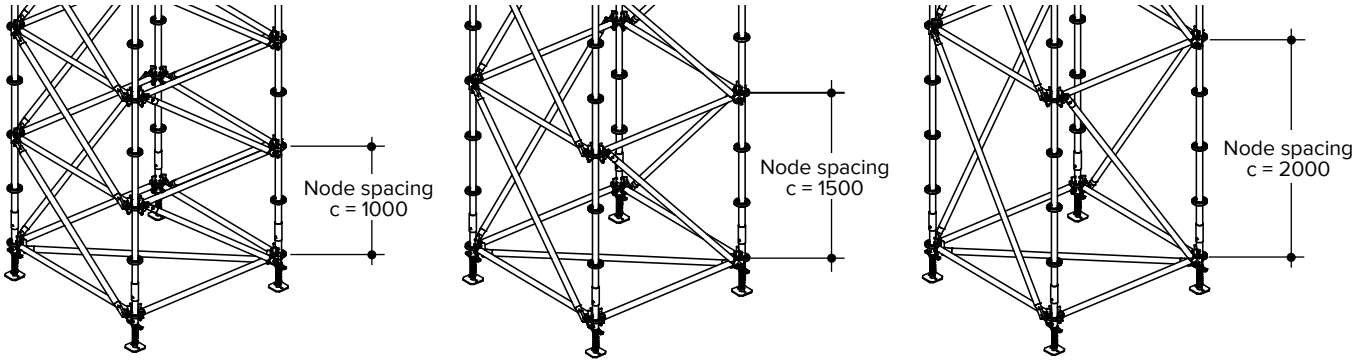
The shoring towers are made up of four braced posts and are square or rectangular in shape. Each tower face is viewed separately as a planar system. So two directions have to be taken into consideration for a rectangular tower.

The tower is erected by connecting the Vertical Posts with Tube Ledgers (Transoms U) and bracing them with V-diagonals. The entire tower is braced with Diagonals. The Diagonals overlap at the top: The Diagonal (n+1) begins before the Diagonal (n) ends. The course of the Vertical Diagonals may be determined by the components attached to the tower, e.g. bracing.

Node spacing

Type testing provides proof of three systems (Refer to the illustrations below):

- Node spacing c = 100 cm
- Node spacing c = 150 cm
- Node spacing c = 200 cm



Each section of the scaffold is framed by two ledgers braced with a V-diagonal. The scaffold section is defined by:

- The Tube Ledger a (width of the load-bearing scaffold level in horizontal direction)
- The Tube Ledger b (width of the area exposed to wind in horizontal direction)
- Node spacing c (Tube Ledger spacing in vertical direction).

With node spacing c = 1000 and c = 2000, the top two ledgers are spaced 50 cm apart; and with node spacing c = 1500 the ledgers are spaced 50 cm or 100 cm apart.

Using the available Vertical Posts of different lengths, the Base Jacks and the Head Jacks, any height between H = 2.825 m and H = 21.375 m can be achieved by extending the jacks as needed.

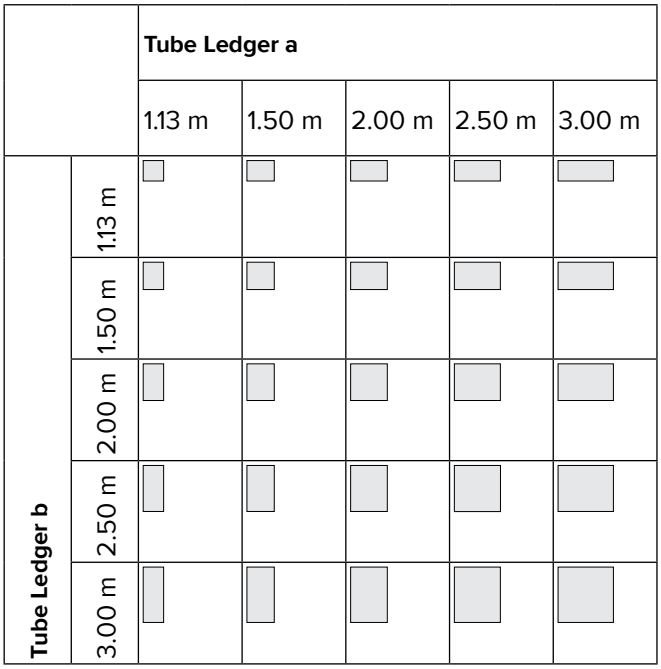
The Vertical Post joints can generally be positioned anywhere within the scaffold section. But keep in mind that only one joint per scaffold section is permissible and the joints have to be positioned the same for all four Vertical Posts.

The following applies to a shoring tower with node spacing c = 200 cm: If there is a Vertical Post joint in scaffold section n, there may not be another joint in the next-lower section n - 1 or the next-higher section n + 1. But if there is a joint directly above a ledger (150 mm above the lower edge of the Rosette), another joint can be placed anywhere in the next-higher scaffold section.

Unless stated otherwise, all dimensions in mm.

Shoring tower footprints

There are 25 different tower footprints possible using the available Tube Ledgers, Vertical Diagonals and Horizontal Diagonals (Refer to the overview below).



Diagrams and Tables

The diagrams on pages 186ff make it simple to determine the load bearing capacity of a shoring tower. These are followed by diagrams for ledger lengths 1.13 to 3.00 m. Additional tables can be found in the type testing information “MODEX shoring towers pursuant to EN 12812.” This describes the structure of MODEX shoring towers with the following dimensions:

- Node spacing c = 100/150/200 (spacing of Tube Ledgers)
- Tube Ledgers a = 1130/1500/2000/2500/3000 (width of load-bearing scaffold level)
- Tube Ledgers a = 1130/1500/2000/2500/3000 (width of area exposed to wind)
- System H = 3000/..../12000/..../21000 (34 systems)

The system designation H indicates the minimum (H/100 - 0.175) and maximum (H/100 + 0.375) erection height in [m], from the bottom of the Base Jack to the top of the Head Jack.

Using the diagrams, the load capacity of the shoring towers can be determined without intermediate calculations. The only input variable needed to determine the load is the coefficient of velocity pressure q [kN/m^2]. The intermediate calculation steps used to determine the wind load (φ, η, χ, a/b, A_1, c_f) are not required.

13.2 Example of dimensioning

The following example is intended to show how to use the diagrams. The goal is to determine the load capacity of a post in a MODEX shoring tower with the following dimensions:

- Shoring tower height H = 12.20 m
  (distance from the bottom of the Base Jack to the top of the Head Jack)
- Node spacing c = 1.50 m (spacing of Tube Ledgers)
- Tube Ledgers a = 2.00 m (width of load-bearing scaffold level)
- Tube Ledgers b = 3.00 m (width of area exposed to wind)
- Velocity pressure q = 1.00 kN/m²

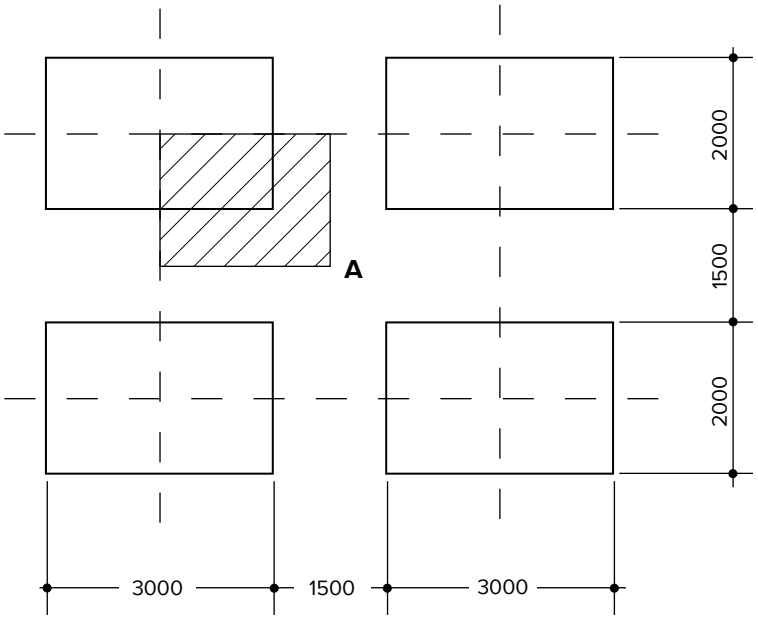
Applying the serviceable life factor χ = 0.6 for the duration of the temporary state of up to 12 months, for the velocity pressure q = 1.00 kN/m² the result is a reduced velocity pressure of:

q x χ = 0.60 kN/m²

Diagram D8 (page 195) then indicates:

- Node spacing c = 1.50 m and Tube Ledger a = 2.00 m
- Tube Ledger b = 3.00 m
- System 1200 for shoring tower heigh H = 12.20 m

Permissible post load $P_{perm.}$ = 35.5 kN.



Design loads

When the ceiling thickness is d = 0.20 m, the characteristic loads are:

Fresh concrete pursuant to EN 12812:2008-12: $P_{concrete}$ = 0.20 x 25.0 = 5.00 kN/m²

Dead weight of ceiling formwork: g_s = 0.25 kN/m²

Equivalent load for operation pursuant to EN 12812:2008-12 p_V = 1.50 kN/m²

Additional load due to accumulation of concrete pursuant to EN 12812:2008-12 p_{BA} = 1.75 kN/m²

Total load: p_{total} = 8.50 kN/m²

Unless stated otherwise, all dimensions in mm.

Spacing the shoring towers 1.50 m apart in both directions results in an influence area per Vertical Post of:

$A = (3.0 / 2 + 1.50 / 2) \times (2.0 / 2 + 1.50 / 2) = 2.25 \times 1.75 = 3.94\ m^2$

Proof:

$P_{exist.} = 3.94 \times 8.50 = 33.5\ kN < 35.5\ kN = P_{perm.}$

The same value can be found in the applicable load capacity table T8.

The following intermediate values are intended only to aid understanding: They are not required to be able to use the diagrams and the table.

$A_1 = 0.31\ m^2/m$
(reference area, Table 4 for node spacing c = 1500 and Tube Ledgers b = 3.00 m)

$\eta = 0.85$
(reduction factor)

$c_f = 1.3$
(aerodynamic coefficient)

$A_c = c_f \times A_1 \times (1 + \eta) = 1.3 \times 0.31 \times (1 + 0.85) = 0.75\ m^2/m$
(reduced reference area)

$w = A_c \times q \times \chi = 0.75 \times 0.6 = 0.45\ kN/m$
(reduced wind load)

Keep in mind that the coefficient of velocity pressure for the working wind of $q = 0.20\ kN/m^2$ may not be reduced applying the serviceable life factor χ!

Example from Diagram D8

MODEX

HÜNNEBECK BY BRAND SAFWAY

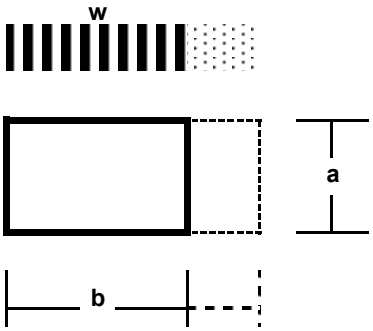
Annex D8
Edition March 5, 2010

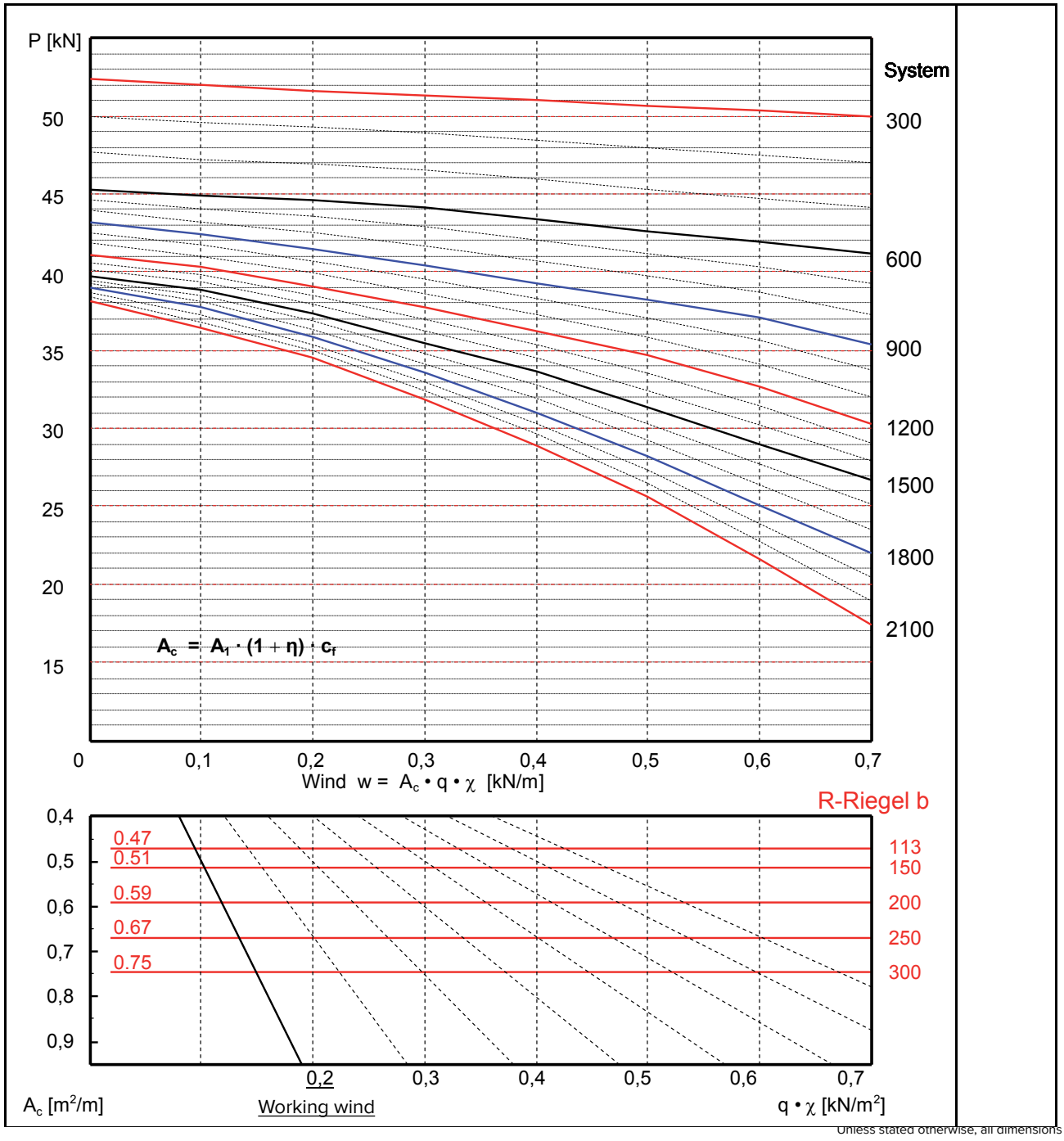
Shoring tower, braced at head, option 1: double diagonal

Permissible post loads depending on wind direction

Node spacing	**150**
Tube ledger a	**200**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is $\chi = 1.0$





Unless stated otherwise, all dimensions in mm.

Shoring tower tied at top: system heights and shoring tower heights (heights [m])

Distance from the bottom of the Base Jack to the top of the Head Jack

Node spacing 200 cm	Node spacing 150 cm	Node spacing 100 cm	Designation System height
Height [m]			
20.825 - 21.375			21.00
20.325 - 20.875			20.50
19.825 - 20.375			20.00
19.325 - 19.875			19.50
18.825 - 19.375			19.00
18325 - 18.875			18.50
17.825 - 18.375			18.00
17.325 - 17.825			17.50
16.825 - 17.375			17.00
16.325 - 16.875			16.50
15.825 - 16.372			16.00
15.325 - 15.875			15.50
14.825 - 15.375			15.00
14.325 - 14.875			14.50
13.825 - 14.375			14.00
13.325 - 13.875			13.50
12.825 - 13.375			13.00
12.325 - 12.875			12.50
11.825 - 12.375			12.00
11.325 - 11.875			11.50
10.825 - 11.375			11.00
10.325 - 10.875			10.50
9.825 - 10.375			10.00
9.325 - 9.875			9.50
8.825 - 9.375			9.00
8.325 - 8.875			8.50
7.825 - 8.375			8.00
7.325 - 7.875			7.50
6.825 - 7.375			7.00
6.325 - 6.875			6.50
5.825 - 6.375			6.00
5.325 - 5.875			5.50
4.825 - 5.375			5.00
4.325 - 4.875			4.50

MODEX

HÜNNEBECK
BY BRAND SAFWAY

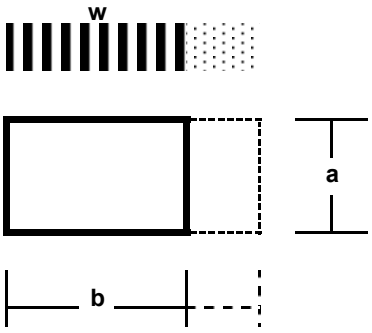
Annex D1
Edition March 5, 2010

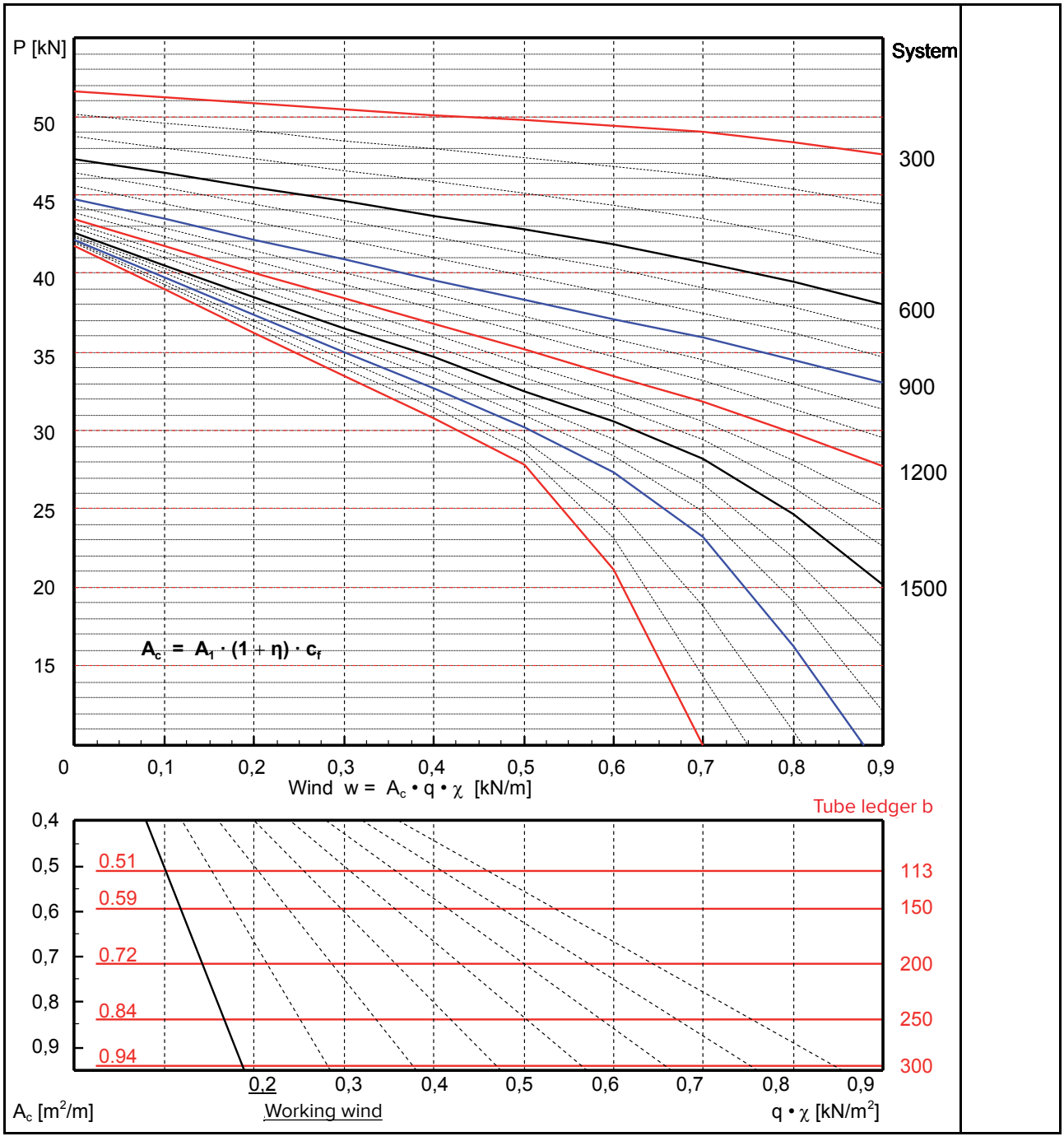
Shoring tower, braced at head, option 1: double diagonal

Permissible post loads depending on wind direction

Node spacing	**100**
Tube ledger a	**113**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK
BY BRAND SAFWAY

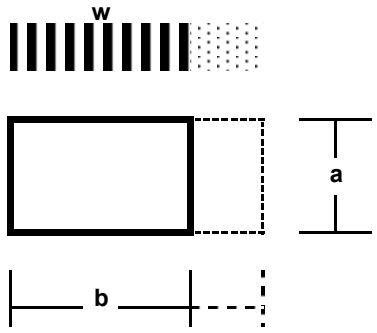
Shoring tower, braced at head, option 1: double diagonal

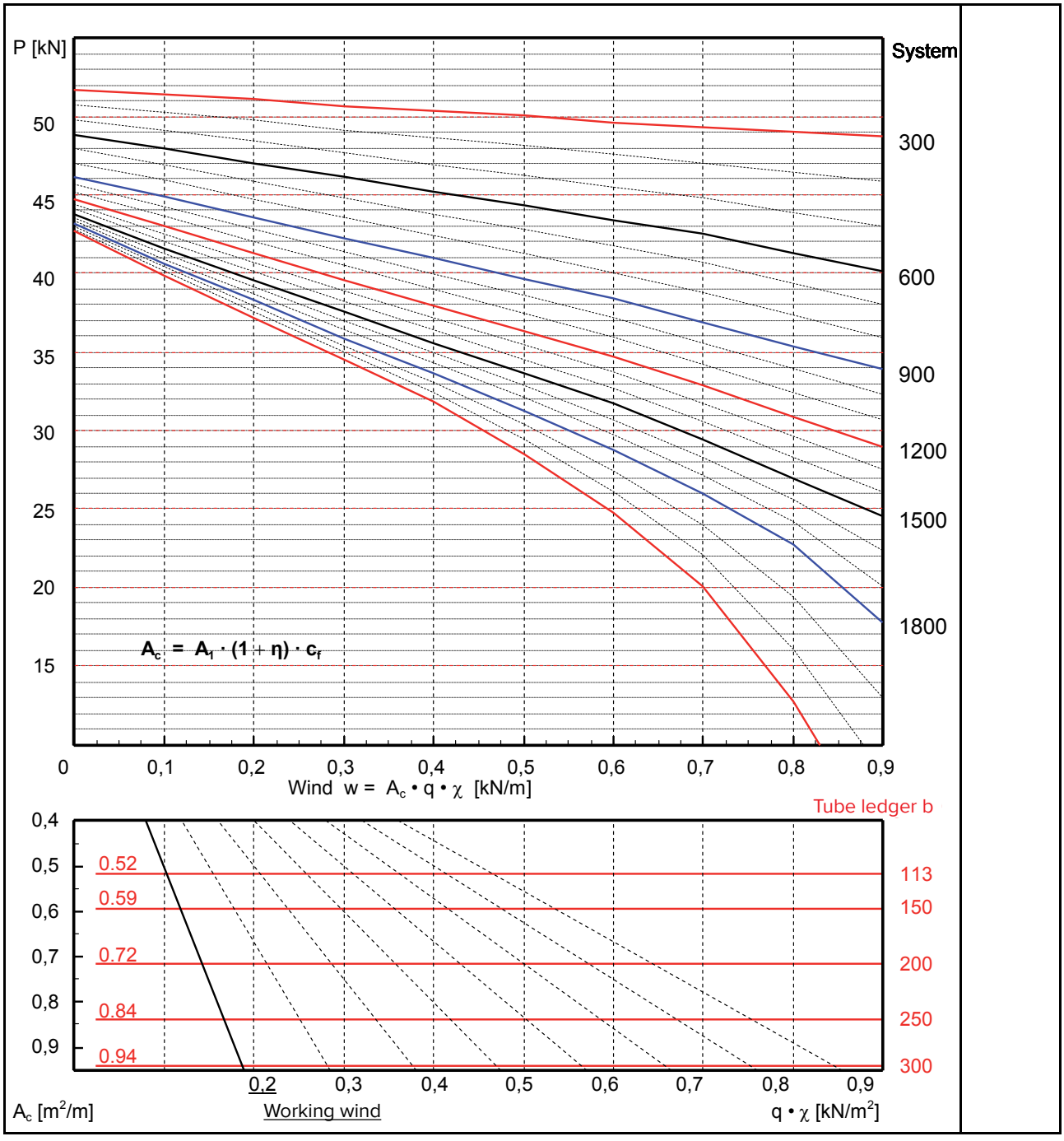
Permissible post loads depending on wind direction

Annex D2
Edition March 5, 2010

Node spacing	**100**
Tube ledger a	**150**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK BY BRAND SAFWAY

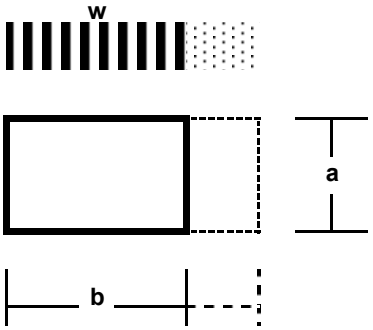
Annex D3
Edition March 5, 2010

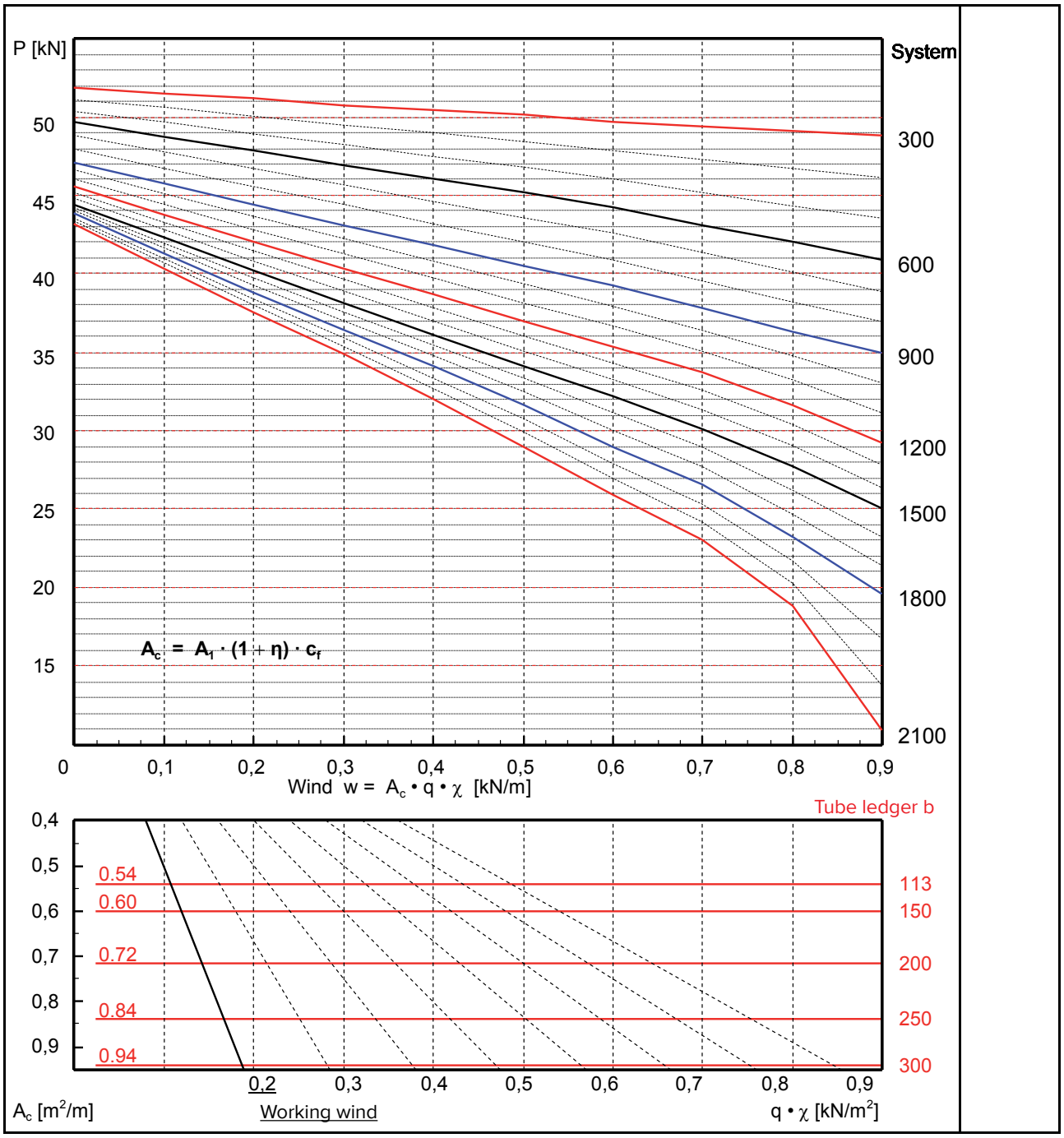
Shoring tower, braced at head, option 1: double diagonal

Permissible post loads depending on wind direction

Node spacing	**100**
Tube ledger a	**200**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK
BY BRAND SAFWAY

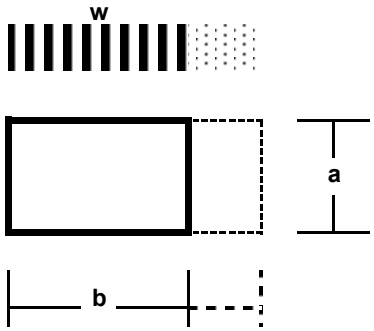
Shoring tower, braced at head, option 1: double diagonal

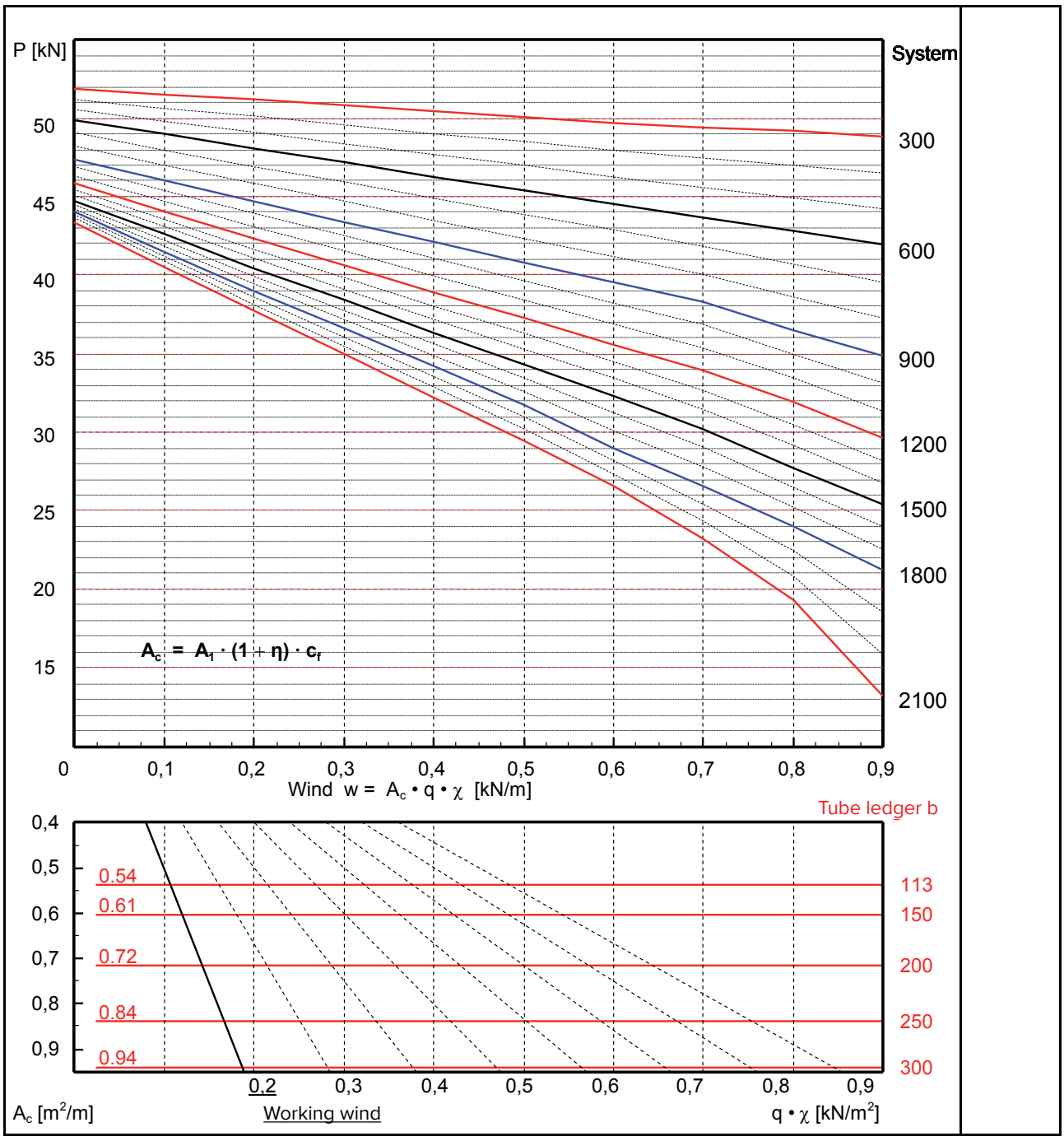
Permissible post loads depending on wind direction

Annex D4
Edition March 5, 2010

Node spacing	**100**
Tube ledger a	**250**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

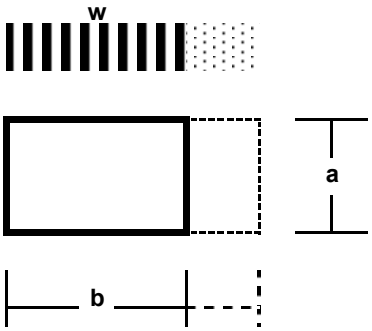
HÜNNEBECK BY BRAND SAFWAY

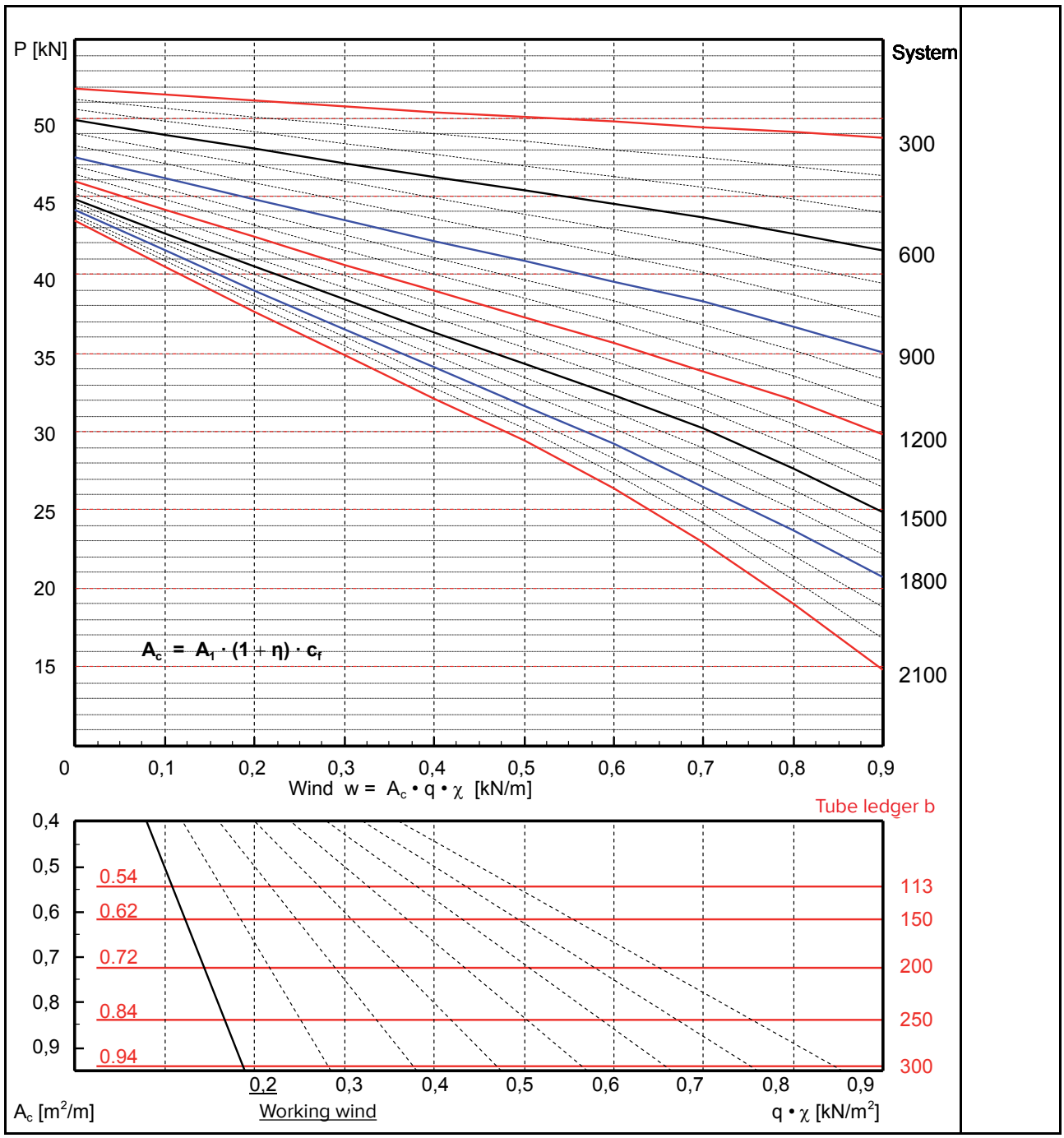
Annex D5
Edition March 5, 2010

Shoring tower, braced at head, option 1: double diagonal
Permissible post loads depending on wind direction

Node spacing	**100**
Tube ledger a	**200**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK
BY BRAND⟩SAFWAY

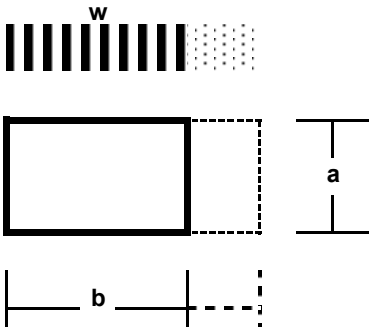
Shoring tower, braced at head, option 1: double diagonal

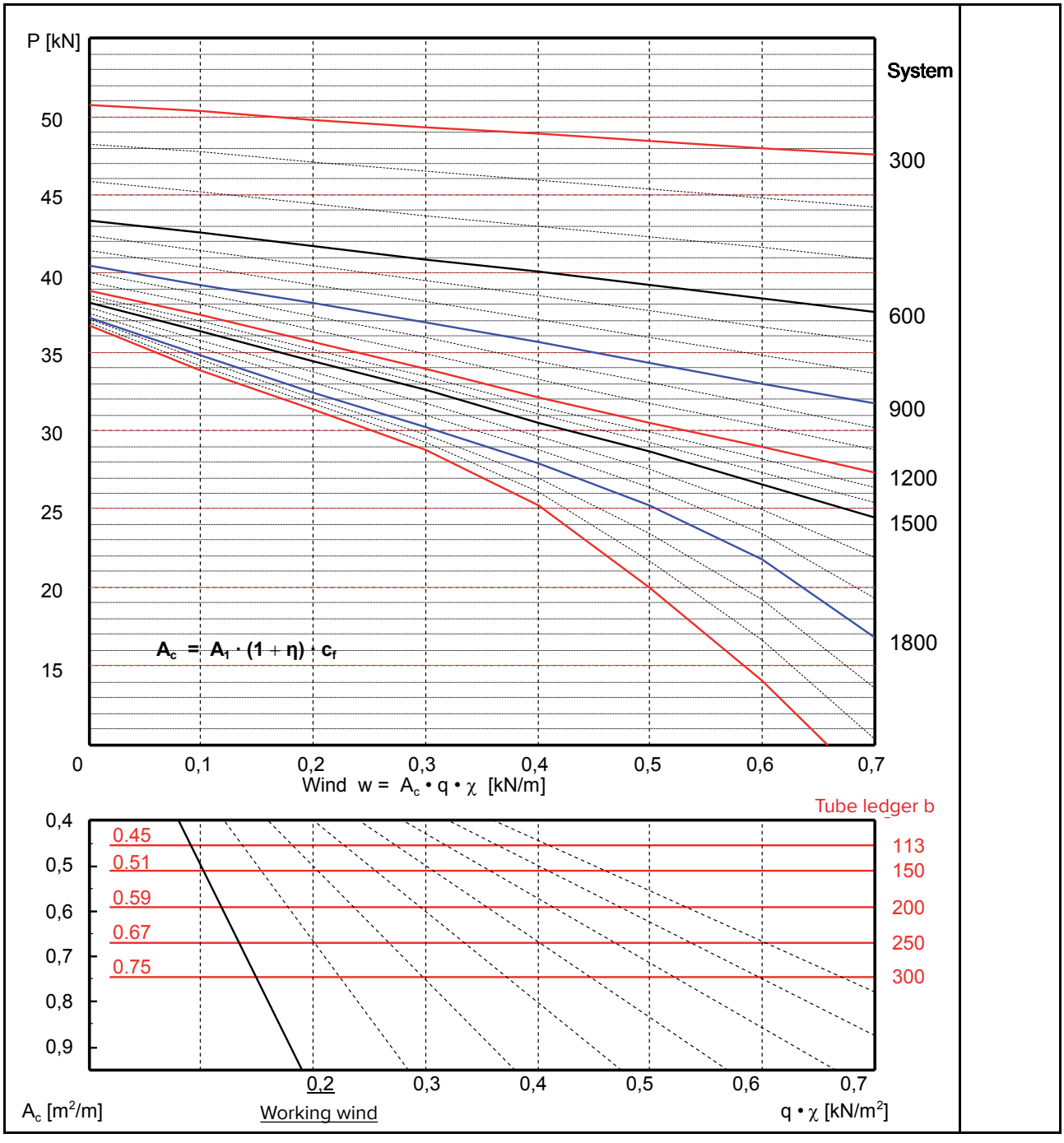
Permissible post loads depending on wind direction

Annex D6
Edition March 5, 2010

Node spacing	**150**
Tube ledger a	**113**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK BY BRAND SAFWAY

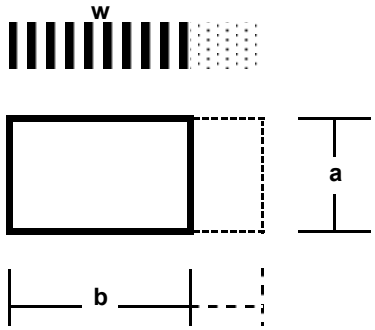
Annex D7
Edition March 5, 2010

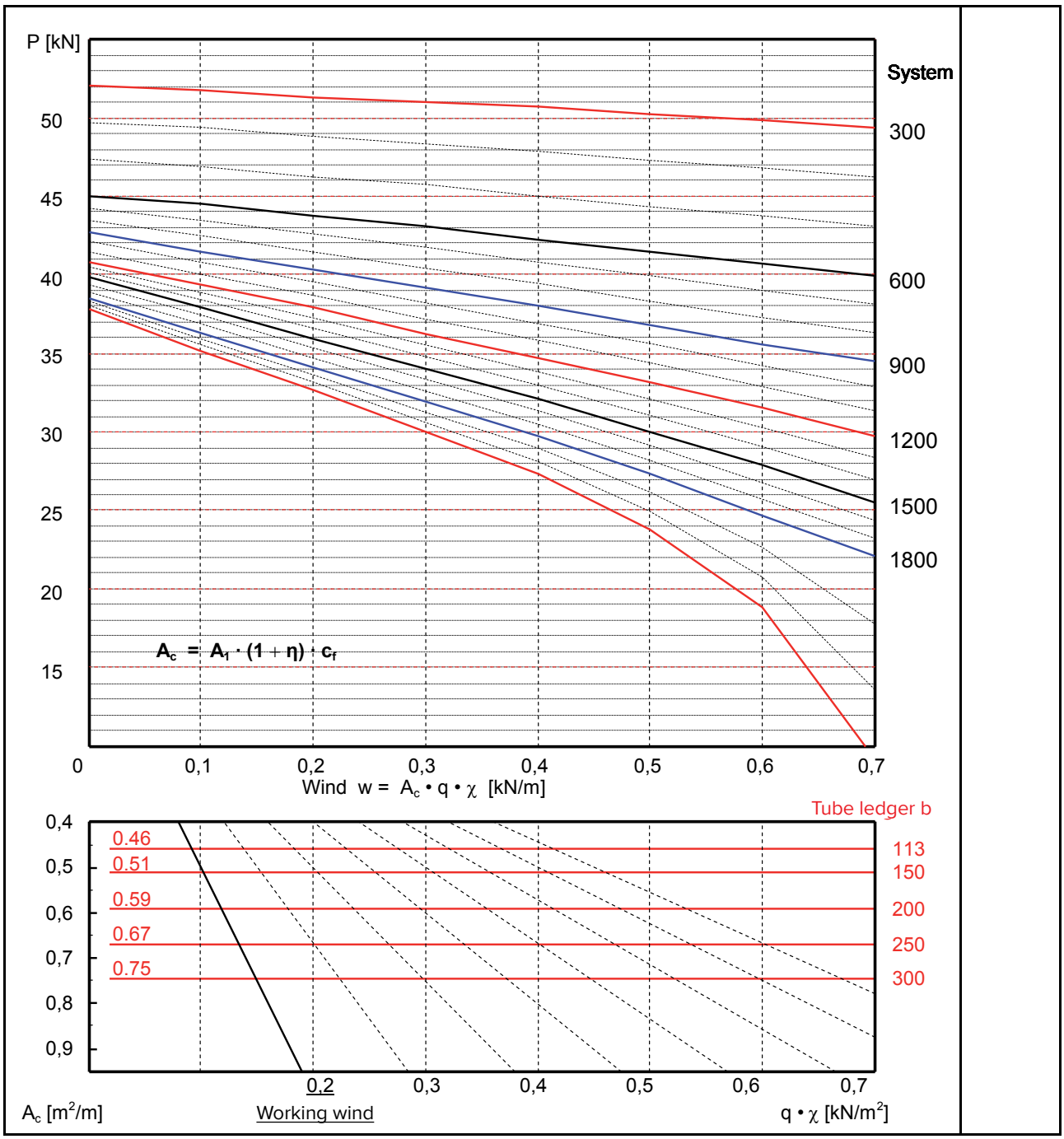
Shoring tower, braced at head, option 1: double diagonal

Permissible post loads depending on wind direction

Node spacing	**150**
Tube ledger a	**150**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK BY BRAND SAFWAY

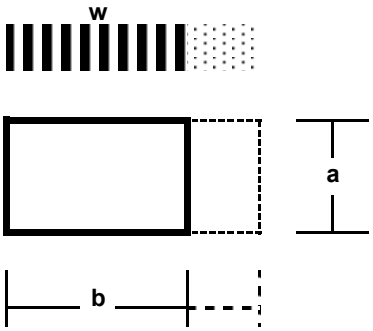
Shoring tower, braced at head, option 1: double diagonal

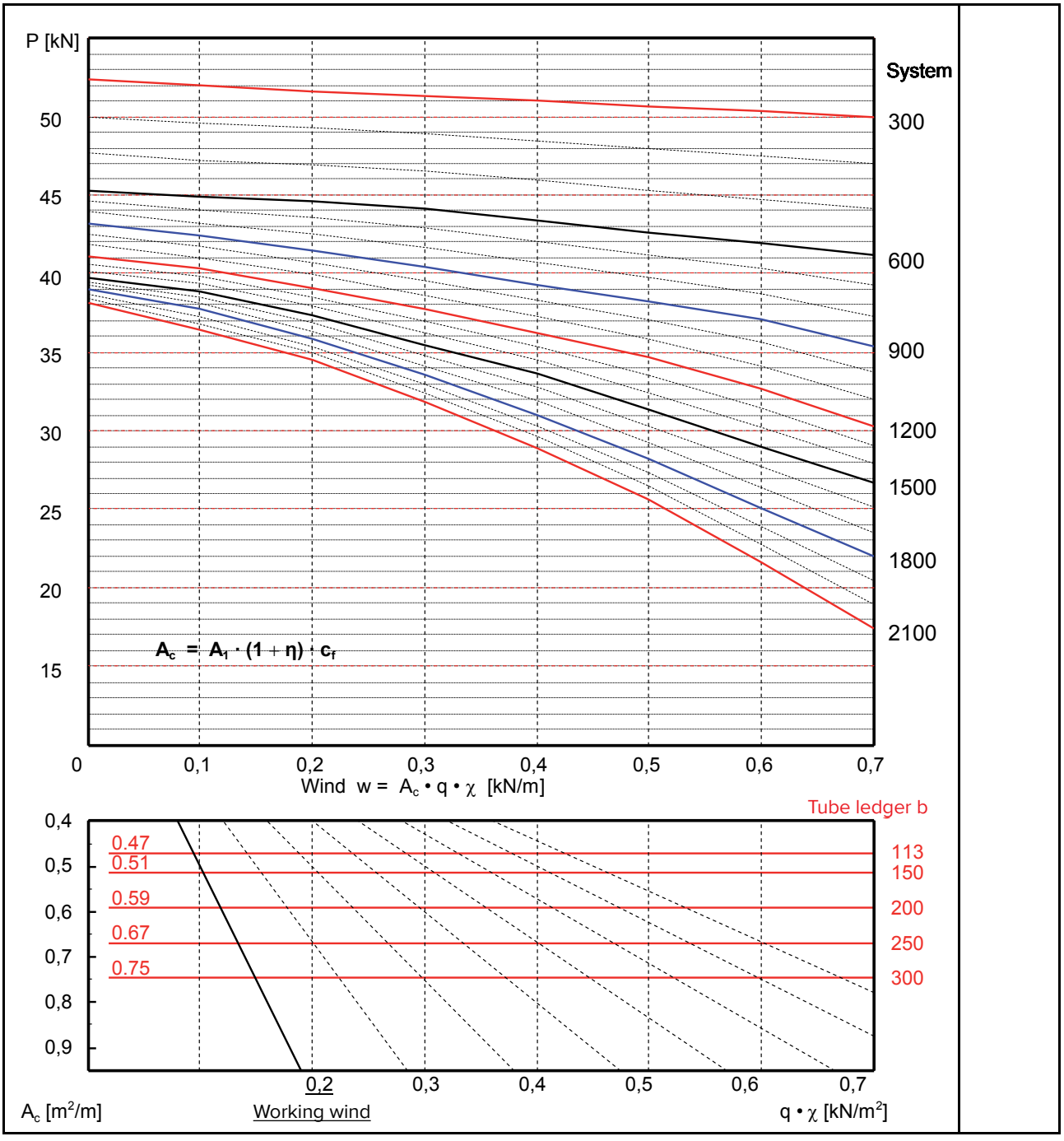
Permissible post loads depending on wind direction

Annex D8
Edition March 5, 2010

Node spacing	**150**
Tube ledger a	**200**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK BY BRAND SAFWAY

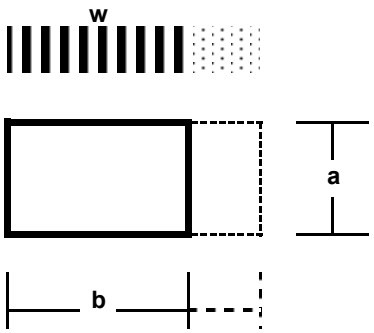
Annex D9
Edition March 5, 2010

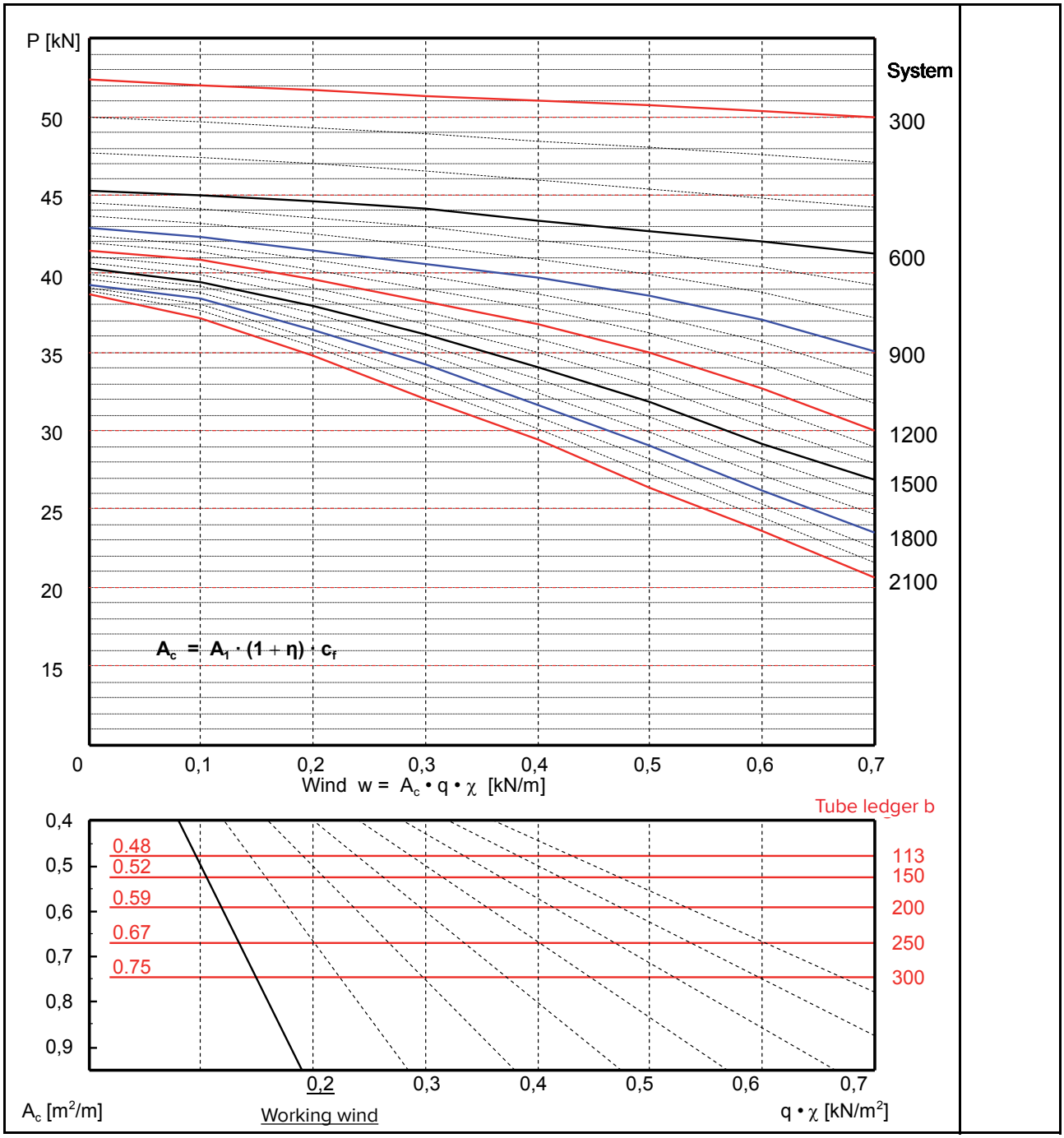
Shoring tower, braced at head, option 1: double diagonal

Permissible post loads depending on wind direction

Node spacing	**150**
Tube ledger a	**250**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is $\chi = 1.0$





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK BY BRAND SAFWAY

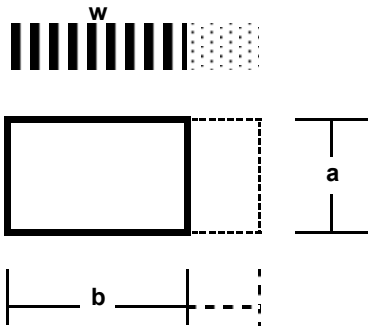
Shoring tower, braced at head, option 1: double diagonal

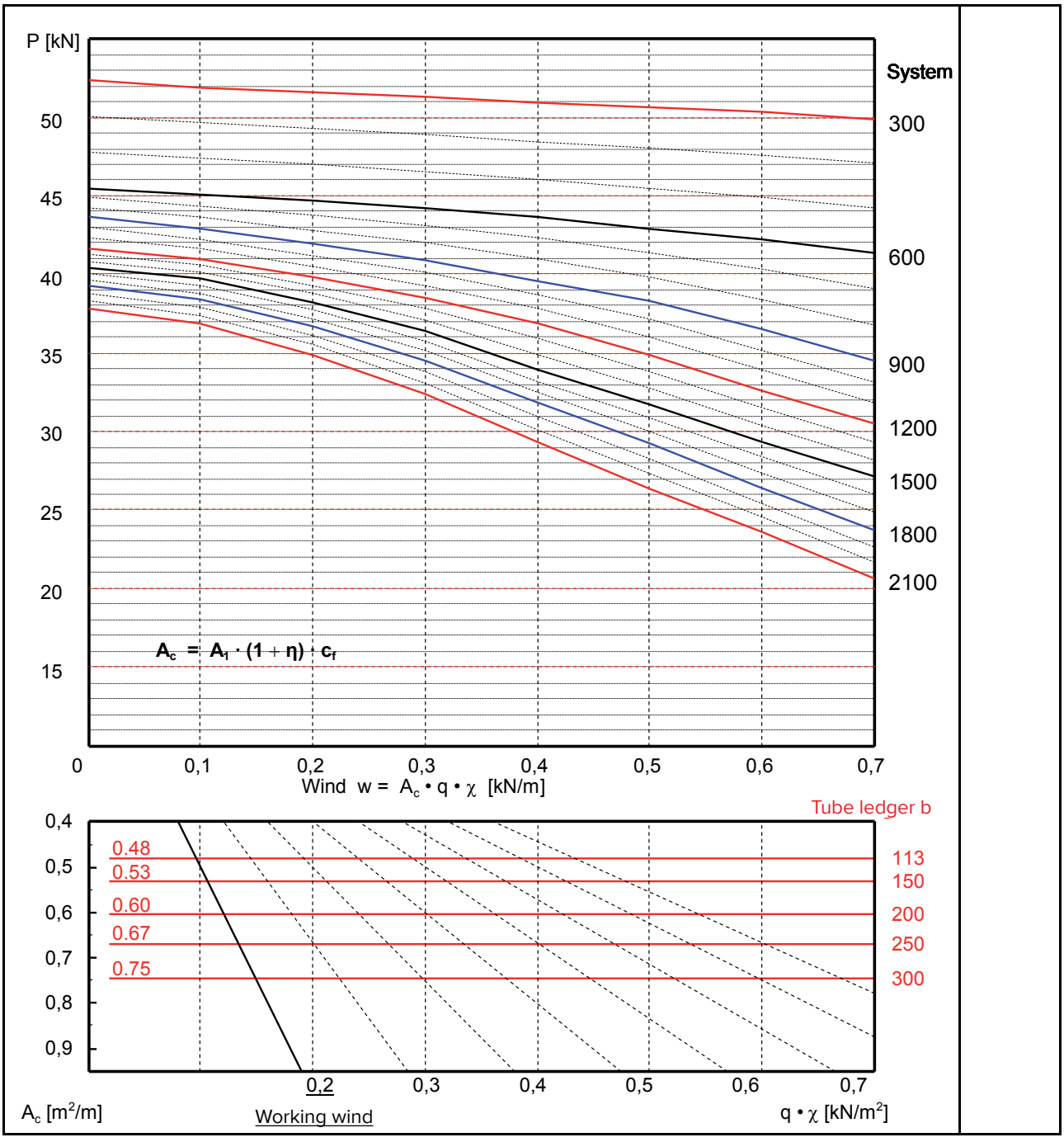
Permissible post loads depending on wind direction

Annex D10
Edition March 5, 2010

Node spacing	**150**
Tube ledger a	**300**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK BY BRAND SAFWAY

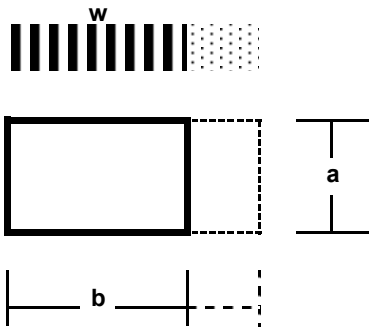
Annex D11
Edition March 5, 2010

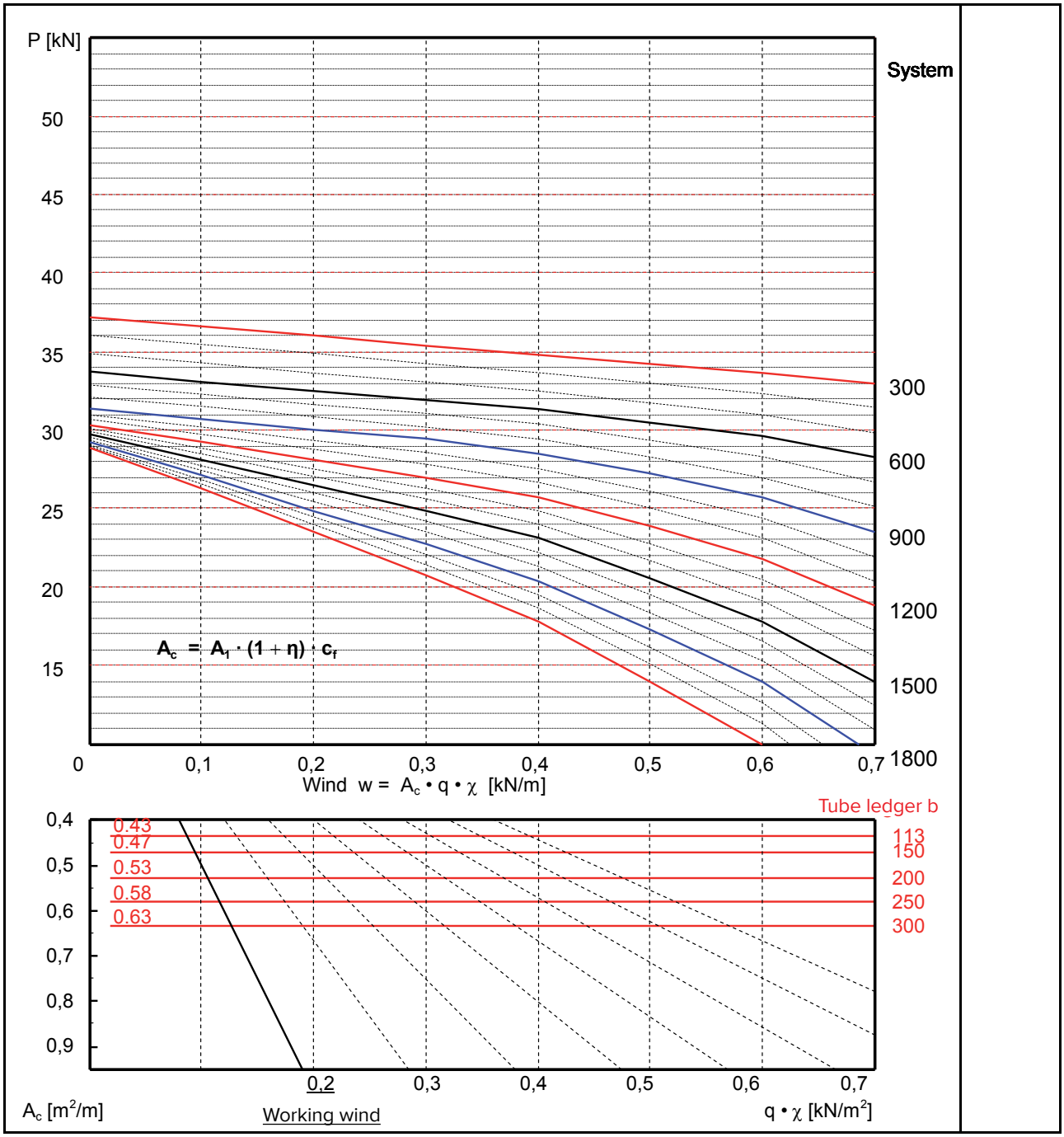
Shoring tower, braced at head, option 1: double diagonal

Permissible post loads depending on wind direction

Node spacing	**200**
Tube ledger a	**113**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

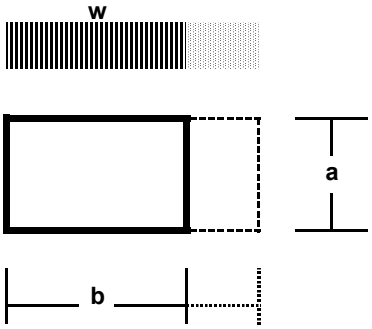
HÜNNEBECK
BY BRAND SAFWAY

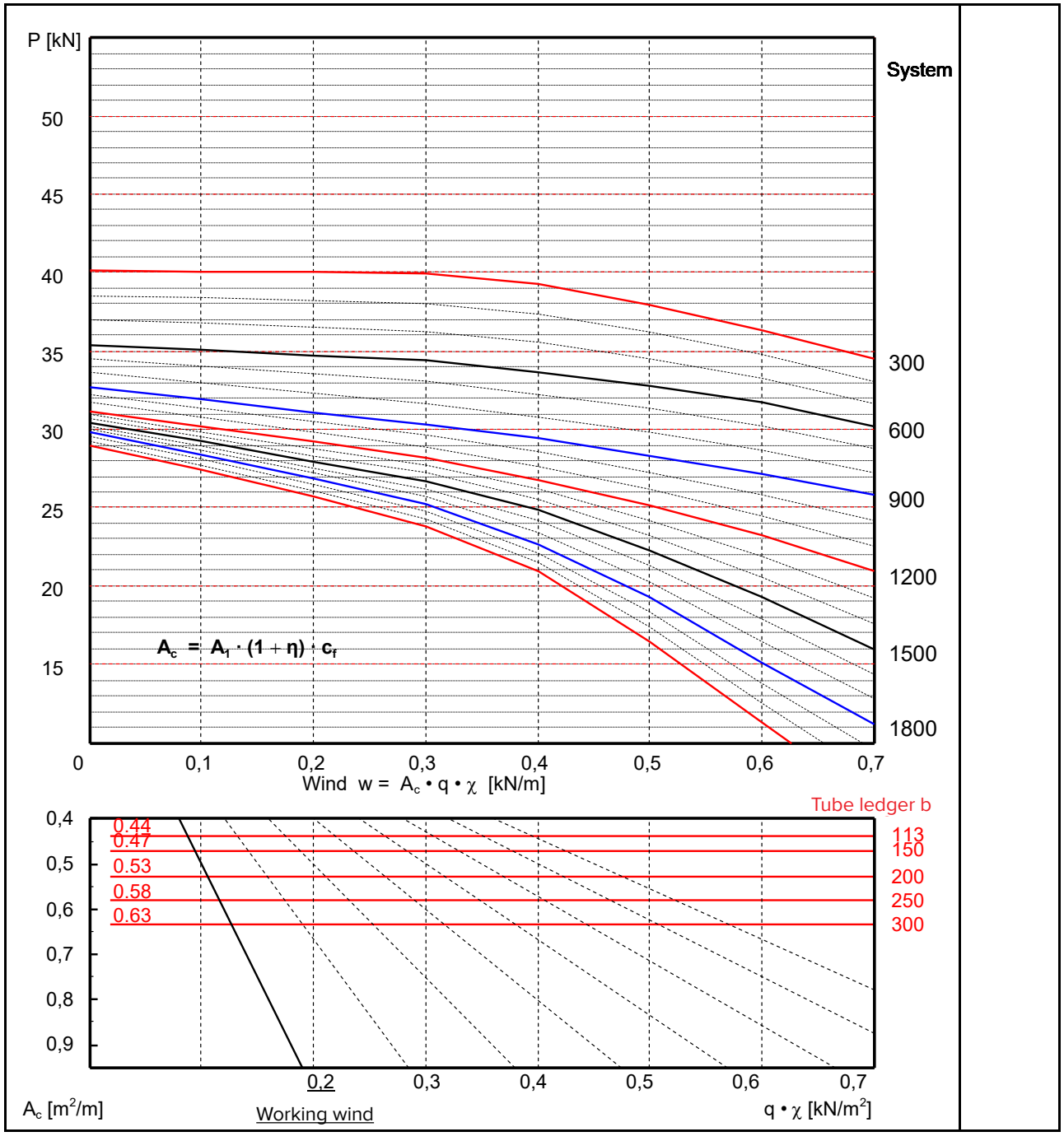
Shoring tower, braced at head, option 1: double diagonal
Permissible post loads depending on wind direction

Annex D12
Edition March 5, 2010

Node spacing	**200**
Tube ledger a	**150**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

HÜNNEBECK BY BRAND SAFWAY

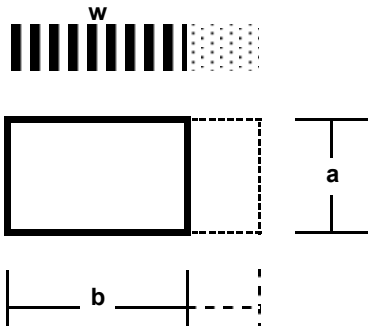
Annex D13
Edition March 5, 2010

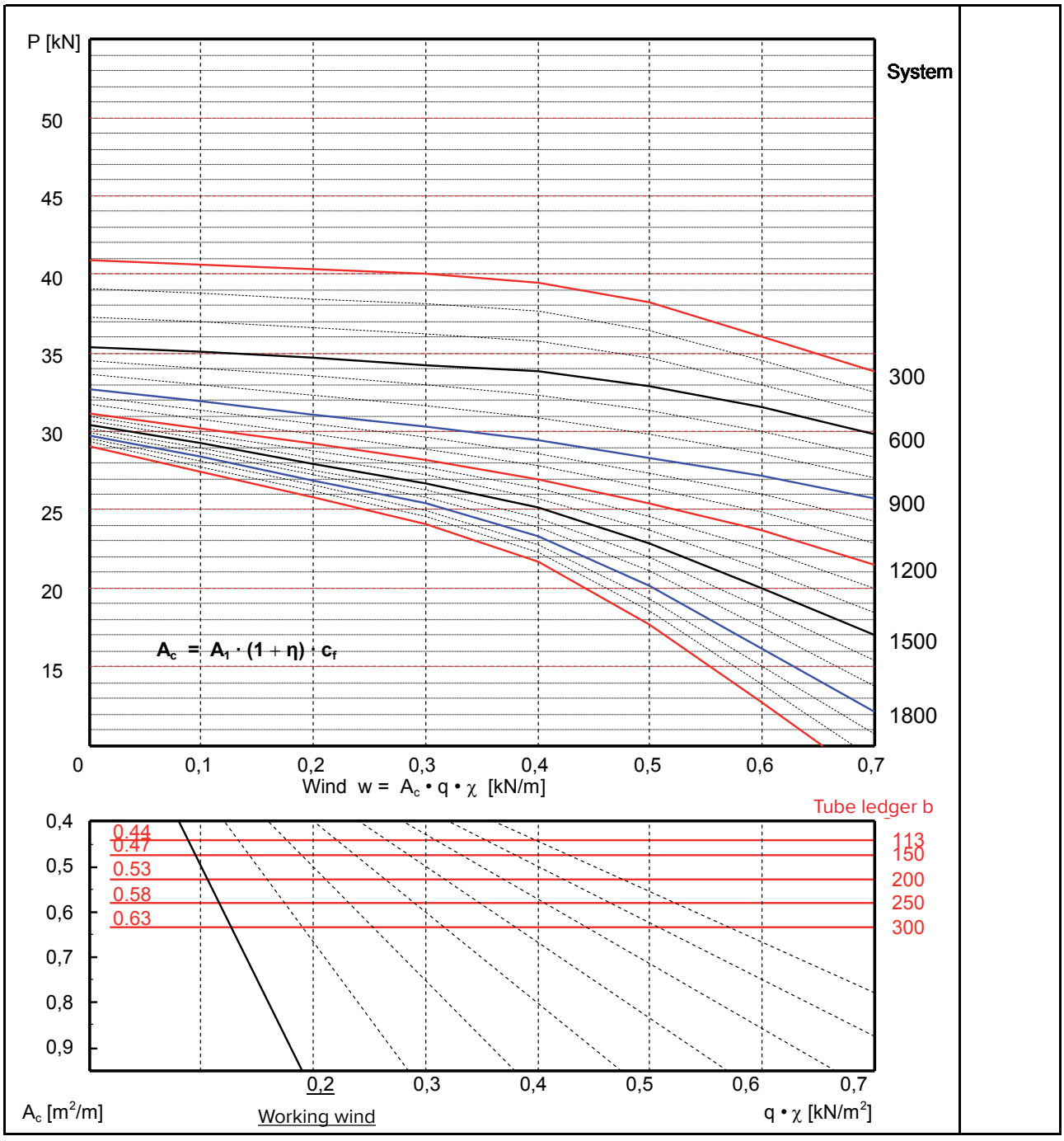
Shoring tower, braced at head, option 1: double diagonal

Permissible post loads depending on wind direction

Node spacing	**200**
Tube ledger a	**200**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

MODEX

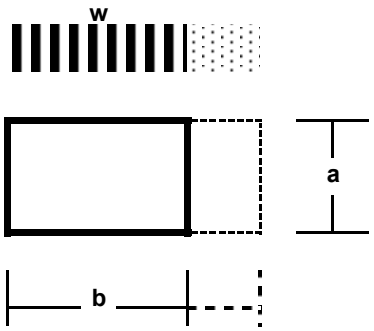
HÜNNEBECK
BY BRAND SAFWAY

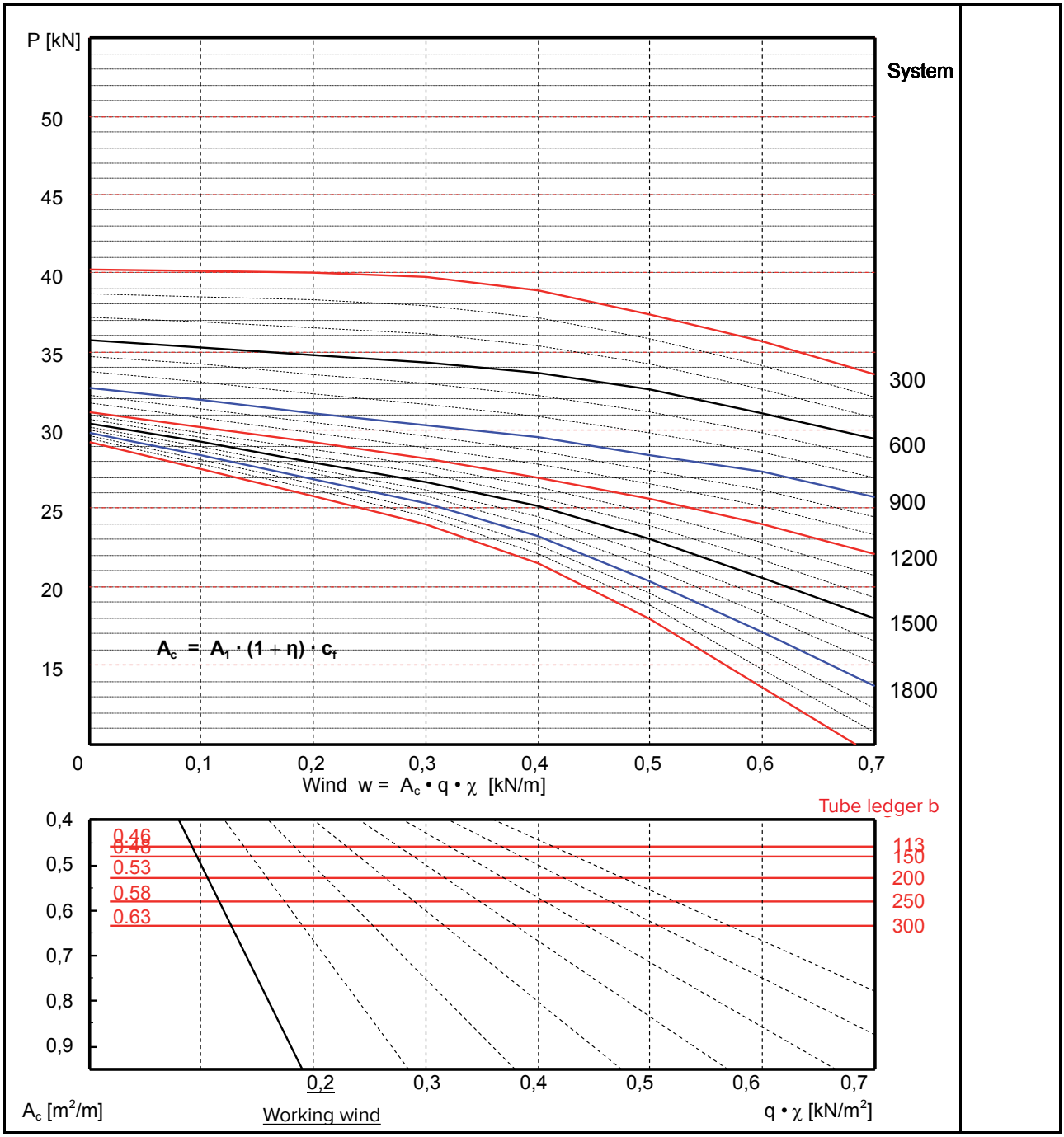
Shoring tower, braced at head, option 1: double diagonal
Permissible post loads depending on wind direction

Annex D14
Edition March 5, 2010

Node spacing	**200**
Tube ledger a	**250**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





MODEX

HÜNNEBECK BY BRAND SAFWAY

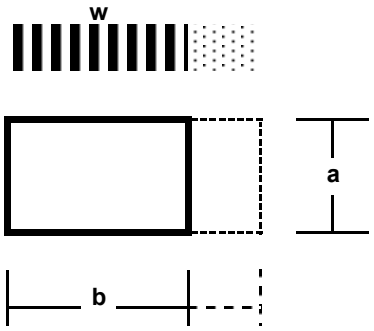
Annex D15
Edition March 5, 2010

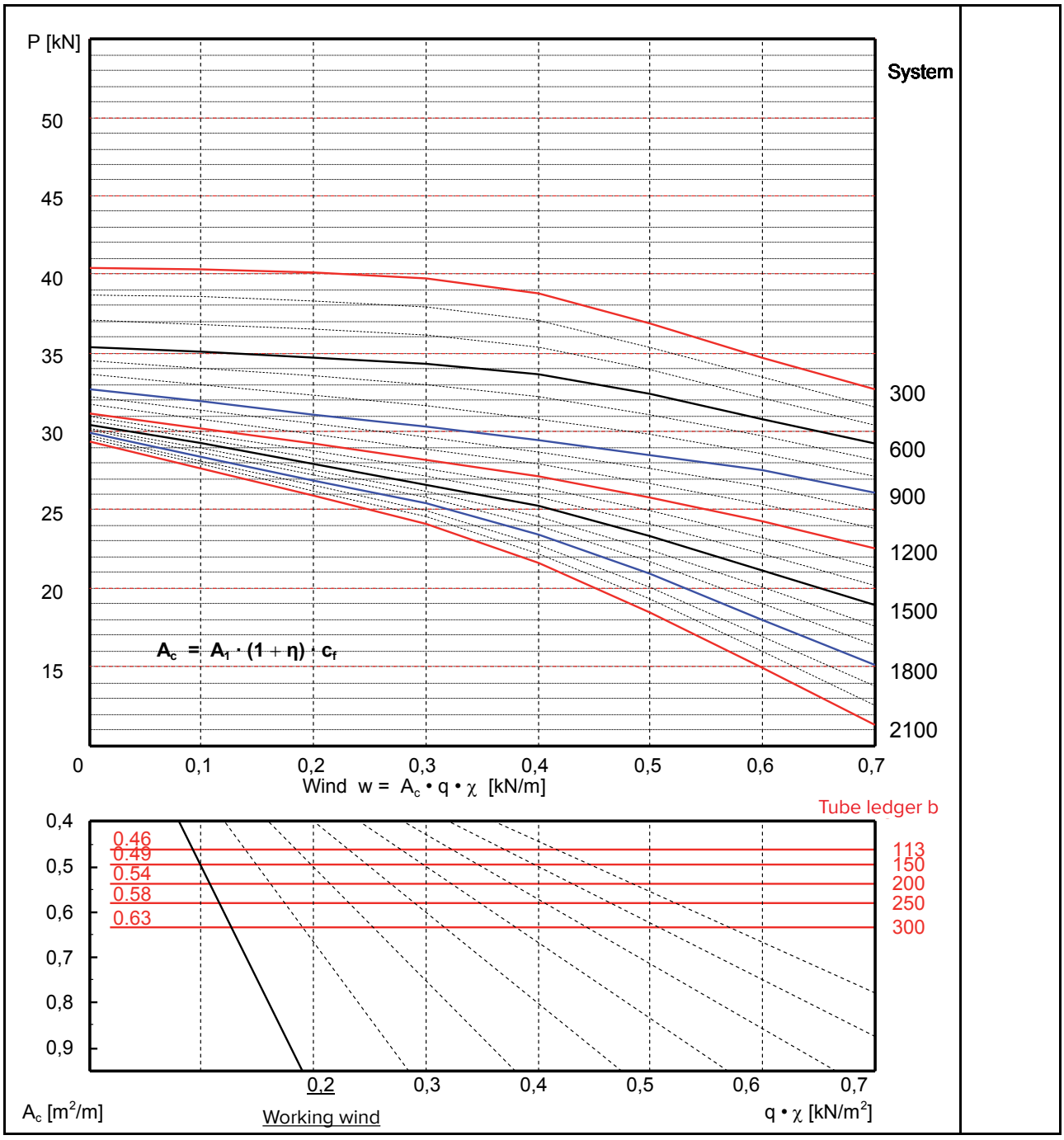
Shoring tower, braced at head, option 1: double diagonal

Permissible post loads depending on wind direction

Node spacing	**200**
Tube ledger a	**300**
Jack	**70/3.8x6.3**
Head Jack	**70/3.8x6.3**
Jack ext.	**35+30**
Aerod. factor c_f	**1.3**
Serv. life factor	According to DIN 1055-4:2005-03, table 1

for working wind q=0.20 kN/m² is χ = 1.0





Unless stated otherwise, all dimensions in mm.

14 Certificates

14.1 General technical approval

Deutsches Institut für Bautechnik

DIBt

Allgemeine bauaufsichtliche Zulassung/ Allgemeine Bauartgenehmigung

Zulassungsstelle für Bauprodukte und Bauarten

Bautechnisches Prüfamt

Eine vom Bund und den Ländern gemeinsam getragene Anstalt des öffentlichen Rechts

Mitglied der EOTA, der UEAtc und der WFTAO

Datum: 19.12.2019

Geschäftszeichen: I 37.1-1.8.22-72/19

Nummer:
Z-8.22-67

Geltungsdauer
vom: **2. Januar 2020**
bis: **2. Januar 2025**

Antragsteller:
HÜNNEBECK GmbH
Rehhecke 80
40885 Ratingen

Gegenstand dieses Bescheides:
Gerüstbauteile für das Modulsystem "Hünnebeck MODEX"

Der oben genannte Regelungsgegenstand wird hiermit allgemein bauaufsichtlich zugelassen und genehmigt.
Dieser Bescheid umfasst 18 Seiten sowie Anlage A (Seiten 1 bis 3), Anlage B (Seiten 1 bis 41), Anlage C (Seiten 1 bis 3) und Anlage D (Seiten 1 bis 6).
Der Gegenstand ist erstmals am 7. März 1990 allgemein bauaufsichtlich zugelassen worden.

DIBt

DIBt | Kolonnenstraße 30 B | D-10829 Berlin | Tel.: +49 30 78730-0 | Fax: +49 30 78730-320 | E-Mail: dibt@dibt.de | www.dibt.de

15 Occupational health and safety

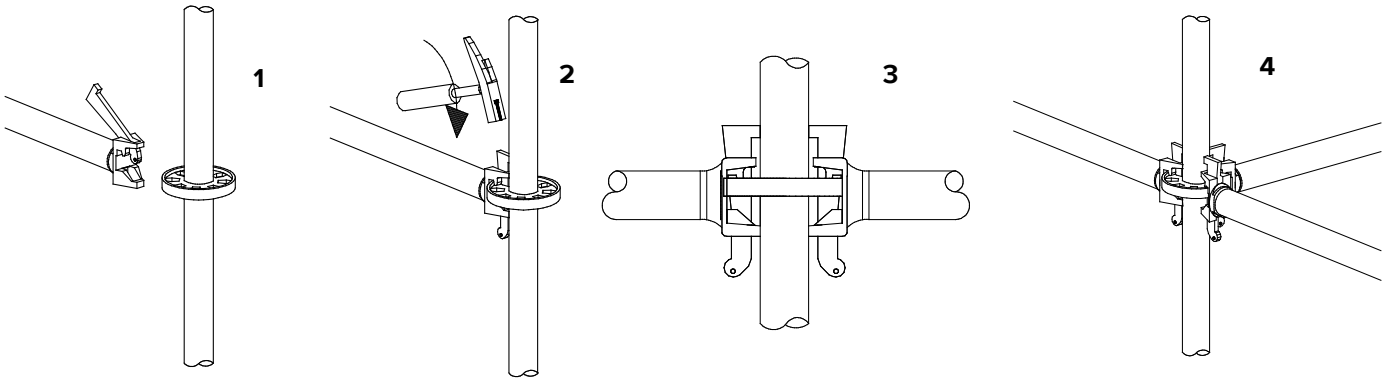
15.1 General information

WARNING	**Safety note:**
	The safety guidelines contained in this manual are intended to make the scaffolder aware of the complexities of erecting and handling scaffolds. This list includes only the most important instructions and does not claim to be complete. It should also not be considered as a substitute for professional dispute regarding occupational health and safety while working on scaffolding.

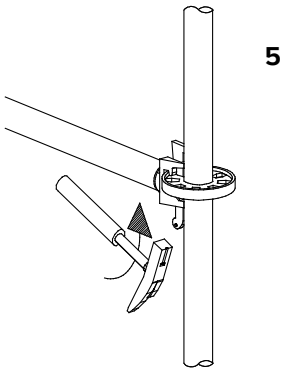
- Inspect all scaffold components for any damage before use,
- Damaged components may be repaired only be the manufacturer.
- Using a hoist to lift and unload material onto scaffolds LC 3 is not permitted.
- Regardless of the load class of the standard design, the general rule applies that only one working platform within a scaffold bay (referring to the area between two posts and along the overall scaffold height) can be subjected to the total working weight.
- Base Plates and Base Jacks must always be attached to the Posts.
- If scaffolds are erected on a surface not capable of supporting the load, load-distributing planks must be placed under the Base Jacks and Base Plates.
- The type of bracing required can be found in the user guide.
- A maximum of five scaffold bays may be vertically stiffened using diagonals.
- Before removing a brace, verify that its function will be performed by other components.
- Replace detached ties with components of equal quality; keep such components on hand.
- Never jump down onto the next deck or drop objects onto the planks.
- Planks should be placed close together. They should neither teeter nor give way.
- When assembling a scaffold, decks should be at least 50.0 cm wide.
- If materials are stored on the planks, the minimum clearance for walking around the material is 20 cm.
- Three-part side protection has to be installed on all decks.
- Neither materials nor tools may be stored on the deck of any fall protection scaffolds.
- If the date and location of the erection of a scaffold coincides with the scheduled work of other contractors, these contractors should be consulted and coordination of the work should be arranged to avoid jeopardizing each other's work.
- The installation schedule must be determined ahead of time, during technical planning of the project. Planning must include avoiding activities that may lead to hazardous situations and falling. If the risk is unavoidable, its occurrence has to be kept to a minimum.
- Scaffold erection should be planned such that time constraints are avoided.
- All materials required at the site should be available in sufficient quantities, in flawless condition, and freely accessible.
- When materials are transported manually, one scaffolder has to be positioned on each scaffold level, including at ground level.
- Never drop scaffold parts to the ground below.
- Store scaffold components such that they are protected from the elements.
- When storing scaffold components, handle them with care.

15.2 Assembly and disassembly of MODEX node

Only a few simple steps are required to assemble the MODEX node. First connect the top of the ledger or diagonal to the MODEX Rosette ①. Then insert the wedge, attached to the top of the ledger, into the opening on the MODEX Rosette. Finally, use a 500 g hammer to drive the wedge down until rebound is felt, creating a friction-locked connection with a fixed angle ②. It should be noted that the upper part of the Tube Ledger does not necessarily have to touch the vertical post ③. This creates a connection with high stiffness ④.



Reverse the order of the steps to release the MODEX node connection. Use the hammer to drive the wedge out of its position until it hangs loose at the node ⑤.



VISUAL INSPECTION	Visually inspect all components to check for damage before using them again. The parts may not be cracked, bent or deformed. The wedge with the integrated rivet must move freely inside the head of the ledger or diagonal and must be captive.

15.3 Safety procedures

The contractor erecting the scaffold is responsible for safe erection, modification and dismantling of the scaffold. He is required to instruct his employees regarding the tasks to be performed. The contractor is obligated to inform the employees of any new developments in the scaffolding field that may be relevant to safety. Instruction includes persisting in reminding the employees of safe work practices. Every contractor who uses the scaffolds is responsible for using them as intended and observing all regulations pertaining to industrial safety. The following laws and regulations on occupational health and safety are relevant:

- German occupational safety law (ASiG); December 12, 1973
- Framework directive 89/391/EEC; June 12, 1989
- Work equipment directive 89/655/EEC; November 30, 1989
- Construction site directive 92/57/EEC; June 24, 1992
- German working conditions act (ArbSchG); August 7, 1996
- German social insurance code, book VII (SGB VII); August 7, 1996
- Building site regulation (BaustellV); June 10, 1998
- German product safety act (ProdSG); December 1, 2011
- German ordinance on industrial safety and health (BetrSichV); February 3, 2015
- German statutory accident insurance regulation DGUV 201-011
- German ordinance on industrial safety and health pertaining to the use of personal protective equipment at work (PSA-BV); December 4, 1996
- Use of personal protective equipment to prevent falling from heights (BGR/GUV-R 198)
- Use of personal protective equipment for rescuing from heights and depths (BGR 199)

Essential information on scaffold erection regulations is provided by:

- DIN 4420, Part 1 (March 2004),
- EN 12810, Part 1 (March 2004), Part 2 (March 2004),
- EN 12811, Part 1 (March 2004), Part 2 (April 2004), Part 3 (February 2003)

The following pages provide samples of various forms to help the contractor meet his obligations pursuant to the laws and regulations stated above:

- Table 15.1: Hazard assessment
- Table 15.2: Transfer of contractor's obligations
- Table 15.3: Inspection diagram
- Table 15.4: Proof of fitness for use
- Table 15.5: Test report
- Table 15.6: Tying report with label for not yet complete scaffolds
- Table 15.7: Release log

These samples do not claim to be complete.

More detailed information can be found in the manual „Arbeits- und Schutzgerüste", Bauingenieur-Praxis (working and protective scaffolds, practical guide for civil engineers), published by Ernst & Sohn Verlag, Berlin, ISBN 3-433-01644-5.

Table 15.1: Hazard assessment

HÜNNEBECK BY BRAND⟩SAFWAY — **Test report for hazard and stress assessment pursuant to § 5 ArbSchuG (German working conditions act)**

Scaffold manufacturer ..... Client.....
Tel. no. ..... Tel. no. .....
Construction project ..... Period of use .....

Hazard factor	Type of hazard	Action	Defects due to: Techn. dept.	Defects due to: ORGA	Defects due to: Employee	Defects resolved by	Consultation
Site	Hazards due to existing equipment in the work area	Determination of hazard posed by	☐	☐	☐	.....	☐
		☐ Overhead power line	☐	☐	☐	.....	☐
		☐ Pipelines, shafts, canals	☐	☐	☐	.....	☐
		☐ Potentially explosive equipment/plants	☐	☐	☐	.....	☐
		☐ Mechanical plants, cranes and conveyors	☐	☐	☐	.....	☐
		☐ Inaccessible areas	☐	☐	☐	.....	☐
		☐ Road and rail traffic	☐	☐	☐	.....	☐
		☐	☐	☐	☐	.....	☐
Falling	Hazards posed by erection, modification and dismantling of scaffolds	Erection/modification/dismantling per user guide	☐	☐	☐	.....	☐
		☐ AGR along side	☐	☐	☐	.....	☐
		☐ AGR in access bay and PPE	☐	☐	☐	.....	☐
		☐ PPE	☐	☐	☐	.....	☐
		☐ Deployment of properly trained and instructed personnel	☐	☐	☐	.....	☐
		☐ Sufficient suitable anchor points for PPE	☐	☐	☐	.....	☐
		☐ Measures to be able to rescue persons secured with PPE	☐	☐	☐	.....	☐
		☐	☐	☐	☐	.....	☐
	Hazard posed by faulty planks	Planks compatible with system	☐	☐	☐	.....	☐
		☐ Alu Frame Decks	☐	☐	☐	.....	☐
		☐ Hollow Box Plank	☐	☐	☐	.....	☐
		☐ Steel Planks	☐	☐	☐	.....	☐
		☐	☐	☐	☐	.....	☐
	Hazard posed by falling off the inside of the scaffold	☐ Distance from wall ≤ 30 cm	☐	☐	☐	.....	☐
		☐ Guard rail (interior)	☐	☐	☐	.....	☐
		☐ Knee rail (interior)	☐	☐	☐	.....	☐
		☐ Stage Brackets (interior)	☐	☐	☐	.....	☐
		☐	☐	☐	☐	.....	☐
	Hazard posed by falling off the outside of the scaffold	☐ Side protection	☐	☐	☐	.....	☐
		☐ Guard rail	☐	☐	☐	.....	☐
		☐ Knee Rail	☐	☐	☐	.....	☐
		☐ Toe Board	☐	☐	☐	.....	☐
		☐ Ends	☐	☐	☐	.....	☐
		☐ Stage Brackets	☐	☐	☐	.....	☐
		☐ Protective roof wall	☐	☐	☐	.....	☐
		☐ Sufficient suitable anchor points for PPE	☐	☐	☐	.....	☐
		☐ Measures to be able to rescue persons secured with PPE	☐	☐	☐	.....	☐
		☐	☐	☐	☐	.....	☐
Structural design	Hazard posed by incorrect erection, by damaged scaffold components or by scaffold components removed prematurely	☐ Visual inspection of scaffold components	☐	☐	☐	.....	☐
		☐ Load-bearing ground/floor	☐	☐	☐	.....	☐
		☐ Use Base Plates/Jacks	☐	☐	☐	.....	☐
		☐ Horizontal assembly	☐	☐	☐	.....	☐
		☐ Specify tying pattern	☐	☐	☐	.....	☐
		☐ Check ties and tying points	☐	☐	☐	.....	☐
		☐ Use only approved plugs	☐	☐	☐	.....	☐
		☐ Do not throw scaffold components	☐	☐	☐	.....	☐
		☐ Store scaffold components properly	☐	☐	☐	.....	☐
		☐ Labelling of scaffold	☐	☐	☐	.....	☐
		☐	☐	☐	☐	.....	☐
Stumbling, slipping, falling	Hazard posed by poor condition and stability of platforms and walkways	☐ Remove obstacles	☐	☐	☐	.....	☐
		☐ Remove debris/dirt	☐	☐	☐	.....	☐
		☐ Dimensions/condition	☐	☐	☐	.....	☐
		☐ Length of Scaffold Retainer	☐	☐	☐	.....	☐
		☐ Climate/weather	☐	☐	☐	.....	☐
		☐	☐	☐	☐	.....	☐
Parts that move uncontrollably	Hazard posed by objects slipping or falling off scaffold	☐ Cordon off / designate	☐	☐	☐	.....	☐
		☐ Protective roofs / safety nets	☐	☐	☐	.....	☐
		☐ Toe Boards	☐	☐	☐	.....	☐
		☐ Hard hats / gloves	☐	☐	☐	.....	☐
		☐	☐	☐	☐	.....	☐
Moving parts without safeguards	Hazard posed by impact drills, hoists, and scaffold lifts	☐ Use only equipment with CE / GE / regular inspection	☐	☐	☐	.....	☐
		☐ Brief employees / consult user guide	☐	☐	☐	.....	☐
		☐ Expert maintenance/inspection	☐	☐	☐	.....	☐
		☐	☐	☐	☐	.....	☐
Electrical equipment and components	Hazard posed by touching live parts of overhead lines, defective machines, faulty wiring	☐ Have electrical equipment installed/maintained by electricians	☐	☐	☐	.....	☐
		☐ Use appropriate power sources, lighting and installation material	☐	☐	☐	.....	☐
		☐ Regularly inspect residual current circuit breakers	☐	☐	☐	.....	☐
		☐ Stay far enough away from overhead lines				.....	
		☐	☐	☐	☐	.....	☐
Physical strain	Risk of injury due to carrying or lifting heavy components > 25 kg	☐ Provide a hoist or scaffold lift	☐	☐	☐	.....	☐
		☐				.....	

Table 15.2: Transfer of contractor's obligations

Confirmation of transfer of contractor's responsibilities
(§ 9 Sect. 2 Nr. 2 OwiG, § 15 Sect. 1 No. 1 SGB VII, § 3 Sect. 1 and 2 ArbSchG)

Mr. / Ms.

will be responsible for the operation / the department*)

of

(Name and postal address of company)

and all aspects pertaining to the industrial health and safety act, the prevention of accidents at the workplace, occupational illnesses, and work-related health hazards. He/She shall be accountable for:

- managing and maintaining facilities*)
- providing instructions and directives*)
- ensuring effective First Aid measurements if necessary*)
- request work-related medical exams or other work-related medical requirements.*)

If the cost does not exceed €.

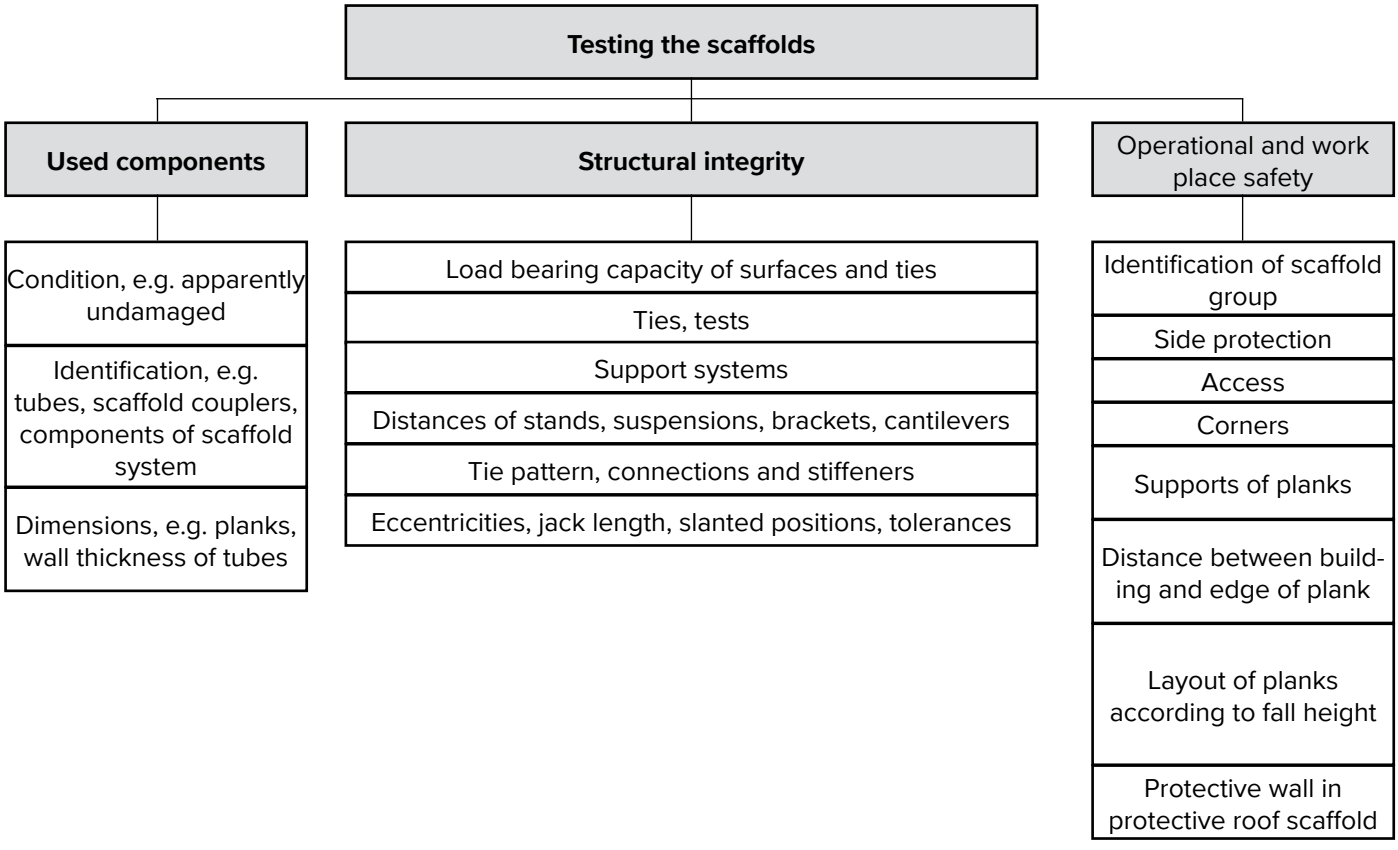
This includes in particular:

City Date

Signature of contractor Signature of responsible person

*) strike out where not applicable

Table 15.3: Inspection diagram



Unless stated otherwise, all dimensions in mm.

Table 15.4: Proof of fitness for use

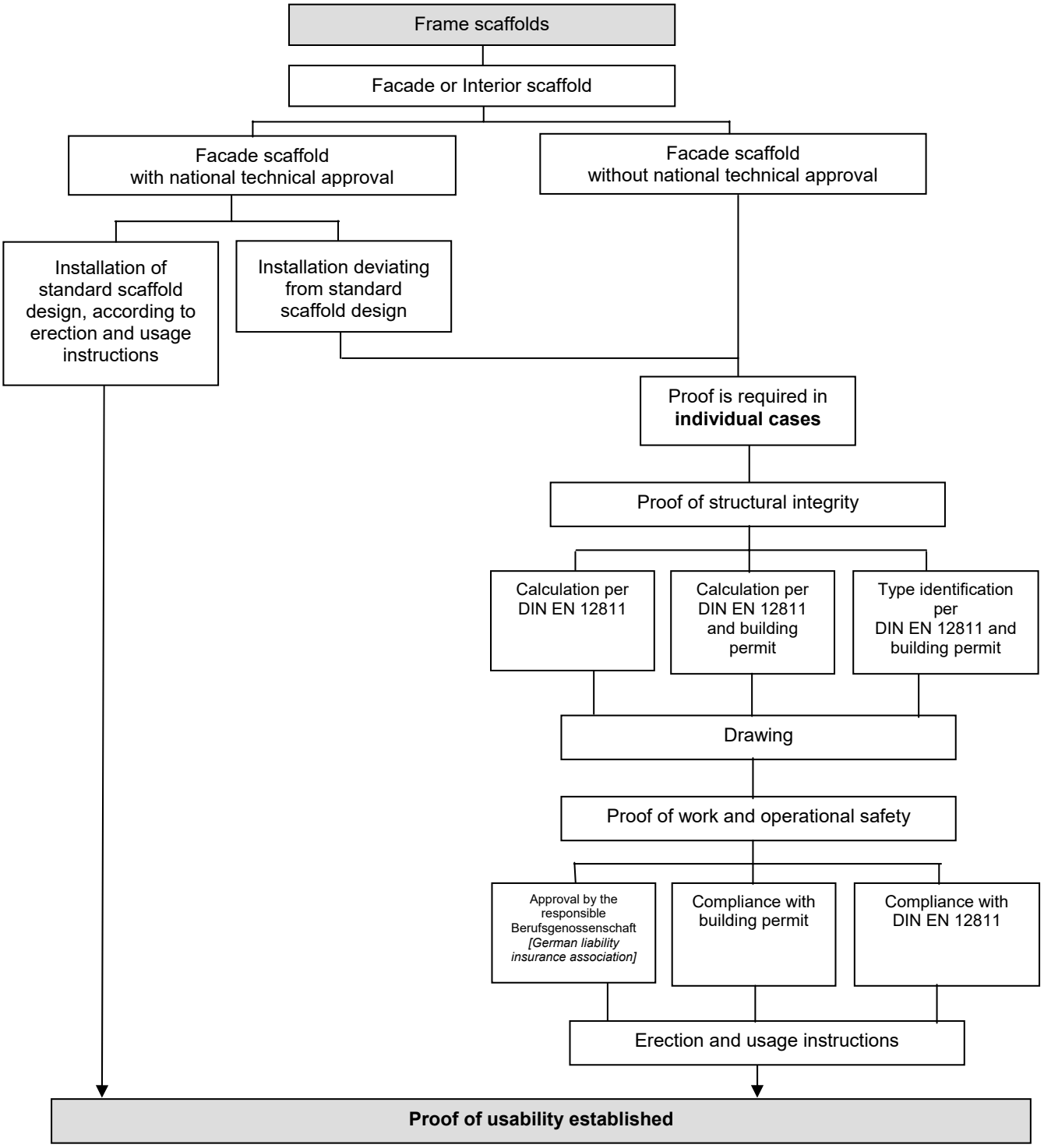


Table 15.5: Test report

HÜNNEBECK BY BRAND SAFWAY

Test report for working and protective scaffolds

pursuant to §§ 510 and 11 BetrSichV (German technical rules on operational safety)

Scaffold manufacturer ..... Client.....

Tel. no. ..... Tel. no. .....

Construction project ..... Time period .....

Type of scaffold: ☐ Working scaffold ☐ Protective scaffold ☐ Protective roof scaffold ☐ Protective roof ☐ Pedestrian passage ☐ Mobile scaffold ☐ Mobile working platform ☐ Suspended scaffold ☐ Weather protection roof ☐ Special scaffold

Design	**Load class**	**Width class**	**Covering**	**Design**
☐ Façade scaffold	☐ **1** 0.75 kN/m²	☐ W06	☐ With nets	☐ Standard design German general type approval no. Z-.....
☐ Birdcage scaffold	☐ **2** 1.50 kN/m²	☐ W09	☐ With tarps	☐ Proper certification for specific case provided
☐ Frame	☐ **3** 2.00 kN/m²	☐ W...	☐ Other	
☐ Module	☐ **4** 3.00 kN/m²	☐ Stage Bracket...		Traffic safety
☐ Mast brackets	☐ **5** 4.50 kN/m²			☐ Permit
☐ Steel tube coupler	☐ **6** 6.00 kN/m²			☐ Warning signs
☐ Other				☐ No-parking zone

Hazard assessment
☐ Not available
☐ Available

Additional protective measures (1)
☐ Side protection (interior)
☐ Cover

Additional protective measures (2)
☐ Safety net
☐ PPE to protect from falling from heights
☐ Determine anchor point for PPE
☐ Measures to be able to rescue persons secured with PPE
☐ Other

Additional assembly aids
☐ Auxiliary scaffold
☐ Aerial working platform
☐ Scaffold lift
☐ Crane
☐ Other

Inspection of scaffold components
☐ Appears undamaged
☐ Original components pursuant to permit and user guide

Structural integrity
☐ Load-bearing capacity of ground/floor
☐ Jack extension length
☐ Longitudinal ledger at height of base point
☐ Diagonals
☐ Lattice Girders
☐ Special design pursuant to construction documents
☐ Castors

Planks
☐ Scaffold planks
☐ System planks

Tying points
☐ Tying pattern
☐ Tying record available
☐ Keep in mind that force is greater with covering

Occupational health and operational safety
☐ Side protection
☐ Distance from wall
☐ Ladders, access ways
☐ Corners
☐ Protective wall in roof protection scaffold
☐ Traffic safety, lighting

Approval
☐ Scaffold not approved
☐ Sign denying access in place
☐ Scaffold approved
☐ Label affixed
☐ User guide handed over

Transfer

☐ Notes: .....

.....

.....

☐ Inspection of working and protective scaffold completed (manufacturer)

City, date: .....

Signature of scaffolder: ..... Foreman: .....

☐ Working and protective scaffold accepted with test certificate (scaffold user)

City, date: ..... Signature of client: .....

City, date: ..... Qualified person: .....

Unless stated otherwise, all dimensions in mm.

Table 15.6: Tying report

Tie report																										
Construction project:												**Component:**														
Plug type:												**Bolt type:**														
Tie surface:												**Test equipment:**														
Total no. of ties:												**Tested ties:**														
x	→	Row of posts, starting from left										Test load in kN:														
Row of stands, starting from left		1	2	3	4	5	6	7	8	9	10	...														
	...																									
	10																									
	9																									
	8																									
	7																									
	6																									
	5																									
	4																									
	3																									
	2																									
	↑ 1																									
Test load kN 1.2 x load of tie		A																								
		B																								
		C																								
		D																								

City, date

Signature of inspector

Label for not yet complete scaffolds

Off limits

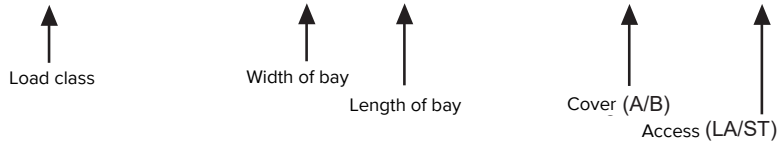
WARNING

Safety note:

Sections of the scaffold that are not ready to be used must be cordoned off and labelled with prohibition signs!

Table 15.7 Release log

Scaffold EN 12810- ..... D - SW...../..... - H1 - ..... - .....



General data

Project .....
Manufacturer .....
Contractor .....
Safety coordin. .....

Details on scaffold

EN 12811 part 1: Working scaffold

☐ Facade scaffold ☐ Area scaffold

☐ Net ☐ Tarpaulin

DIN 4420 part 1: Protective scaffold

☐ Protect. scaf. ☐ Protect. scaf. ☐ Protect. roof

☐ Standard model Approval Z-.....-.....)
(+ manual version .....)

☐ Structural analysis

Load class

☐ **1** 0,75 kN/m² ☐ **2** 1,50 kN/m² ☐ **3** 2,00 kN/m²
☐ **4** 3,00 kN/m² ☐ **5** 4,50 kN/m² ☐ **6** 6,00 kN/m²

Attention: As sum of evenly distributed live loads in each scaffold bay

Check by qualified person

For the manufacturer .....
Name / Date / Signature

For the scaffold user .....
(1 Name / Date / Signature

.....
(2 Name / Date / Signature

.....
(3 Name / Date / Signature

.....
(4 Name / Date / Signature

.....
(5 Name / Date / Signature

.....
(6 Name / Date / Signature

Unless stated otherwise, all dimensions in mm.

15.4 Instruction for use

WARNING

Safety note:

The following text has to be given to the user of the scaffold.

The instructions compiled here are intended to make the scaffolder aware of how to handle scaffolds. This list includes only the most important instructions and does not claim to be complete.

It should also not be considered as a substitute for professional dispute regarding occupational health and safety while working on scaffolding.

- Inspect the scaffold for any damage before entering it.
- Enter the scaffold only through proper access ways (interior ladders, staircases).
- Never use a damaged scaffold.
- Using a hoist to lift and unload material onto scaffolds LC 3 is not permitted.
- Regardless of the load class of the standard design, the general rule applies that only one working platform within a scaffold bay (referring to the area between two posts and the overall scaffold height) can be subjected to the total working weight.
- The user may not change the scaffold structure after it has been completed.
- Never jump down onto the next deck or drop objects onto the planks.
- Planks must be placed close to one another. They should neither teeter nor give way.
- If materials are stored on the planks, the minimum clearance for walking around the material is 20.0 cm.
- Three-part side protection has to be installed on all decks.
- Neither materials nor tools may be stored on the deck of any fall protection scaffolds.
- Handle scaffold materials with care when using scaffolds.

16 Chronology

Changes since edition 2018-11		
Change	**Page**	**Date**
Certificates updated	203	2020-02

Hünnebeck
Deutschland GmbH
Rehhecke 80
D-40885 Ratingen
+49 2102 9371
info_de@huennebeck.com
www.huennebeck.com

The illustrations in this brochure depict actual site conditions which may not always conform with applicable safety rules and regulations.

Last updated: February 2020

Keep for later use!

1850 EN 2020-02-25

Drucknorm

BRAND SAFWAY · Aluma Systems BY BRAND SAFWAY · HÜNNEBECK BY BRAND SAFWAY · SGB BY BRAND SAFWAY