SUPER 100
FAÇADE SCAFFOLDING SYSTEM

INSTRUCTIONS FOR
ASSEMBLY AND USE (AVA)
-VN-1.1

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AVA FAÇADE SCAFFOLDING SYSTEM
SUPER 100 | 2020-07-EN

SUPER 100

SUPER 100
INSTRUCTIONS FOR ASSEMBLY AND USE

Scaffolding system:	BERA-RUX rapid-erection scaffolding SUPER 100 Working and protective scaffold of load classes 4 to 6 DIN EN 12810 / DIN EN 12811
Manufacturer:	RUX GmbH, Hagen
Approval:	Z-8.1-185.2
Classification:	Scaffolding EN 12810 - 6D - SW09/200 - H2 - B - LS Scaffolding EN 12810 - 5D - SW09/250 - H2 - B - LS Scaffolding EN 12810 - 4D - SW09/300 - H2 - B - LS
Load-bearing capacity:	3.00 kN/m² to 6.00 kN/m²
Scaffolding bay length:	maximum 3.00 m

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1 Preliminary remarks

1.1 These Instructions for Assembly and Use are valid for the erection, modification and dismantling of the SUPER 100 scaffolding system and its use is exclusively aimed at professionals.

1.2 The scaffolding system SUPER 100 has general type approval on the basis of the approval No. Z-8.1-185.2.

1.3 The standard design detailed in these Instructions corresponds to the approval No. Z-8.1-185.2. It is described in section 9 of these Instructions. Other details can be taken from the approval mentioned above.

1.4 The technical solutions described in these Instructions for Assembly and Use shall not be deemed as excluding any other technically-proven and equally-suitable solutions.

1.5 Besides the rules contained in these Instructions, the general regulations pertaining to the scaffolding trade and to users of the scaffolds are to be observed, for example:
- General type approval No. Z-8.1-185.2
- DIN EN 12811-1: Temporary Structures for Buildings - Part 1: Working Scaffolds
- DIN 4420-1: Working and Protective Scaffolds - Part 1: Protective Scaffolds
- The Occupational Health and Safety Act (ArbSchG)
- Industrial Safety Regulation (BetrSichV) in its currently valid version
- Accident Prevention Requirement "Construction Work" (BGV C22)
- Technical Rules for Operational Safety (TRBS 1111, 2121)
- Instruction Manual for Handling Working and Protective Scaffolds (BGI 663)
- Scaffolding Work (BGI 5101)
- Technical Regulations for Scaffolding – Stand Framing as Facade or Modular System out of Prefabricated Components

1.6 These Instructions only apply in conjunction with the use of original SUPER 100 components that are marked in accordance with approval Z-8.1-185.2 and which are indicated in the component part list in section 9.1.

1.7 The component parts of SUPER 100 may not be modified.

1.8 Scaffold components have to be adequately and responsibly checked for damage by the scaffolder/scaffold builder prior to erecting. Damaged components may not be used.

1.9 Persons may not access the scaffolding if they have not clearly satisfied the requirements of the medical check-up (G41 – working at heights with a risk of falling).

1.10 The publisher of these Instructions for Assembly and Use is:

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Subject to technical modifications and revision. In the case of any omissions or doubt, the respective provisions valid at any one time are to be consulted.

2 General

2.1 The SUPER 100 scaffolding system is approved as a working and protective scaffold of load classes 4 to 6 according to DIN EN 12811-1:2004-3.

Table 1: Classification

Classification	Load class	Bay length	Load capacity
Scaffold EN 12810 - 6D - SW09/200 - H2 - B - LS	6	≤ 2.0 m	6.0 kN/m²
Scaffold EN 12810 - 5D - SW09/250 - H2 - B - LS	5	≤ 2.5 m	4.5 kN/m²
Scaffold EN 12810 - 4D - SW09/300 - H2 - B - LS	4	≤ 3.0 m	3.0 kN/m²

2.2 The stability as well as the usability shall be deemed as verified and evidenced for the standard design described in these Instructions on account of the general type approval issued by the DIBt. Any deviations to this standard design are permissible when, in individual cases, the stability and usability are evidenced in writing in line with the technical building requirements and the findings detailed in the approval Z-8.1-185.2 (supplementary technical information in this respect has been compiled in section 10).

2.3 The stability may also be evidenced with the help of measurement tables or calculation aids which have been prepared on the basis of the technical building requirements.

2.4 Deviations to these Instructions are possible when, in individual cases, the safety of the erecting processes has been verified in writing (for example: against falling, stability in intermediate states).

2.5 The erecting, modification and dismantling of the system scaffolding may only be carried out under the supervision of a qualified person (supervising official) by suitably qualified staff after having been instructed specifically on the site itself and on the results of the risk assessment. Qualified staff may be master scaffolders, persons successfully qualified as scaffolders, certified senior scaffold fitters, certified scaffold group leaders, people with comparable expertise and construction trade training as well as adequate practical professional experience in the scaffolding business.

2.6 These Instructions for Assembly and Use and the above-mentioned approval have to be available on the site for the supervising official and the staff throughout the entire erection and disassembly process.

2.7 The erection and disassembly of the scaffolding may only take place below wind force 5. When a higher wind force is experienced, the scaffolding is to be immediately secured and cleared. By way of orientation: there is a noticeable restriction that is felt when simply walking when the wind force is above 6.

2.8 Depending upon the complexity, a plan will need to be prepared for the erection, modification and disassembly work (assembly instructions) by the contractor responsible for the erection and the scaffolding work or have this prepared by a designated qualified person. In this respect these Instructions for Assembly and Use may be supplemented by detailed information pertaining to the respective implementation.

2.9 Unfinished scaffolds or scaffold areas have to be marked with warning signs clearly stating that "Unauthorised access is prohibited". Access to such areas will need to be appropriately blocked off.

2.10 After completion, the scaffolder/scaffold builder has to have the scaffold checked for the correct build and secure function. This inspection has to be carried out by a qualified person and may be conducted by the supervising official.

2.11 After completion and testing, the scaffolding will need to be marked. This marking has to include details about the scaffolder/scaffold builder, the type of scaffolding and the load and width classes and should also contain general safety instructions. Such marking is to be located at a clearly visible position on the scaffold e.g. at the access points to the ascents.

2.12 When the scaffold builder/scaffolding company is convinced of the proper and orderly condition of the scaffold, it may then be passed over to the user. It is recommended that the transfer is carried out together with the user and documented e.g. in an inspection report.

2.13 The results of the inspection are to be documented in an inspection report and kept for a reasonable period – generally 3 months after the scaffold has been disassembled again.

2.14 During the entire period of use of the scaffold, these Instructions for Assembly and Use have to be available on site to the user.

2.15 Please contact the publisher if you have any queries about these Instructions, assembly procedures or the risk assessment:

RUX GmbH, Neue Straße 7, D-58135 Hagen
Telefon: 02331 - 4709 - 0 Telefax: 02331 - 4709 - 202
Mail: info@scafom-rux.de

3 General requirements

Scaffolding components must be visually inspected for damage before fitting. Damaged scaffold components may not be used.

The scaffold is to be erected in the sequence indicated in the following sections.

During erection, the stability of the scaffolding must always be guaranteed - even in intermediate states.

Personal protective equipment must be worn during all assembly work. This includes suitable clothing, safety shoes, gloves and safety helmet with chin strap as per EN 397. Depending on requirements, additional gear such as safety goggles, ear protection, safety vest or other personal protective equipment may need to be used.

See sections 4.4.2 to 4.4.5. for the use of personal protective equipment (PSAgA) against falls from a height.

4 Assembling the scaffolding

4.1 Determining the intended installation points

Before the actual assembly work begins, the intended installation points need to be determined on site in accordance with the site-specific installation plan.

The gap between the decking and the wall to be scaffolded is – depending on the work to be carried out – to be kept as small as possible and may only have a maximum width of 30 cm (see also section 4.4.2). If this gap cannot be maintained locally and the fall height is greater than 2 m, three-part side protection (principal guardrail, intermediate guardrail and toe board) has also to be fitted on the inside of the scaffold.

4.2 Erecting the first scaffold bay

The erection of the scaffold is to commence with a scaffold bay in which vertical diagonals have been envisaged. In the standard design described here, vertical diagonals may only be installed in scaffold bays that are at least 2.00 m long.

4.2.1 LOAD-DISTRIBUTING BASE STRUCTURE

The scaffolding may only be erected on sufficiently firm ground capable of bearing loads.

The ground is generally seen as capable of load-bearing if a car can be driven over it without leaving tracks: for example, on paved, asphalted or concreted and, generally-speaking, on gravelled areas.

If the ground is not of sufficiently load-bearing nature, load-distributing base structures will need to be used (see Figure 1).

Figure 1: Load-distributing base structure with scaffold planks

On inclined ground, the base structure has to be designed in such a way that it is reliably secured against slippage and that a horizontal support surface for the scaffold is created (for example by installing wedges). For inclinations of more than 5°, local load transmission will need to be verified and, if necessary, suitable measures taken to provide the required degree of safety.

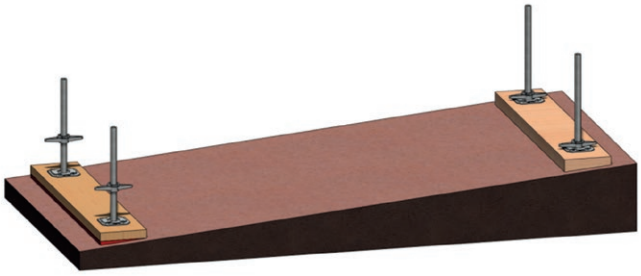


Figure 2: Load-distributing base structure on an inclined surface

An inclination of 5° corresponds to an inclination of 8.5%, which means a difference of 8.5 cm in height over a 100-cm length.

4.2.2 BASE JACKS, BASE TRANSOMS, DECKING TRANSOMS

At the pre-determined positions for the vertical frames, two base jacks are to be placed in pairs at the centre of the base structure (see Figure 1) and screwed out to the desired extension length:

Extension length of the base jacks = lower edge of base plate to lower edge of vertical frame.

For the standard design described here, the permissible extension length of the base jacks is:

29.5 cm for scaffolding without extension brackets
25.0 cm for scaffolding with extension brackets

For longer extension lengths, the stability of the scaffolding must be verified for each individual case.

Base jacks must always have full-surface contact with the supporting surface. In scaffold bays where vertical diagonals are envisaged, base or decking transoms are to be placed on the spindles (see Figure 3).

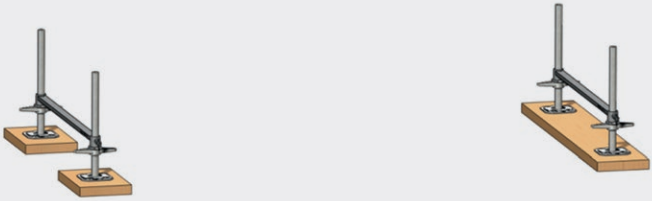


Figure 3: Base jacks with base or decking transoms

When installing a transom, ensure that the gravity pin is in the correct position!

In scaffolding bays where ladder access is envisaged, decking transoms are to be fitted on the spindles (see Figure 4). System decks are then placed on these transoms (see Section 4.2.8).

Figure 4: System decks on decking transoms

These system decks can no longer be fitted after the lowermost vertical frames have been installed in this bay.

4.2.3 HEIGHT COMPENSATION

If the ground has different heights at the various erection points or if certain scaffold level heights are to be reached, compensation frames with a height of 0.50 m or 1.00 m need to be fitted (see Figure 5).

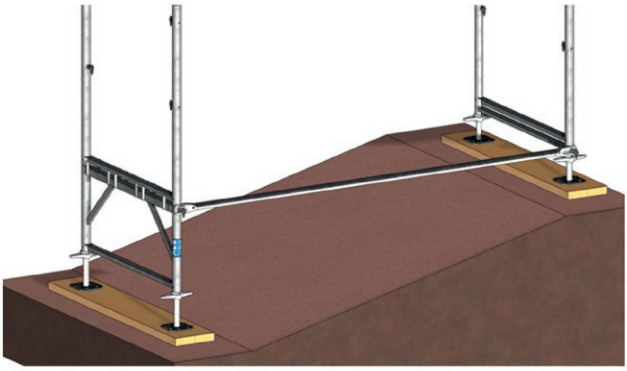


Figure 5: Compensation frame with 0.50 m or 1.00 m height

Compensation frames may only be fitted directly above the jacks or base transoms.

When vertical diagonals are to be fitted into a bay, a scaffold tube (Ø 48.3 x 3.2) needs to be connected with swivel couplers (see section 5.10) between the compensation frames as a diagonal. In this case, an additional longitudinal ledger needs to be mounted directly above the base jacks (see Figure 5).

4.2.4 VERTICAL FRAMES AND PASSAGE FRAMES

The vertical frames and passage frames are to be placed vertically on the base jacks and secured against toppling over.

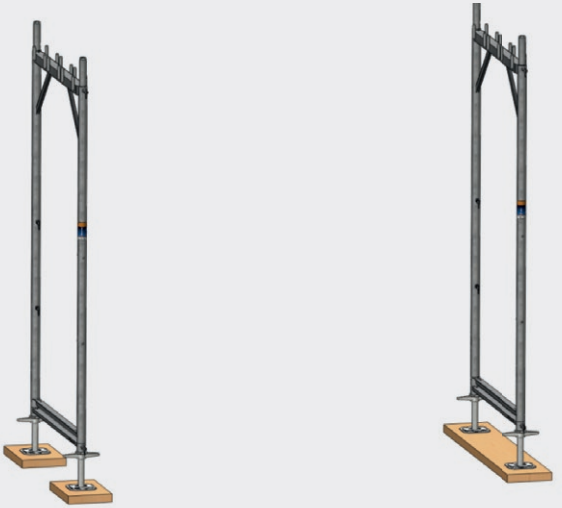


Figure 6: Assembly of the first scaffold bay – vertical frames

4.2.5 LONGITUDINAL LEDGER, PRINCIPAL GUARDRAIL

A longitudinal ledger needs to be fitted on the transoms between the vertical frames (see Figure 7).

Figure 7: Assembly of the first scaffold bay - longitudinal ledger

There are holes at the ends of the longitudinal ledgers, guardrails and diagonals which are pushed over the gravity locks on the vertical frames. The gravity lock pins must then be closed immediately.

Mounting of diagonals:

Figure 8: Open gravity lock

Slide the diagonal over the gravity lock after setting the pin in its horizontal position.

Figure 9: Closed gravity lock

The pin on the gravity lock must hang vertically downwards and the mounted components secured against loosening.

Fitting of gravity lock guardrails:

Figure 10: Open gravity lock

Figure 11: Closed gravity lock

Slide the principal guardrail over the gravity lock after setting the pin in its horizontal position.

The pin on the gravity lock must hang vertically downwards and the mounted components secured against loosening.

Fitting of toggle railings:

Figure 12: Toggle rail insertion and locking *(Figure on right: view from outside)*

Set the locking bolt of the toggle rail in its horizontal position and push through the lug of the guardrail from the decking side and then turn the locking bolt downwards. The locking bolt then has to point downwards in a vertical position and the railing secured against loosening.

Principal and intermediate guardrails have to be fitted so that their flattened ends rest against a vertical scaffolding element for safety purposes when a person is leaning against the principal or intermediate guardrails. Gravity locks are suitable for attaching principal and intermediate guardrails when they point towards the scaffold decking, i.e. the inside of the scaffold. Gravity locks which point towards the outside of the scaffold are not suitable, e.g. diagonal gravity locks. Toggle railings and intermediate guardrails are always to be mounted from the scaffold decking side, i.e. from the inside of the scaffold against the guardrail lugs, not from the outside of the scaffold.

4.2.6 VERTICAL DIAGONALS

A vertical diagonal brace has to be fitted between the vertical frames on the outside of the scaffold (see Figure 13).

There are holes at the ends of the vertical diagonals which fit over the gravity locks of the transoms or vertical frames (see Figures 8 and 9). Diagonals are provided with a double hole at one end. When mounting the diagonals, the outer hole located at the end of the diagonal has to be used. The gravity locks then have to be closed immediately (see section 4.2.5).

Figure 13: Assembly of the first scaffold bay - vertical diagonal

Some configurations also require vertical diagonal braces on the inside of the scaffold (see section 9.2). In this case, scaffolding tubes (Ø 48.3 x 3.2) are to be used that are connected to the standards of the vertical frames directly at the nodes by means of swivel couplers (see section 5.10).

Triangles are stable - squares for themselves are not!

4.2.7 TRANSVERSE DIAGONALS

Some configurations require transverse diagonals in the lowermost vertical frames (see Figure 14 and section 9.2). In this case, scaffolding tubes (Ø 48.3 x 3.2) are to be used that are connected to the standards of the vertical frames by means of swivel couplers (see section 5.10).

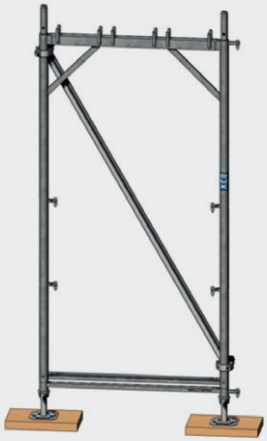


Figure 14: Vertical frame with transverse diagonal

4.2.8 SYSTEM DECKS

Only the system decks mentioned in section 9.1 may be used.

The holes at the ends of the decks are passed over the pins on the decking ledgers of the vertical frames, brackets, transoms or similar and the decks are then fitted.

Figure 15: System decks hooked onto the pins

The number of decks to be fitted in each bay is indicated in the following tables.

Table 2: Decking elements

Decking element	Approval, Annex A, Page	Number per scaffolding bay	Width	Load class		
				≤ 2.0 m	2.5 m	3.0 m
Wooden plank	10	3	0.29 m	≤ 5	≤ 4	–
Profiled wooden plank	12	3	0.29 m	≤ 5	≤ 5	≤ 4
Aluminium deck	14	3	0.29 m	≤ 6	≤ 6	≤ 5
Aluminium floor panel	15	1 (+1)	0.59 m	≤ 5	≤ 5	≤ 4
Steel deck	16	3	0.29 m	≤ 6	≤ 5	≤ 4
Solid wood plank, 45 mm	68	3	0.29 m	≤ 4	–	---
Solid wood plank, 48 mm	69	3	0.29 m	≤ 5	≤ 4	–
Aluminium deck, 45 mm	70	3	0.29 m	≤ 6	≤ 4	–

The decking reinforces the scaffolding parallel and at right angles to the facade.
Each scaffolding level needs to be fully covered with decking.

In scaffold bays where ladder access is envisaged, the following ladder frames will need to be used:

Table 3: Ladder frames

Decking element	Approval, Annex A, Page	Number per scaffolding bay	Width	Load class		
				≤ 2.0 m	2.5 m	3.0 m
Aluminium ladder frame with ladder, building veneer plywood BFU 100G	35	1	0.57 m	–	≤ 4	≤ 3
Aluminium ladder frame with ladder, entirely out of aluminium	36	1	0.57 m	---	≤ 4	≤ 3
Aluminium ladder frame with ladder, entirely out of aluminium (surface out of extruded profiles)	32	1	0.58 m	≤ 5	≤ 4	≤ 3

Pay careful attention to the permissible load classes of the ladder frames! Install a front ascent solution if need be!

Ladder access frames may only be installed in the level at 2 m height if the bay directly above the base jacks is fitted with system decks on transoms (see section 4.2.2).

4.2.9 ALIGNMENT

The first scaffold bay must be aligned so that

- the vertical frames are vertical,
- the system decks are horizontal and
- the maximum permissible wall distance of 30 cm is not exceeded (see section 4.1).

Figure 16: Fully assembled first scaffold bay

4.3 ERECTING ADDITIONAL SCAFFOLD BAYS ON THE FIRST LEVEL

4.3.1 NORMAL BAYS

Further scaffold bays are erected in the same way as described for the first one in the previous section.

Base or decking transoms are to be fitted onto the base jacks in scaffold bays in which vertical diagonals are envisaged (see Figure 3).

Decking transoms are to be fitted onto the base jacks in scaffolding bays where ladder access is envisaged (see Figure 3).

> When installing a transom, ensure that the gravity lock is in its correct position!

- Fit system decks onto the decking transoms (see section 4.2.8).

> These system decks can no longer be fitted if the lowermost positioning frames have already been attached in this bay.

- The vertical frames are to be fitted on the base jacks and aligned vertically.
- Decks are to be fitted in each bay across the scaffold's entire width (see section 4.2.8) and aligned horizontally.

Figure 17: Further scaffold bays

When inner extension brackets are envisaged for the first scaffolding level:
- Attach extension brackets on the inside (see section 5.3.1)
- Fit decks on the inner extension brackets and secure them against lifting (see section 4.2.8)

All other scaffolding bays have to be aligned so that
- the vertical frames are vertical,
- the system decks are horizontal and
- the maximum permissible wall distance of 30 cm is not exceeded (see section 4.1).

4.3.2 BRACING

The vertical diagonals are to be installed according to the configuration shown in section 9.2 (see section 4.2.6). The following points have to be observed:

- At least one vertical diagonal brace needs to be installed at each scaffolding level (see section 4.2.6)
- One vertical diagonal may be allocated to:
  - a maximum of five scaffold bays in structures without extension brackets and
  - a maximum of four scaffold bays in structures with extension brackets
- The direction of inclination of the vertical diagonals may be freely selected
- Longitudinal ledgers always need to be fitted in addition in bays with vertical diagonal braces under the lowest scaffolding level (see section 4.2.5)

Some system configurations require transverse diagonals in the lowest vertical frames (see section 9.2). For this purpose, scaffold tubes (Ø 48.3 x 3.2) are used which are connected to the standards of the vertical frames by means of swivel couplers (see section 5.10 and Figure 14).

4.3.3 CORNER STRUCTURES

At the corners of the building, two vertical frames are connected with each other using two swivel couplers. One swivel coupler is fitted directly under the corner struts of the vertical frames. The other swivel coupler is attached in the lower area of the vertical frames (see Figure 18 and Figure 19).

Figure 18: Corner structure with two vertical frames

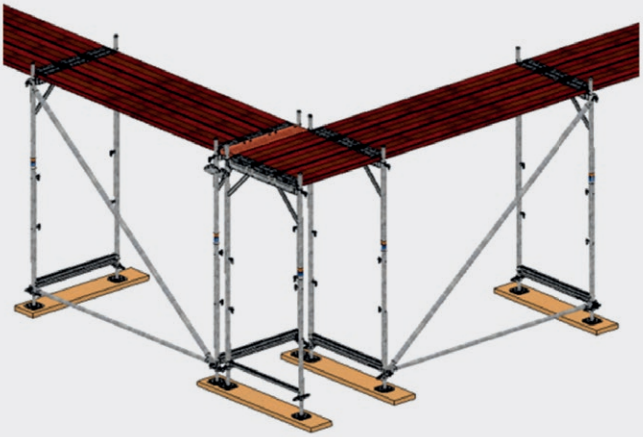


Figure 19: Corner structure with three vertical frames

4.3.4 SYSTEM-INDEPENDENT COMPONENTS IN SCAFFOLDING LEVELS

The scaffolding levels are to be completed with system-independent components if need be.

In this respect the load-bearing capacity of the system-independent components must be taken into account regarding load and the required span width.

A gap between two scaffold decks may not exceed 2.5 cm.

A gap between a main scaffold deck and a deck on an inner bracket may not exceed 8 cm.

A gap between a scaffold deck and an adjacent building or another structure with sufficient load-bearing capacity may not exceed 30 cm.

The decking surfaces of safety scaffolds may not have any gaps.
Decked surfaces on protective roofing must be tightly closed-gap right up to the building.

4.4 ERECTING ADDITIONAL SCAFFOLDING LEVELS

4.4.1 SECURE AGAINST TOPPLING

There is the danger of a scaffolding toppling over when being erected or dismantled if the scaffold is not adequately anchored. For Instance, in the bay on the first level where vertical transport is carried out. This can be remedied e.g. by temporary supports at the level of the decking at a height of 2 m (see Figure 20).

Figure 20: Example of a temporary anti-topple system for the first scaffolding level

4.4.2 PROTECTION AGAINST FALLS

There is a danger of falling when assembling additional scaffolding levels. The erection work has to be carried out in such a way that the danger of falling is prevented as far as possible and that the remaining risk is kept to an absolute minimum. The scaffolder/scaffold builders have to determine suitable measures for averting danger on the basis of their risk assessment from case to case and for the respective job. Possible measures for averting danger could include:

- Use of the SUPER 100 mounting safety guardrail "MSG" (see Figure 30)
- Use of suitable personal protective equipment "PSAgA" (see Figure 35)
- A combination of the above safety measures

As soon as work is carried out with personal protective equipment, a height rescue concept has to be provided at the construction site.

Only components that have been approved for the mounting safety guardrail as per approval Z-8.1-185.2 may be used for this purpose.

Only systems whose suitability for scaffolding work has been demonstrated may be used as personal protective equipment against falls from a height.

Only the approved areas on the vertical frames and guardrail posts with transoms or protective mesh supports may be used as personal protective equipment anchorage points (see Fig. 21 and Fig. 22). The approved anchorage points for personal protective equipment are marked in **green** in the following illustrations.

Figure 21: Permissible anchorage points for the personal protective equipment on the vertical frame

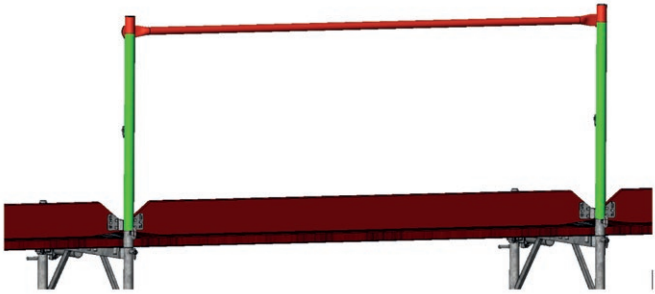


Figure 22: Permissible anchorage points for the personal protective equipment on the guardrail post with transom

Areas marked in red are **not** permissible as anchorage points for personal protective equipment.

Only a minimum of two vertical frames or guardrail posts with transom or protective mesh supports that are connected by at least one principal guardrail may be used as anchorage points for personal protective equipment.

Figure 23: Recommended anchorage points on the vertical frame

The upper decking transom in the vertical frame (marked in green in Figure 23) is recommended as an anchorage point for the personal protective equipment.

When selecting the actual attachment points, the respective current statutory requirements and the specifications of the relevant professional associations need to be observed.

Anchorage points should be as high as possible, at least 1.00 m above the decking surface on which the work is to be carried out.

Only those areas that are part of a closed frame can be considered for an anchorage point. Open tube ends such as those on tube connectors or any other protruding tube ends from scaffold anchors for example are unsuitable because the personal protective snap hook can slip off.

Only in exceptional cases with a separate risk assessment can lower attachment points be selected if necessary. For example, the standard tubes in the area between the base ledger and the guardrail gravity lock at a height of 1.00 m.

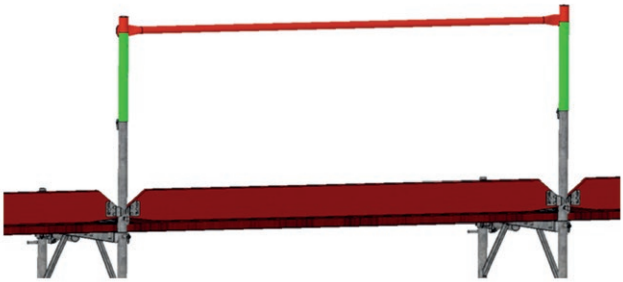


Figure 24: Recommended anchorage points for the upper scaffold finish section

When working on the eaves scaffolding level, there are no vertical frames to serve as anchorage points. In this case, only the vertical tube of the guardrail post with transom or the protective mesh supports are available as an approved anchorage point for personal protective equipment.

The highest possible anchorage point in this situation is thereby the area between the gravity locks on the vertical post tube, marked green in Figure 24.

A separate risk assessment is required for the use of this anchorage point since the minimum height required of 1.00 m above the decking surface is not given.

The area above the upper guardrail gravity lock cannot be used as an anchorage point because the personal protective snap hook can slip off the open end of the tube.

> Personal protective equipment may only be used when the fall height is sufficient to prevent any impact with the ground. A fall height of at least 5.75 m needs to be available. The fall height is measured vertically downwards from the personal protective equipment anchorage point.

The use of a mounting safety guardrail or personal protective equipment may be dispensed with in individual cases when a mounting safety guardrail or personal protective equipment does not offer adequate protection or cannot be used due to structural or scaffolding-specific circumstances and

- the work is to be carried out by technically qualified and physically suitable persons,
- the employer has carried out special training for the verified exceptional case and
- the edge from which a person can fall is clearly visible to the person.

Measures to protect against falling are not required if the working and access areas are no more than 0.30 m away from other load-bearing and sufficiently large surfaces.

4.4.3 VERTICAL TRANSPORT OF SCAFFOLDING COMPONENTS

4.4.3.1 Construction lifts

For scaffolds with a height of more than 8 m scaffold bay height (decking height above ground level), construction site lifts have to be used during assembly and dismantling. Construction site lifts may also include manually operated rope pulley hoists.

Construction lifts may be dispensed with if the scaffold bay height does not exceed 14 m and the width of the scaffold does not exceed 10 m.

Observe the instructions for assembly and use relating to the construction site lift used!

4.4.4 MANUAL TRANSPORT

In scaffolding bays where vertical transport is to be carried out by hand, principal and intermediate guardrails must be fitted at the lower levels. The principal guardrail is sufficient at the topmost scaffolding level. At least one person must stand on each scaffolding level during manual transport (see Figure 25 and Figure 35).

Figure 25: Example of vertical transport by hand

4.4.5 ERECTING THE SCAFFOLDING

As part of the risk assessment, the scaffolder/scaffold builder determines the fall protection measures to be applied (see section 4.4.2). The following possible measures are intended as fall protection during scaffold assembly.

4.4.5.1 Result of the risk assessment: mounting safety guardrail

A) Installation of the mounting safety guardrail from the secured level. The mounting safety guardrail must be attached to all sides of the scaffold where there is a risk of falling:

- Fit the first mounting safety guardrail post onto the standard (see Figure 26).

Figure 26: Assembly of the first mounting safety guardrail post

- Hook the mounting safety guardrail onto the first post and connect the second post to the free end of the guardrail (see Figure 27).

Figure 27: Hooking in the mounting safety guardrail and connecting the second mounting safety guardrail post

• Mounting safety guardrail: fit second mounting safety guardrail post (see Figure 28).

Figure 28: Fitting the second mounting safety guardrail post

• Fit additional mounting safety guardrail units along the entire length of the scaffolding (see Figure 29).

Figure 29: Fitting of additional mounting safety guardrail units

B) Assembly of the next scaffolding level in the protection of the mounting safety guardrail.

Figure 30: Assembly of the scaffolding level in the protection of the mounting safety guardrail

- Enter the top level via the planned ascent and close the hatch of the ladder frame immediately after climbing through.
- Fit the vertical frames onto the lower vertical frames in the ascent bay (see Figure 31).

Figure 31: Attaching a vertical frame

- Fit the second vertical frame onto the lower vertical frames in the access bay.
- Fit the guardrails in the ascent bay (see section 4.2.5).

- If it is intended to make the upright standard joints resistant to tensile forces, fit the locking pin **(shown in green in Figure 32).**

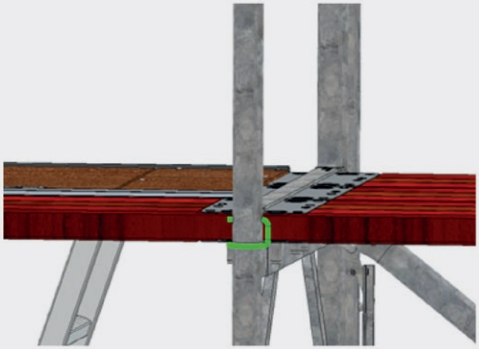


Figure 32: Inserted locking pin

- Starting from the ascent bay:
  - Fit the next vertical frame (see Figure 30)
  - Install the next principal guardrail (see section 4.2.5)
  - If it is intended to make the upright standard joints resistant to tensile forces, fit the locking pin (see Figure 32)
- When a scaffold end is reached, fit a front guardrail.

Figure 33: Installed front guardrail: open tube end mounted on a gravity lock

- Fit system decks on the vertical frames (see section 4.2.8).

- When inner extension brackets are envisaged for this scaffolding level:
  - Attach extension brackets on the inside (see section 5.3.1)
  - Fit system decks on the inner extension brackets and secure them against lifting (see section 4.2.8)

- When anchorage is envisaged for this scaffolding level, fit the anchors (see section 4.4.7).

- When front ascent is envisaged, assemble the ascent (see section 5.2).

4.4.5.2 RESULT OF THE RISK ASSESSMENT: MOUNTING SAFETY GURADRAIL IN THE ASCENT BAY / PERSONAL PROTECTIVE EQUIPMENT

A) Installation of the mounting safety guardrail in the ascent bay from the secured level (see section 4.4.5.1).

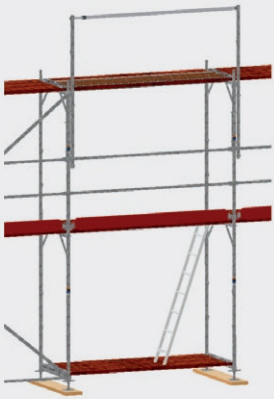


Figure 34: Mounting safety guardrail installed in the ascent bay only

- Assemble the next scaffolding level in the ascent bay in the protection of the mounting safety guardrail (see section 4.4.5.1).
- Enter the top level via the planned ascent and close the hatch of the ladder frame immediately after climbing through.
- Fit the vertical frame onto the lower vertical frames in the ascent bay (see Figure 31).
- Fit the second vertical frame onto the lower vertical frames in the ascent bay.
- Fit the guardrails in the ascent bay (see section 4.2.5).
- If it is intended to make the upright standard joints resistant to tensile forces, fit the locking pin (see Figure 32).

B) Further assembly of the scaffolding level with personal protective equipment.

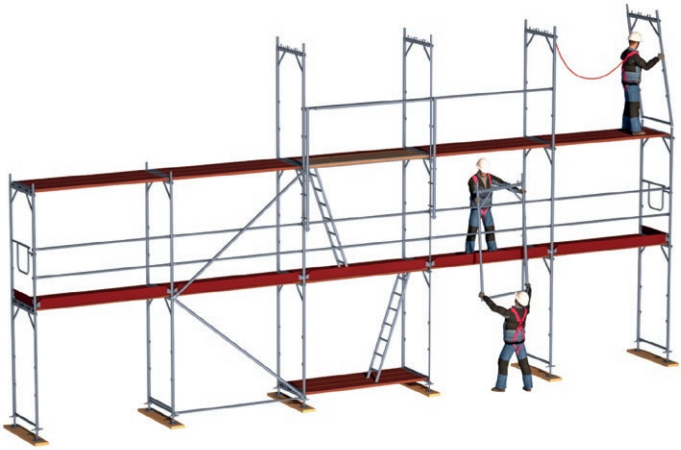


Figure 35: Assembly with personal protective equipment on the topmost scaffolding level

- Starting from the ascent bay:
  - Before leaving the area which is secured, attach personal protective equipment to a designated anchorage point with the snap hook (see section 4.4.2)
  - Fit the next vertical frame (see Figure 35)
  - Insert the next guardrail (see section 4.2.5)
  - If it is intended to make the upright standard joints resistant to tensile forces, fit the locking pin (see Figure 32)
- When a scaffold end is reached, fit the front guardrail (see Figure 33).
- Fit system decks on the vertical frames (see section 4.2.8).
- When inner extension brackets are envisaged for this scaffolding level:
  - Attach extension brackets on the inside (see section 5.3.1)
  - Fit system decks on the inner extension brackets and secure them against lifting (see section 4.2.8)
- When anchorage is envisaged for this scaffolding level, fit the anchors (see section 4.4.7).
- When front ascent is envisaged, assemble the ascent (see section 5.2).

If personal protective equipment is used, correct anchorage of the scaffolding level on which work is being carried out is required (see section 9.2).

4.4.6 BRACING

Vertical diagonals are used for bracing the scaffold on the outer side and in some cases also on the inner side (see Section 9.2).

As a rule, vertical diagonal braces are to be installed in every fifth scaffold bay, but for some configurations additional vertical diagonals are also required (see section 9.2).

The fitting of the vertical diagonals is described in section 4.2.6. The points mentioned in section 4.3.2 need to be observed.

4.4.7 ANCHORAGE

4.4.7.1 Anchor arrangement and anchor forces

The anchor arrangement, any additional anchorage as well as the corresponding anchorage forces for the relevant system configuration can be taken from the general type approval Z-8.1-185.2 and they are also described in section 9.2. The anchor forces specified therein constitute working loads.

Anchors are to be installed continuously during erection of the scaffolding structure. Screws/Bolts of at least 12 mm diameter or equivalent structures are to be used for fixing.

When determining the levels at which the anchors are to be affixed, it should be noted that the vertical frames with heights of 0.50 m and 1.00 m are to be regarded as full scaffolding levels.

4.4.7.2 Short tie bars

A short tie bar is to be attached to the inner standard directly underneath the scaffold decking using a standard coupler (see Figure 36 and Figure 37).

Figure 36: Short tie bar, version without bracket

Figure 37: Short tie bar, version with inner extension brackets

Short tie bars are suitable for distributing forces acting at right angles to the façade

4.4.7.3 V-shaped tie bars

V-shaped tie bars are arranged in a V-shape and are attached to an inner standard tube with standard couplers. The anchors are arranged at an angle of 90° to each other and approx. 45° to the anchorage surface (see Figures 38 - 40).

Figure 38: V-shaped tie bar, basic configuration

Figure 39: V-shaped tie bar, configuration with inner brackets

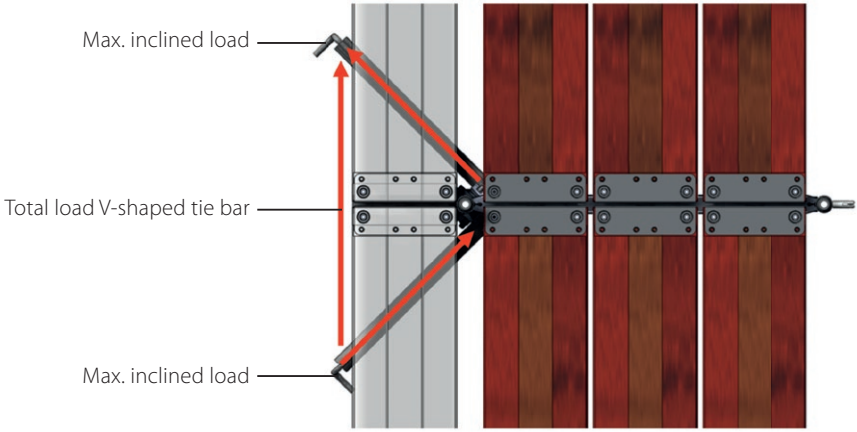


Figure 40: Forces on the V-shaped tie bar

V-shaped tie bars are suitable for distributing forces acting at right angles and forces acting parallel to the façade.

4.4.7.4 Anchorage at corners

Additional anchorage is required in the area of scaffolded corners.

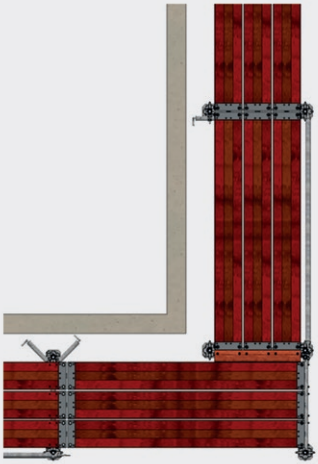


Figure 41: Anchorage at corners, structure with two vertical frames

Figure 42: Anchorage at corners, structure with three vertical frames

4.4.7.5 Deviation from the intended position of the tie bars

If there is no load-bearing material base at the intended anchorage height, the tie bars may be fitted within the anchorage level at a vertical distance from the node of no more than 30 cm.

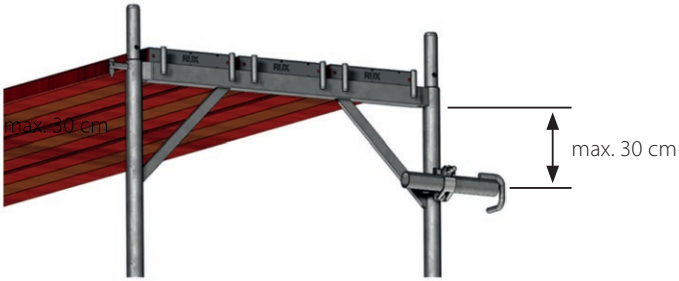


Figure 43: Anchorage with deviating tie position

When the position of the tie bars deviates from the intended position (see Figure 36 to Figure 39), additional measures are required for some configurations, see section 9.2.

The overall structural stability of the scaffold has to be verified when the tie bar positions deviate from the planned node positions at more than one anchorage level or when the maximum permissible degree of deviation

4.4.7.6 Diversion of anchor forces into the anchor base material

- The anchor forces as per section 9.2 have to be diverted by means of tie bars and other suitable fittings into a sufficiently load-bearing anchor base material (e.g. the structure to be scaffolded).

- Suitable fittings, for example, are the anchorage installations for facades described in DIN 4426 "Safety Equipment for Maintenance of Buildings, Fall Protection".

- Unsuitable fittings, for example, are steel wires and ropes. The use of such materials is **not** permitted.

- Sufficiently load-bearing anchor base materials are e.g. reinforced concrete slabs, walls and pillars and load-bearing masonry as per DIN 1053 "Masonry".

- Inadequate load-bearing anchor base materials are e.g. snow guards, lightning rods, drainage pipes, window frames. It is **not** permitted to connect the fittings to such elements.

- The load-bearing capacity of the fittings between the tie bar and the anchor base material has to be verified for the anchor forces involved.

- The load-bearing capacity of the fittings can be verified, for example,
  - in the type approval from the Institut für Bautechnik, Berlin,
  - static calculation or
  - load tests in accordance with section 4.4.7.7.

- If fittings with type approval are used for anchorage, the requirements contained therein have to be complied with. These include for example:
  - Verification of the anchor base material
  - Required component dimensions and edge distances
  - Special installation instructions

4.4.7.7 Load tests

If loads tests are required, these have to be carried out at the actual site.
Suitable test equipment will need to be used to perform the tests.

Anchorage points at which test loads are to be applied have to be determined (number and location) by a qualified person.

The load tests are to be carried out in accordance with the following criteria:

- The test load shall be 1.2 times the required anchorage force as per section 9.2
- The extent of the test has to comprise of
  - at least 10 % of all fittings used when the anchor base material is concrete and
  - at least 30 % for all other building materials,

and at least 5 separate load tests.

- If one or more of the fittings fail the load test, the qualified person shall
  - determine the causes of this,
  - find a replacement fitting and
  - increase the scope of the tests if necessary.

Test results must be recorded in writing and kept at least for the duration of the standing time of the scaffolding.

Examples of anchorage protocols can be found in section 10, as well as in the BGI 663.

4.5 TOPMOST LEVEL OF THE SCAFFOLDING

Above the topmost scaffolding level, guardrail posts with transoms are attached and secured there by means of the ring bolts on the guardrail post. Principal and secondary guardrails are mounted on the gravity lock pins on the guardrail posts (see Figure 44 and section 4.2.5).

Fig. 44: Upper finish section with guardrail posts with transoms

Alternatively, guardrail posts and separate deck retainers may be used (see Figure 45).

Fig. 45: Upper finish section with guardrail posts and deck retainers

Fitting is carried out in the same way as described in section 4.4.5. Protection against falling - depending on the result of the risk assessment (see section 4.4.2) by the scaffolder/scaffold builder – to be in accordance with sections 4.4.5.1 or 4.4.5.2.

4.6 COMPLETION OF THE SIDE PROTECTION

A complete side protection consists of a principal and secondary guardrail as well as a toe board.

Any missing toe boards or other missing parts of the side protection shall be installed at all scaffolding levels which are going to be needed by the user after erection, approval and handover have taken place.

The toe boards with their end fittings are to be positioned between the standards in such a way that their upper edges form one continuous level throughout (see Figure 46).

Figure 46: Complete side protection

Scaffolding levels with incomplete side protection have to be secured by appropriate barriers. They may not be accessed by the user.

4.7 SYSTEM-INDEPENDENT COMPONENTS AS SIDE PROTECTION

If necessary, the side protection is to be supplemented with system-independent components. The side protection is to be designed in such a way that the principal guardrail is 100 cm above the decking surface and a ball with a diameter of 47 cm cannot fit between the guardrail sections and cannot exit the decked surface at any point up to a height of 1.00 m.

Scaffold tubes in connection with scaffold couplers are particularly suitable as guardrail components. Toe boards need to have a height of at least 15 cm.

5 ALTERNATIVE DESIGNS AND FITTING OF SUPPLEMENTARY COMPONENTS

5.1 GENERAL

When installing supplementary components, there may be an increased risk of falling. Scaffolding work must be carried out in such a way that the risk of falling is excluded or kept to an absolute minimum. The safety instructions for the erection, modification and dismantling of the scaffold described in section 2 have to be observed.

5.2 ACCESS TO WORKPLACES ON SCAFFOLDS

Before starting work on the first scaffolding level, an access has to be installed.
Suitable for this are:

- front stairway ascents
- front ladder ascents
- inner ladder ascents

5.2.1 FRONT STAIRWAY ASCENT

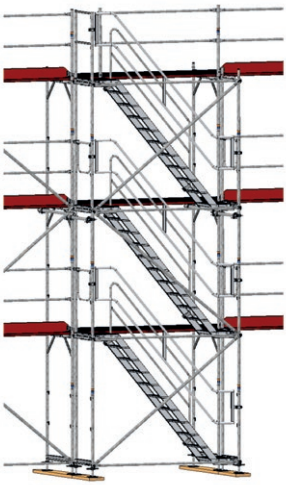


Figure 47: Front stairway ascent

The stairway has to be erected in front of the scaffold in a 2.50 m long scaffold bay (see Figure 47).
Components with a system width of 650 mm are used for the stairway.
The stairway has to be connected to the scaffold every 4 m by means of scaffold tubes and couplers. The scaffold has to be tied at these points, even if no anchors are envisaged for the scaffold itself (see section 9.2).

Construction of the lowermost level:

- At the intended installation points:
  - Establish the load-distributing base structure in accordance with section 4.2.1
  - Arrange base jacks as per section 4.2.2
- Attach a decking transom to a pair of base jacks (see section 4.2.2)
- Attach a base transom to the other pair of base jacks (see section 4.2.2)
- Fit a longitudinal ledger between the transoms (see section 4.2.5)
- Attach the first vertical frame onto the base jacks with the base transom and secure against toppling over (see section 4.2.4)
- Position the platform stairway on the decking transom and the vertical frame
- Fit the second vertical frame above the decking transom and secure against toppling over

- Attach the vertical diagonal brace (see section 4.2.6)
- Fit the principal guardrail between the diagonal gravity locks on the vertical frames (see section 4.2.5)
- Align the stairway ascent:
  - Position vertical frames in the levels of the vertical frames of the scaffolding and align them vertically and horizontally
  - Establish the distance to the scaffold (see Figure and section 4.1)

Construction of the other levels:

There is an increased risk of falling when installing the stairway. Scaffolding work must be carried out in such a way that the risk of falling is excluded or kept to an absolute minimum. The safety instructions for the erection, modification and dismantling of the scaffold described in section 2 have to be observed.

- Fit the vertical frame above the top platform of the now existing stairway and, if necessary, connect to the scaffold using scaffold tubes and standard couplers (see section 5.10)
- Place the stairway on the ledgers of the vertical frames
- Position the second vertical frame and, if necessary, connect to the scaffold using scaffold tubes and standard couplers
- Fit front guardrails in both vertical frames (see Figure 33).
- Connect the double handrail for the aluminium platform stairway on the outside to the vertical frames with the pre-fitted semi-couplers (see section 5.10)
- Mount the vertical diagonal brace and principal guardrail
- If necessary, add more anchorage to the scaffolding

Upper scaffold finish section:

- Fit the front guardrail frame above the top platform of the existing stairway
- Connect the double handrail for the aluminium platform stairway on the outside to the vertical frame and front guradrail frame with the pre-fitted semi-couplers (see section 5.10)
- Fit guardrail holder for decks with guardrail posts, two guardrails of 2.00 m and a toe board of 2.00 m to the scaffold decking next to the topmost aluminium platform stairway (see Figure 47)

Inner guardrail

- If desired, additional interior railings can be mounted for aluminium platform stairways

5.2.2 FRONT LADDER ASCENT

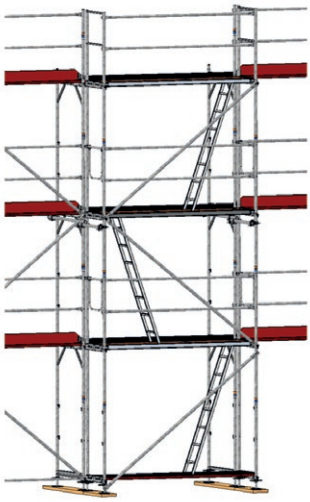


Figure 48: Front ladder ascent

The ladder ascent has to be connected to the scaffold every 4 m by means of scaffold tubes and couplers. The scaffold has to be tied at these points, even if no anchors are envisaged for the scaffold itself (see section 9.2).
Components with a system width of 650 mm are to be used for the front ladder ascent.

Construction of the lowermost level:

- At the intended installation points
  - Establish the load-distributing base structure in accordance with section 4.2.1
  - Arrange base jacks as per section 4.2.2
- Attach decking transom to a pair of base jacks (see section 4.2.2)
- Place system deck on the decking transom (see section 4.2.8)
- Attach the vertical frame to the pair of base jacks and secure against toppling over (see section 4.2.4)
- Install longitudinal ledger between the decking transoms (see section 4.2.5)
- Attach the vertical diagonal brace (see section 4.2.6)
- Position the ladder frames and, if necessary, system decking on the vertical frames (see section 4.2.8)

- Align the ladder ascent:
  - Align the vertical frames so that they are vertical and the system decks are horizontal
  - Position vertical frames in the levels of the vertical frames of the scaffolding
  - Establish the distance from the scaffold (see Figure 48)
- Fit a gap cover between the scaffold deck and the ladder frame

Construction of the other levels:

- Fit the vertical frame (see Figure 31) and, if necessary, connect to the scaffold using scaffold tubes and standard couplers
- Install the guardrails (see section 4.2.5)
- Fit front guardrail (see section 4.4.5)
- Install the vertical diagonal brace (see section 4.2.6)
- Position the ladder frame on the vertical frames (see section 4.2.8)

> The hatches of the ladder frames are to be arranged in an offset manner. They may only be opened for climbing through and must be closed again immediately afterwards. Otherwise, the hatches are to remain closed.

- Fit a gap cover between the scaffold deck and the ladder frame
- If necessary, add more anchorage to the scaffolding

Upper scaffold finish section:

The upper scaffold finish section of the front ladder ascent is assembled in the same way as the finish section for the upper scaffolding level (see section 4.5).

5.2.3 INNER LADDER ASCENT

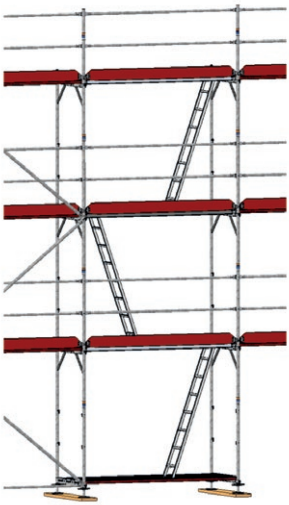


Figure 49: Inner ladder ascent

The inner ladder ascent may only be used for the combinations of bay lengths and load classes stated in the following table. In other cases, front ascents are required.

Table 4: Inner ladder ascent, load classes

Load class	Bay length
1	≤ 3.0 m
2	≤ 3.0 m
3	≤ 3.0 m
4	≤ 2.5 m
5	≤ 2.0 m

Ladder frames are used for the inner ladder ascent (see Figure 49).

The scaffold bay on the decking transoms under the ladder frame is to be fitted with decking (see sections 4.2.2 and 4.2.8).

The hatches of the ladder frames are to be arranged in an offset manner. They may only be opened for climbing through and must be closed again immediately afterwards. Otherwise, the hatches are to remain closed.

The vertical frames of the ladder frame have to be anchored to the façade at every second level at a minimum.

5.3 EXTENSION BRACKETS

When using extension brackets, it may be necessary to complete the side protection with system-independent components (see section 4.7 and Figure 50).

5.3.1 Inner extension console

The single-deck inner extension brackets are used to widen the decking surface on the inside of the scaffold (see Figure 50). They may be fitted at all scaffolding levels.

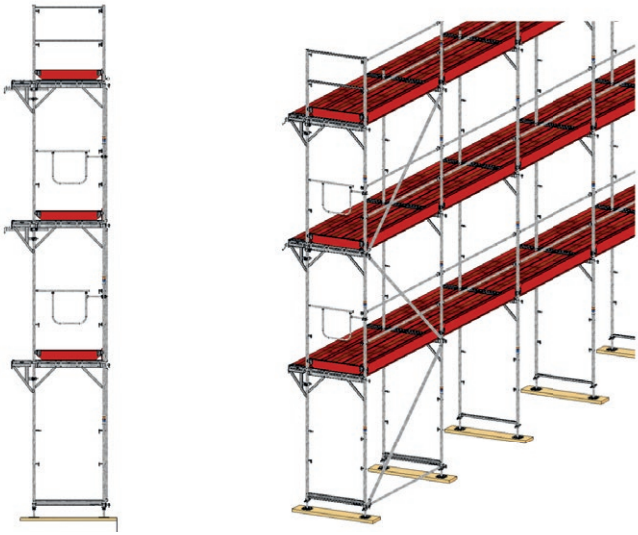


Figure 50: Scaffold with inner extension brackets

The extension brackets are connected to the vertical frames by means of the welded-on semi-couplers (see section 5.10).

The extension brackets are decked with 0.29 m-wide system planks and secured against lifting (see section 4.2.8).

5.3.2 OUTER EXTENSION BRACKETS

Outer extension brackets are used to widen the decking surface on the outside of the scaffold (see Figure 51 and Figure 52).

Outer brackets may only be used up to load class 4.

They may only be fitted at the topmost scaffolding level.

A gap cover needs to be fitted between the main and extension decking when outer extension brackets are used.

Single-deck extension brackets:

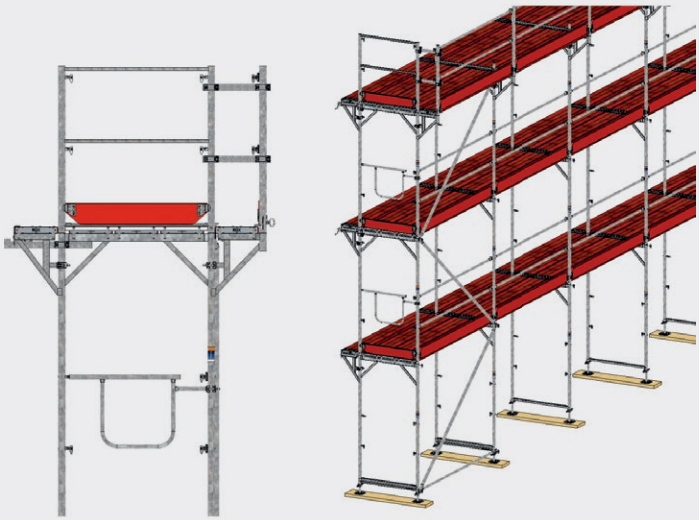


Figure 51: Scaffold with outer single-deck extension brackets

The single-deck outer extension brackets are attached in the same way as the inner extension brackets (see section 5.3.1).

Two-deck extension brackets:

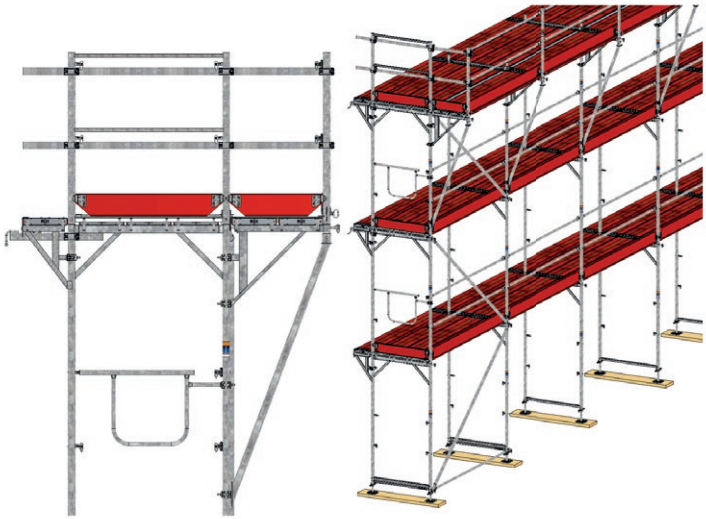


Figure 52: Scaffold with double-deck extension brackets on the outside and support prop

The two-deck outer extension brackets are connected to the vertical frames by means of the welded-on semi-couplers (see section 5.10).

To underpin the two-deck outer extension brackets, a support prop is connected to each of the extension brackets and the vertical frame.

Either one or two system decks are then fitted to the two-deck extension brackets (see section 4.2.8).

The use of ladder frames is not permitted on extension brackets.

5.4 PASSAGE FRAMES

Passage frames are used to secure traffic routes (see Figure 53). The passage frames are to be aligned so as to be perpendicular.

Each passage frame consists of a horizontal passage frame connector and two vertical passage frame standards.

The passage frames are mounted in the same way as the vertical frames (see sections 4.2 and 4.4).

Figure 53: Passage frame

The design of the scaffold with passageway frame is shown in section 9.2. The additional measures specified there need to be observed:

- Additional horizontal ledgers
- Additional anchorage
- Additional vertical diagonal braces
- Additional transverse diagonals
- Additional inner standard reinforcements

Access to the second scaffolding level is by means of a front stairway or ladder ascent.

5.5 BRIDGING GIRDERS

Bridging is necessary if, for example, passageways have to be kept free.

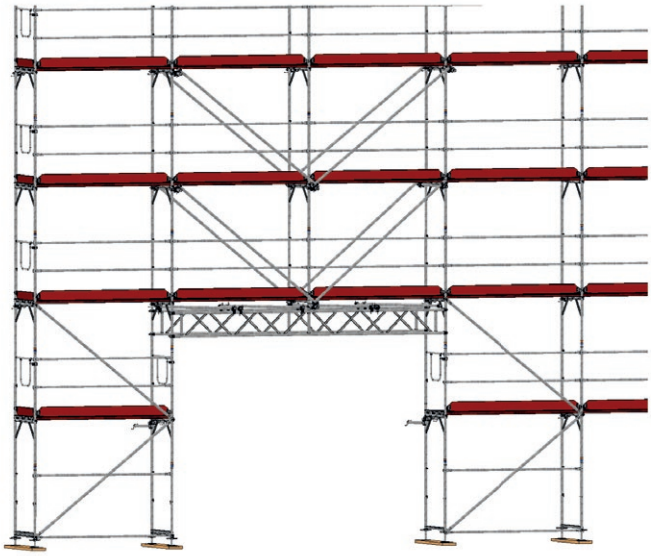


Figure 54: Bridging

The bridging elements are placed directly under the first or second scaffolding level and braced (see section 9.2). For this purpose, bridging girders are used which are connected to the vertical frames by means of the welded-on semi-couplers (see section 5.10).

Alternatively, lattice girders may be used which are connected to each vertical frame by means of two standard couplers (see section 5.10).

The bracing or reinforcement of the bridging or lattice girders has to take place at the centre of the bridging itself as well as at the centre of both bays to be bridged. For bracing, the top chords of the two parallel girders have to be kept horizontal. This can be achieved either by anchorage to the building or by applying a horizontal latticework structure made up of scaffold tubes and couplers (see Figure 55 and Figure 56).

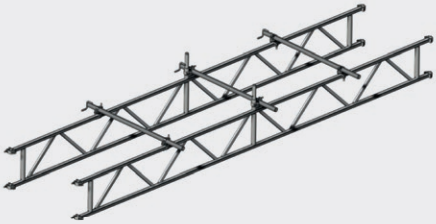


Figure 55: Horizontal bracing with anchorage

Figure 56: Horizontal bracing with latticework structure

The design of the scaffold with bridging girder is shown in section 9.2. The additional measures specified there need to be observed:

- Additional vertical diagonal braces (for instance, in two scaffolding levels above the girder)
- Additional horizontal ledgers
- Additional anchorage

The additional vertical diagonal braces above the bridging girders are to be connected to the vertical standards by means of standard couplers and tubing (see Figure 57). Alternatively, the diagonals can be connected near the nodes with swivel couplers of the class B – as per EN 74-1:2005 – with a load-bearing capacity of 9.09 kN.

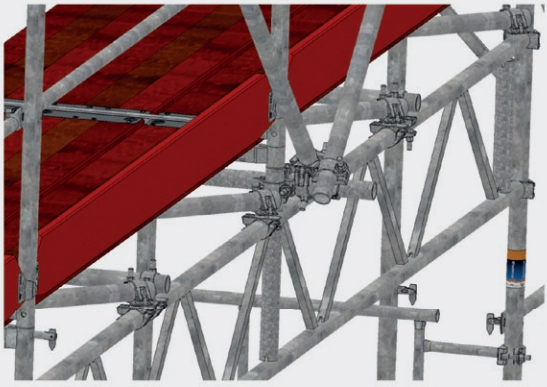


Figure 57: Connection of diagonal braces with standard couplers

5.6 PROTECTIVE ROOF

The protective roof may only be mounted on the outer side of a scaffold in the second scaffolding level (H = 4 m) (see Figure 58).

Principal guardrails are to be fitted between the protective roof and the working area at this level.

The protective roof configuration consists of an outer extension bracket, a support prop for extension brackets, a protective roof extension arm, decks, a gap cover and deck retainers for the protective roof extension arm. The entire surface at this level (protective roof and working area) has to be gap free and be flush with the building structure.

The design of the scaffold with protective roof is described in section 9.2. The additional measures specified there need to be observed:

- Additional horizontal ledgers
- Additional anchorage
- Additional vertical diagonal braces

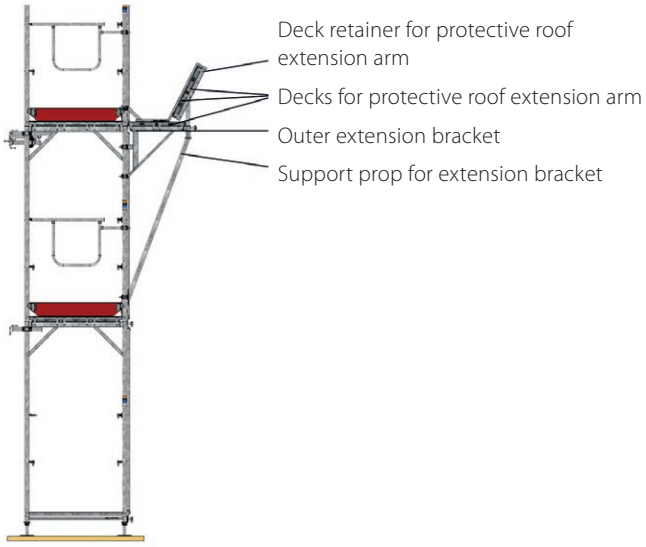


Figure 58: Protective roof

Personal protective equipment has to be worn during the assembly work. The snap hook on the personal protective equipment may only be attached at the approved anchorage points (see section 4.4.2).

Firstly, the entire façade scaffolding, including side protection components, has to be erected and anchored up to the 3rd scaffolding level to a height of approx. 6.20 m.

Then, the protective roof has to be fitted.
To do this, extension brackets and the support prop are to be mounted from the first scaffolding level at a height of approx. 2.20 m (see section 5.3.2). In this respect the scaffolder only works in the area secured by guardrails.

The scaffolder then climbs up to the second scaffolding level and secures her/himself there with the personal protective equipment by attaching the snap hook to the horizontal top decking ledger on the vertical frames, i.e. at a height of approx. 6.20 m (see section 4.4.2).

Subsequently, the decks are fitted on the extension brackets on the second scaffolding level at a height of approx. 4.20 m (see section 4.2.8).

Then the protective roof extension arms are attached to the extension brackets. Additional decks are then mounted on the protective roof extension arms (see section 4.2.8).

Finally, deck retainers are inserted into the protective roof extension arms and then affixed to the outer standards of the vertical frames by means of the welded-on semi-couplers (see section 5.10).

5.7 PROTECTIVE WALL

Protective walls are used to provide a conform level of safety against falling when working on roof areas.

The design of a protective wall has to comply with the respectively valid requirements. Further information on assembly, use and dimensions can be found in BGI 663 - Handlungsanleitung für den Umgang mit Arbeits- und Schutzgerüst [June 2011] (Instruction Manual for Handling Working and Protective Scaffolds).

Examples of applications on flat and inclined roofs

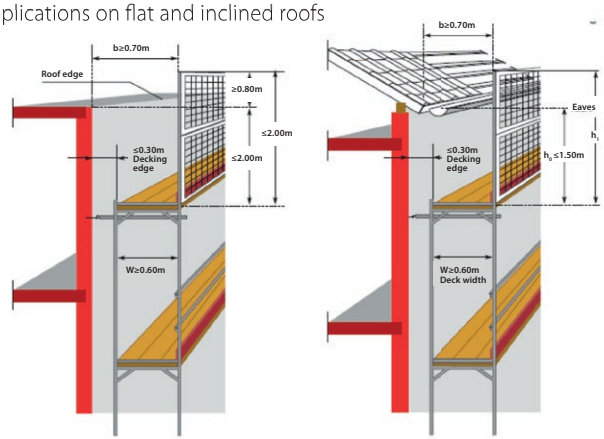


Figure 59: Protective wall with dimensions

Protective wall on vertical frames:

The 2.0 m protective mesh supports with transom are fitted to the vertical frames and secured to the inner scaffold standard by means of locking pins and the ring bolts on the protective mesh post (see Figure 32 / Figure 60).

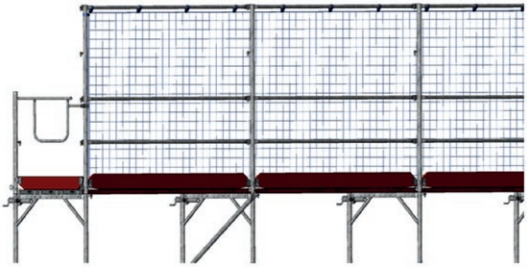


Figure 60: Protective wall on vertical frames

Protective wall on outer extension brackets:
The 2.0 m protective mesh supports with transom are fitted to the 2-deck extension brackets and secured by means of locking pins and the ring bolts on the protective mesh post (see Figure 32 and Figure 61).

Figure 61: Protective wall on extension brackets

To complete the protective wall configuration, two protective mesh gratings are attached above each other in each scaffold bay by affixing the ends of the mesh grating to the gravity lock pins (see section 4.2.5).

As an alternative to protective gratings, safety nets as per DIN EN 1263-1 can be used.
The safety nets are to be attached to a principal guardrail at a height of 2.00 m above the decking surface and at toe board height.

When safety nets without edge reinforcement ropes are used, they have to be threaded onto the principal guardrail loop for loop.

When safety nets with edge reinforcement ropes are used, they have to be attached to the principal guardrail at a maximum spacing distance of 75 cm with suitable quick-action fasteners. The mesh size of the safety nets may not exceed 100 x 100 mm.

5.8 FREE-STANDING SCAFFOLDING LEVELS ABOVE THE UPPERMOST ANCHORS

During construction phases of new buildings, the topmost scaffolding level may protrude above the uppermost anchorage level by 2 m (see Figure 62).

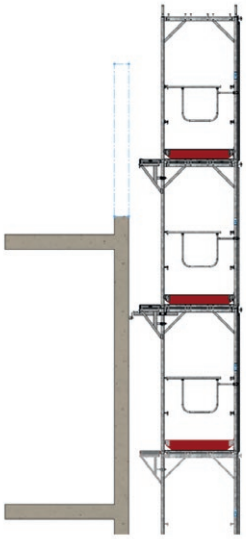


Figure 62: Free-standing scaffolding level as an intermediate state during erection

The non-anchored scaffold frames are to be rigidly connected to the scaffold frames beneath, e.g. by means of locking pins (see Figure 32).

5.9 CLADDING

The scaffold may be clad e.g. with nets or tarpaulins.

Additional anchorage is required for cladded scaffolds (see section 9.2).

When cladding the scaffold with nets, RUX nets are to be used that meet the requirements for air permeability and the spacing of the fastenings. The nets are fastened to the outer standard tubes of the vertical frames with one-way ties at a maximum spacing of 20 cm.

System-independent tarpaulins may be used for cladding with tarpaulins.

Figure 63: Cladding with nets

Figure 64: Cladding with tarpaulins

Nets and tarpaulins are fastened to the outer standards of the vertical frames using one-way ties. The maximum permissible distance between the fastenings is 20 cm.

Scaffold claddings are to be fitted around the front sides of the scaffolding.

5.10 COUPLERS

The terms standard, swivel and semi-coupler are used in many places in these Instructions for Assembly and Use to simplify matters. These terms generally stand for scaffold couplers of class B or BB as per DIN EN12811-1 or DIN EN 74-1:2005.

When using scaffold couplers, ensure that the following points are observed:

- The couplers may only be used with scaffold tubes made of steel or aluminium with an external diameter of 48.3 mm that meet the requirements of DIN EN 12810-1 for round steel tubes and round aluminium tubes
- The nuts of the couplers are to be tightened with a torque of 50 Nm
- If class BB coupler configurations are used, only couplers of identical design may be used; both couplers have to contact each other in an unloaded state
- A grease-oil mixture has to be applied to the threads of the screws/bolts and nuts and re-greased when the grease-oil mixture is worn away
- Threads may not have any corroded surfaces
- The free end of a scaffold tube has to protrude at least 4 cm outside the coupler

6 DISMANTLING THE SCAFFOLDING

To dismantle the scaffolding, reverse the sequence of the work steps described above.

The anchors may only be removed when the scaffolding levels above them have been completely dismantled. Components have to be dismantled immediately when their anchors have been removed.

To avoid tripping hazards, dismantled scaffold components are not to be stored on traffic routes.

Dismantled scaffold components may not be thrown down from the scaffolding.

The scaffold components are to be appropriately transported and stored.

7 USAGE

The scaffold may be used in accordance with the combinations of load classes and bay lengths stated in the following table.

Table 5: Load classes and permissible bay lengths

Load class	Bay length	Permitted load capacity	Outer bracket
1	≤ 3.0 m	75 kg / m²	permitted
2	≤ 3.0 m	150 kg/m²	permitted
3	≤ 3.0 m	200 kg / m²	permitted
4	≤ 3.0 m	300 kg / m²	permitted
5	≤ 2.5 m	450 kg / m²	impermissible
6	≤ 2.0 m	600 kg / m²	impermissible

The load capacities shown constitute maximum permissible loads on one scaffolding level.

Every user of a scaffolding is responsible for its proper use and adherence to the operational safety requirements applying to the scaffold. Should any defects become apparent on the scaffold, the erection surface or the anchorage either before or during usage, the scaffolder/ scaffold builder is to be notified of this immediately. In this case, the scaffold may not be used any longer until the defects have been rectified and the scaffold user has to correspondingly mark and block-off the scaffold without delay.

It is forbidden to jump on decks or to throw anything down on to them.
It is forbidden to lean over guardrails. The hatches of the ladder frames may only be opened immediately before ascending or descending and must be closed again immediately afterwards. Scaffold surfaces that serve as a protective roof may not be walked on by the scaffold user.

The depositing and storage of materials and equipment is not permitted on the following areas:

- Hatches of ladder frames
- Front ascents (stairway or ladder ascent)
- Areas that serve as a safety catch scaffolding or protective roof

The scaffold user has to ensure that the scaffold is not accessed by unauthorised persons during the period it is in use.

The valid statutory requirements of the Industrial Safety Regulation (BetrSichV) and the Accident Prevention Requirement "Construction Work" (BGV C22) are to be observed when using the scaffold.

Further information on usage can be found in BGI 663 - Handlungsanleitung für den Umgang mit Arbeits- und Schutzgerüst [June 2011] (Instruction Manual for Handling Working and Protective Scaffolds).

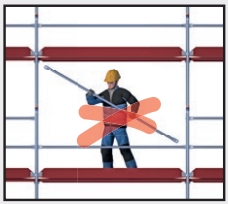
The following safety instructions are to be observed.

8 SAFETY INSTRUCTIONS

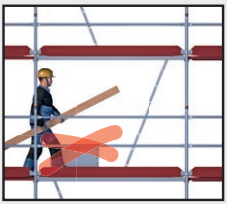
WARNINGS

- **Unauthorised access and use of the scaffolding is forbidden.**
- **Any defects or deficiencies are to be reported to the scaffold builder immediately and the scaffold is to be cordoned off and made inaccessible.**

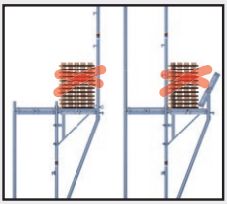
Pay careful attention to the Safety Instructions



Any modifications to the scaffolding may only be carried out by the scaffold builder

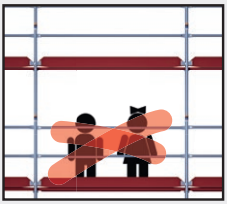


Keep hatches in the ascent decks closed

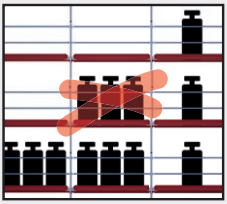


Do not store material on safety catch scaffolds or protective roofs

Workplaces may not be located above one another at any one time



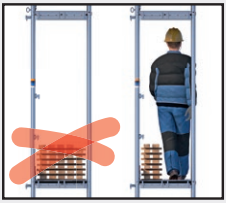
Children may not access the scaffolding at any time



Do not overload scaffold decks

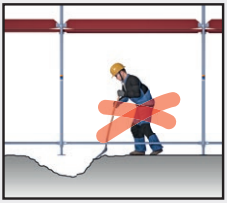
Pay careful attention to any possible risk of falling between the scaffold and the building

Only use fitted ladders or stairways for ascent and descent



When material is stored, make sure there is still sufficient space left to move along the decking

Do not jump on decks



Do not endanger the stability of the scaffolding by excavating or digging around the base

9 STANDARD DESIGN OVERVIEW

9.1 COMPONENT ELEMENTS OF THE STANDARD DESIGN

Table 6: Component elements of the standard design

Designation	Approval Z-8.1-185.2, Appendix A, Page
Vertical frame with gravity lock	002
Vertical frame with guardrail lug	003
Base jack	007
Base plate	008
Decking transom / Base transom / Intermediate transom	009
Wooden plank	010
Profiled wooden plank	012
Aluminium deck with ned cap	014
Aluminium floor panel with end cap	015
Steel deck	016
Vertical diagonal brace	017
Tie bar (steel shore tube)	018
Principal guardrail, intermediate guardrail (back railing)	019
Principal, intermediate guardrail (toggle rails)	020
Wooden toe board	021
Guardrail post with gravity lock / with guardrail lug	022
Deck holder 1000	023
Guardrail post with transom 1000 and guardrail lug	025
Front guardrail (front guardrail double) 1000	026
Front guardrail frame with gravity lock / with guardrail lug	027
Front principal guardrail 1000	028
Protective mesh	029
Protective mesh supports	030
Aluminium ladder frame with aluminium profiled surface	032
Aluminium ladder frame with integrated ladder and BFU 100G	035
Aluminium ladder frame with integrated ladder entirely out of aluminium	036
Aluminium platform stairway	037
Double handrail for aluminium platform stairway	039
Inner handrail for aluminium platform stairway	040
Inner extension bracket with deck retainer	041
Bracket deck retainer	042
Outer extension bracket, single-deck, with support	043
Outer extension bracket, double-deck, with support	044
Support prop for extension bracket, double-deck	045
Protective roof extension arm	046
Deck retainer for protective roof extension arm, double-deck	047

Designation	Approval Z-8.1-185.2, Appendix A, Page
Outer extension bracket, triple-deck, with support	048
Support prop for extension bracket, triple-deck	049
Deck retainer for protective roof extension arm, triple-deck	049
Gap cover	051
Passage frame connector 1650	052
Passage frame standard	053
Bridging girder 4.00 m	054
Bridging girder 5.00 m	055
Bridging girder 6.00 m	056
Vertical frame 650 with gravity lock	057
Vertical frame 650 with guardrail lug	058
Decking ledger 650, decking pins, base transom 650	059
Front guardrail (front guardrail double) 650	060
Mounting safety guardrail post	061
Telescopic guardrail	062
Base plate	064
Vertical frame 2 m with gravity lock	065
Vertical frame 2 m with guardrail lug	066
Vertical frame 1 m	067
Plank out of solid wood D=45 mm	068
Plank out of solid wood D=48 mm	069
Aluminium deck D = 45 mm	070
Tie bar	071
Longitudinal ledger/Principal guardrail	072
Front guardrail frame	073
Deck retainer	074
Wooden toe board	075
Extension bracket, single-deck and double-deck	076
Steel tube ladder	077
Ladder frame, complete (2 struts, 1 ledger)	078
Deck retainer	079
Steel toe board	080
Aluminium toe board	081

Permissible load classes for the system decks can be seen in section 4.2.8

9.2 STANDARD DESIGN CONFIGURATIONS

9.2.1 PRELIMINARY REMARKS

For the Super 100 system scaffolding, the stability and usability of the standard design have been verified with the approval Z-8.1-185.2. The standard design includes all scaffold constellations detailed in section 9.2. These scaffolding constellations are identically depicted in Appendix B of approval Z-8.1-185.2.

The following representations show configurations that depict the standard design and describe the required additional measures referred to in previous sections. All components are shown at their designated positions.

Anchor arrangement:
The following table shows the arrangement of the anchors:

Table 7: Anchor arrangement

Design	Closed façade	Partially open façade
No cladding	8 m offset	
Clad with netting	8 m offset	4 m or 4 m offset
Clad with tarpaulin	2 m	

In addition to the anchor arrangement shown, more anchorage may be required for some configurations (see section 9.2).

9.2.2 OVERVIEW OF CONFIGURATIONS

Table 8: Schedule of configurations

Number	Bay length	Load class	Inner brackets	Outer brackets	Clad with netting	Clad with tarpaulin	Protective wall	Protective roof	Passage frames	Bridging	Stairway ascent	Ladder ascent	Upper level unanchored	Partially open façade	Closed façade	Anchor arrangement	Jack extension [mm]
[1]	L = 3.0 m	Load class 4												X	X	8v	295
[2]			X											X	X	8v	250
[3]			X	X										X	X	8v	250
[4]					X									X		4v	250
[5]					X										X	8v	250
[6]			X		X									X		4v	250
[7]			X		X										X	8v	250
[8]			X	X	X									X		4-2m	250
[9]			X	X	X										X	8v	250
[10]			X			X								X		2	250
[11]			X			X									X	2d	295
[12]			X	X		X								X		2	250
[13]			X	X		X									X	2d	250
[21]	L = 2.5 m und L = 2.0 m	Load class 5 and 6												X	X	8v	295
[22]			X											X	X	8v	250
[23]					X									X		4v	250
[24]					X										X	8v	250
[25]			X		X									X		4v	250
[26]			X		X										X	8v	250
[27]			X			X								X		2	250
[28]						X									X	2d	295

Number	Bay length	Load class	Inner brackets	Outer brackets	Clad with netting	Clad with tarpaulin	Protective wall	Protective roof	Passage frames	Bridging	Stairway ascent	Ladder ascent	Upper level unanchored	Partially open façade	Closed façade	Anchor arrangement	Jack extension [mm]
[31]	L = 3.0 m	Load class 4					X							X	X	8v	295
[32]			X				X							X	X	8v	250
[33]			X	X			X							X	X	8v	250
[34]					X		X							X		4v	250
[35]					X		X								X	8v	250
[36]			X		X		X							X		4v	250
[37]			X		X		X								X	8v	250
[38]			X	X	X		X							X		4-2m	250
[39]			X	X	X		X								X	8v	250
[40]			X			X	X							X		2	250
[41]			X			X	X								X	2d	295
[42]			X	X		X	X							X		2	250
[43]			X	X		X	X								X	2d	250
[51]	L = 2.5 m und L = 2.0 m	Load class 5 and 6					X							X	X	8v	295
[52]			X				X							X	X	8v	250
[53]					X		X							X		4v	250
[54]					X		X								X	8v	250
[55]			X		X		X							X		4v	250
[56]			X		X		X								X	8v	250
[57]			X			X	X							X		2	250
[58]			X			X	X								X	2d	295
[61]	L = 3.0 m	LC 4					(X)	X						X	X	8v	295
[62]			X				(X)	X						X	X	8v	250
[63]			X	X			(X)	X						X	X	8v	250
[64]	2.5+2.0	LC 5+6					(X)	X						X	X	8v	295
[65]			X				(X)	X						X	X	8v	250

Number	Bay length	Load class	Inner brackets	Outer brackets	Clad with netting	Clad with tarpaulin	Protective wall	Protective roof	Passage frames	Bridging	Stairway ascent	Ladder ascent	Upper level unanchored	Partially open façade	Closed façade	Anchor arrangement	Jack extension [mm]
[71]	L = 3.0 m	LC 4					(X)		X					X	X	8v	295
[72]			X				(X)		X					X	X	8v	250
[73]			X	X			(X)		X					X	X	8v	250
[74]	2.5+2.0	LC 5+6					(X)		X					X	X	8v	295
[75]			X				(X)		X					X	X	8v	250
[81]	L = 3.0 m	LC 4					(X)	(X)		6m				X	X	8v	295
[82]			X				(X)	(X)		6m				X	X	8v	250
[83]			X	X			(X)	(X)		6m				X	X	8v	250
[84]	2.5+2.0	LC 5+6					(X)	(X)		5m				X	X	8v	295
[85]			X				(X)	(X)		5m				X	X	8v	250
[91]	L=3.0m	LC 4	X	X			(X)				1L			X	X	8v	250
[92]			X	X			(X)					X		X	X	8v	250
[101]	3.0	4	X										X	X	X	8v	250
[102]	2.5/	5+6	X										X	X	X	8v	250

Explanations:

8v	Anchor arrangement 8 m offset
4v	Anchor arrangement 4 m offset
4	Anchor arrangement 4 m
2	Anchor arrangement 2 m
4-2m	Anchor arrangement 4 m, first anchorage level H = 2 m
2d	Anchor arrangement 2.0, in specific areas every second node as pressure support (pressure support arrangement 4 m offset)
(x)	Additional possible constellations

9.2.3 REPRESENTATION OF CONFIGURATIONS

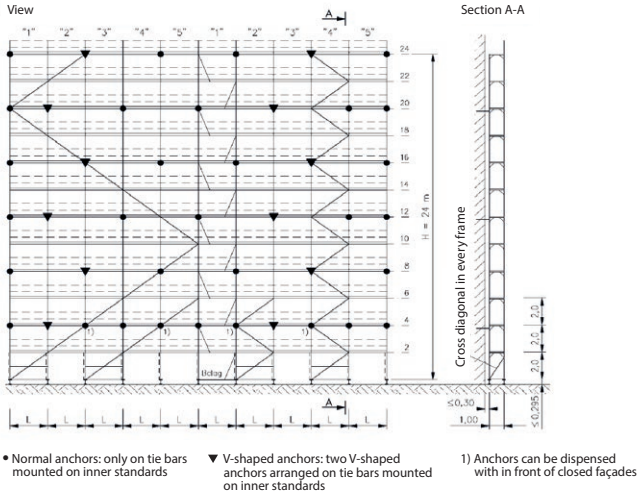
9.2.3.1 LOAD CLASS 4 BASIC CONFIGURATION [1]

Unclad scaffold with bay lengths of up to 3.0 m:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **01**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

1) Anchors can be dispensed with in front of closed façades

Max. jack extension: 295 mm
Anchorage: 8 m offset
Additional ties at H = 4 m (only in front of open façade)

Façade			Partially open	Closed
Jack loads		Inside:	9.5 kN	15.1 kN
		Outside:	15.0 kN	21.5 kN
Anchor forces	Orthogonal:		4.2 kN	1.6 kN
	Parallel:	Long tie:	---	
		Short tie:	0.3 kN	
		V-shaped tie:	4.7 kN	
	V-shaped tie bar:	Max. inclined load:	3.4 kN	

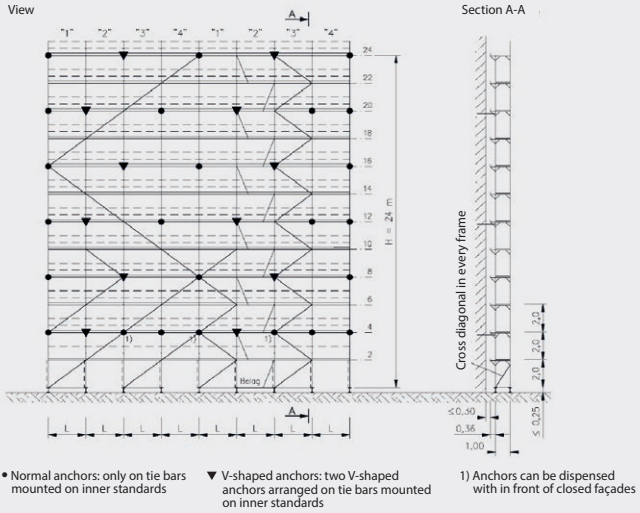
9.2.3.2 LOAD CLASS 4 BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [2]

Unclad scaffold with bay lengths of up to 3.0 m:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **02**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

1) Anchors can be dispensed with in front of closed façades

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m (only in front of open façade)

Façade			Partially open	Closed
Jack loads		Inside:	24.9 kN	24.0 kN
		Outside:	22.8 kN	22.8 kN
Anchor forces	Orthogonal:		4.2 kN	1.7 kN
	Parallel:	Long tie:	---	
		Short tie:	0.1 kN	
		V-shaped tie:	6.0 kN	
	V-shaped tie bar:	Max. inclined load:	4.2 kN	

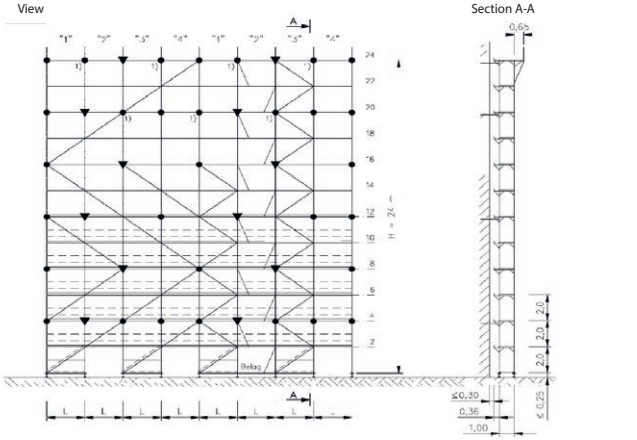
9.2.3.3 LOAD CLASS 4 BRACKET CONFIGURATION 2 (WITH INNER AND OUTER BRACKETS) [3]

Unclad scaffold with bay lengths of up to 3.0 m:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 35x35x4.5 (new model)

(Configuration No. **03**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

1) Anchors can be dispensed with in front of closed façades

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m, 20 m, 24 m

Façade			Partially open	Closed
Jack loads		Inside:	25.1 kN	24.7 kN
		Outside:	30.7 kN	30.7 kN
Anchor forces	Orthogonal:		3.7 kN	1.6 kN
	Parallel:	Long tie:	---	
		Short tie:	0.1 kN	
		V-shaped tie:	6.2 kN	
	V-shaped tie bar:	Max. inclined load:	4.4 kN	

9.2.3.4 LOAD CLASS 4 NET-CLAD, BASIC VERSION

Bay lengths of up to 3.0 m:

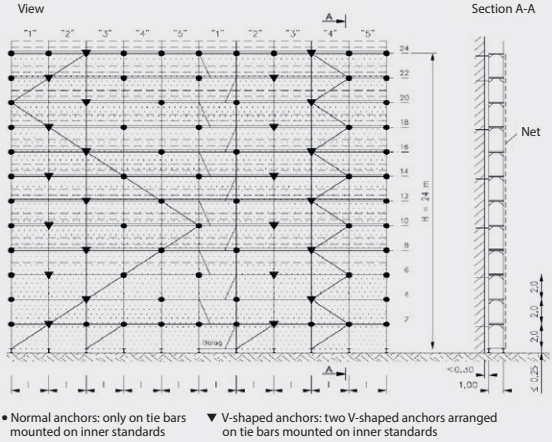
The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

9.2.3.4.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE [4]

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **04**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

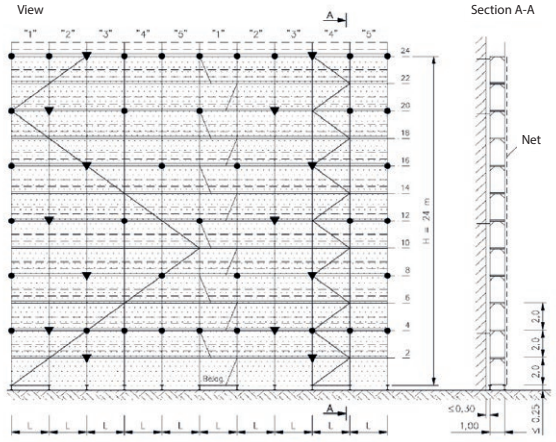
Max. jack extension: 250 mm
Anchorage: 4 m offset
Additional ties at H = 2 m and 24 m

Façade			Partially open
Jack loads		Inside: Outside:	15.2 kN 20.5 kN
Anchor forces	Orthogonal:		4.6 kN
	Parallel:	Short tie: V-shaped tie:	0.2 kN 4.3 kN
	V-shaped tie bar:	Max. inclined load:	3.3 kN

9.2.3.4.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [5]

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **05**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m
1 additional V-shaped tie at H = 2 m (every 5 bays)

Façade			Closed
Jack loads		Inside: Outside:	15.7 kN 19.3 kN
Anchor forces	Orthogonal:		3.0 kN
	Parallel:	Short tie: V-shaped tie:	0.3 kN 3.4 kN
	V-shaped tie bar:	Max. inclined load:	2.4 kN

9.2.3.5 LOAD CLASS 4 NET-CLAD, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS)

Bay lengths of up to 3.0 m:

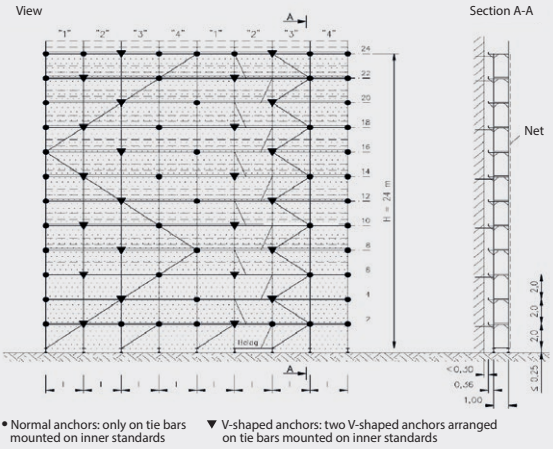
The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

9.2.3.5.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE [6]

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **06**)



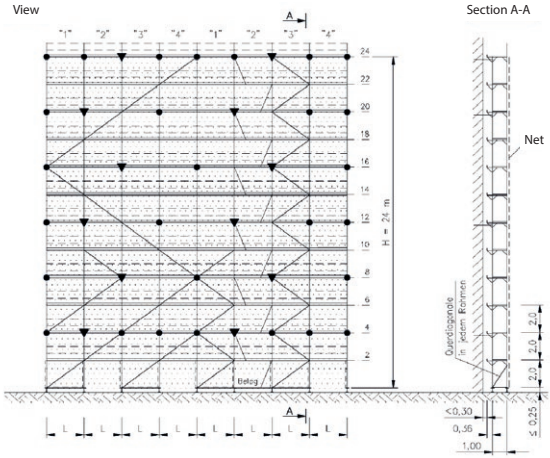
Max. jack extension: 250 mm
Anchorage: 4 m offset
Additional ties at H = 2 m and 24 m

Façade			Partially open
Jack loads		Inside: Outside:	23.8 kN 20.6 kN
Anchor forces	Orthogonal:		4.4 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 4.8 kN
	V-shaped tie bar:	Max. inclined load:	3.4 kN

9.2.3.5.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [7]

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **07**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m

Façade			Closed
Jack loads		Inside: Outside:	23.5 kN 22.1 kN
Anchor forces	Orthogonal:		2.8 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 4.2 kN
	V-shaped tie bar:	Max. inclined load:	3.0 kN

9.2.3.6 LOAD CLASS 4 WITH NET, BRACKET CONFIGURATION 2 (WITH INNER AND OUTER BRACKETS)

Bay lengths of up to 3.0 m:

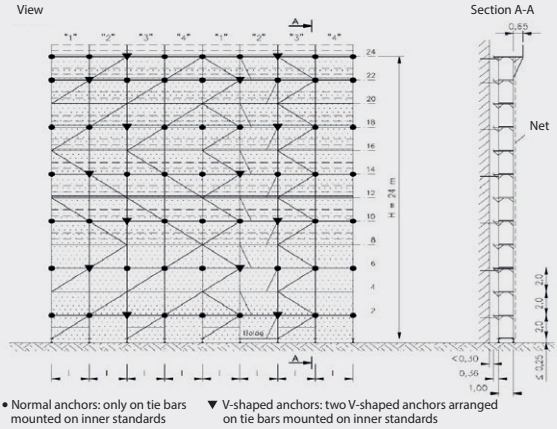
The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

9.2.3.6.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE [8]

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **08**)



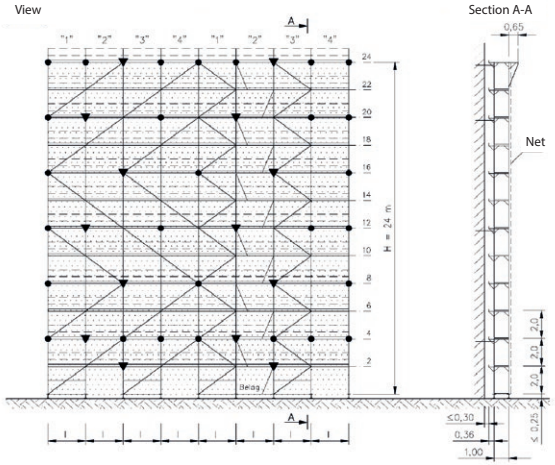
Max. jack extension: 250 mm
Anchorage: Every 4 m, first anchor level at H = 2 m
Anchor every node at H = 22 m and 24 m

Façade			Partially open
Jack loads		Inside: Outside:	24.3 kN 27.6 kN
Anchor forces	Orthogonal:		4.0 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 4.8 kN
	V-shaped tie bar:	Max. inclined load:	3.4 kN

9.2.3.6.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [9]

Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **09**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m
1 additional V-shaped tie at H = 2 m (every 4 bays)

Façade			Closed
Jack loads		Inside: Outside:	25.2 kN 29.1 kN
Anchor forces	Orthogonal:		3.0 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 4.4 kN
	V-shaped tie bar:	Max. inclined load:	3.1 kN

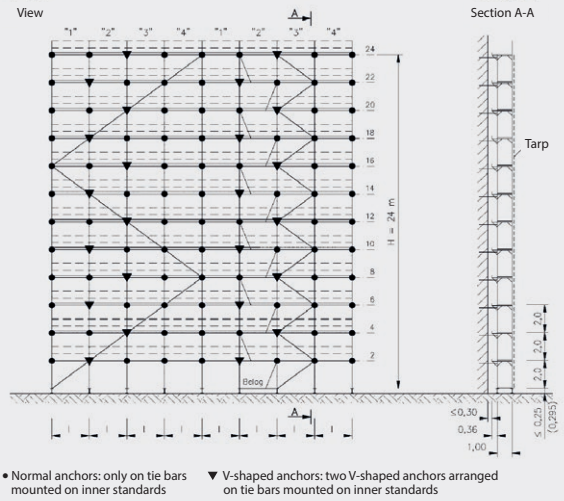
9.2.3.7 LOAD CLASS 4 TARPAULIN-CLAD, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [10] [11]

Bay lengths of up to 3.0 m:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **10 - 11**)



Max. jack extension: 250 mm (in front of closed façades 295 mm)
Anchorage: Every 2 m (every node)
Closed façade: pressure support instead of anchor at every 2nd node at H = 4 m to 22 m (except at H = 2 m and H = 24 m)

Façade			Partially open	Closed
Jack loads		Inside:	24.7 kN	23.5 kN
		Outside:	20.2 kN	20.2 kN
Anchor forces	Orthogonal:		Compressive: 5.9 kN Tensile: 5.4 kN	Compressive: 4,5 kN Tensile: 3,1 kN
	Parallel:	Short tie:	0.1 kN	
		V-shaped tie:	5.4 kN	
	V-shaped tie bar:	Max. inclined load:	4.2 kN	3.8 kN

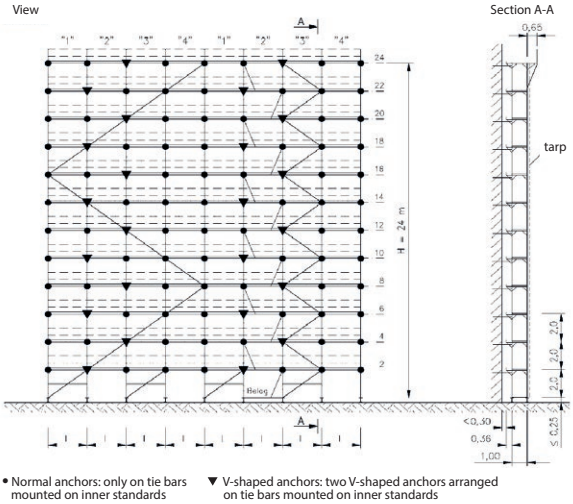
9.2.3.8 LOAD CLASS 4 WITH TARPAULIN, BRACKET CONFIGURATION 2 (WITH INNER AND OUTER BRACKETS) [12] [13]

Bay lengths of up to 3.0 m:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **12- 13**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: Every 2 m (every node)
Closed façade: pressure support instead of anchor at every 2nd node at H = 2 m to 22 m (except at H = 24 m)

Façade			Partially open	Closed
Jack loads		Inside: Outside:	24.9 kN 28.4 kN	24.9 kN 28.4 kN
Anchor forces	Orthogonal:		Compressive: 6.9 kN Tensile: 5.3 kN	Compressive: 5.4 kN Tensile: 3.1 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 5.4 kN	
	V-shaped tie bar:	Max. inclined load:	4.9 kN	3.9 kN

9.2.3.9 LOAD CLASS 5 AND 6 BASIC CONFIGURATION [21]

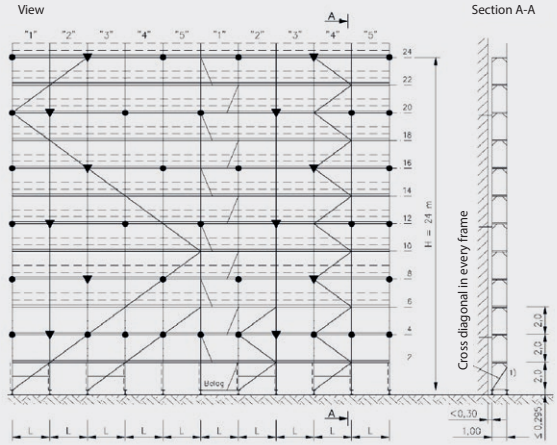
Unclad scaffold:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or Vertical frame with base transom 35x35x4.5 (new design)**

LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **21**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Q-diagonals can be dispensed with in front of closed façades

Max. jack extension: 295 mm
Anchorage: 8 m offset
Additional ties at H = 4 m

Façade			Partially open	Closed
Jack loads		Inside:	16.8 kN	16.2 kN
		Outside:	21.3 kN	21.3 kN
Anchor forces	Orthogonal:		3.7 kN	1.4 kN
	Parallel:	Short tie:	0.3 kN	
		V-shaped tie:	4.8 kN	
	V-shaped tie bar:	Max. inclined load:	3.4 kN	

9.2.3.10 LOAD CLASS 5 AND 6 BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [22]

Unclad scaffold:

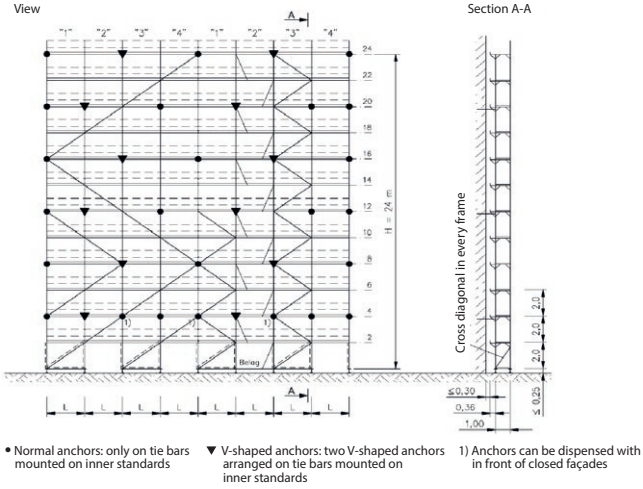
Load class 5 with bay lengths up to 2.5 m
Unclad scaffold

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or Vertical frame with base transom 35x35x4.5 (new design)**

LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **22**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards
1) Anchors can be dispensed with in front of closed façades

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m (only in front of open façade)

Façade			Partially open	Closed
Jack loads		Inside:	26.1 kN	25.9 kN
		Outside:	20.4 kN	20.4 kN
Anchor forces	Orthogonal:		3.7 kN	1.5 kN
	Parallel:	Short tie:	0.1 kN	
		V-shaped tie:	6.0 kN	
	V-shaped tie bar:	Max. inclined load:	4.3 kN	

9.2.3.11 LOAD CLASS 5 AND 6 NET-CLAD, BASIC CONFIGURATION

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

9.2.3.11.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE [23]

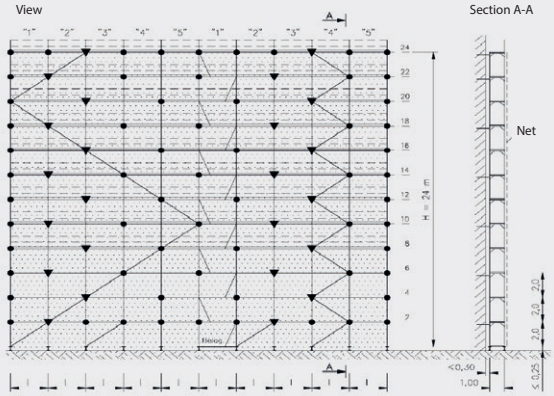
The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

6.2.2.1 Scaffold in front of partially open façade

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or Vertical frame with base transom 35x35x4.5 (new design)**

LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **23**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

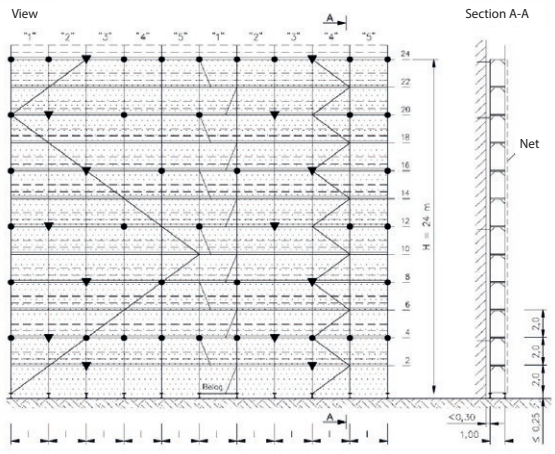
Max. jack extension: 250 mm
Anchorage: 4 m offset
Additional ties at H = 2 m and 24 m

Façade			Partially open
Jack loads		Inside: Outside:	16.0 kN 20.3 kN
Anchor forces	Orthogonal:		3.8 kN
	Parallel:	Short tie: V-shaped tie:	0.3 kN 3.9 kN
	V-shaped tie bar:	Max. inclined load:	2.8 kN

9.2.3.11.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [24]

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or**
Vertical frame with base transom 35x35x4.5 (new design)
LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **24**)



• Normal anchors: only on tie bars mounted on inner standards ▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m
1 additional V-shaped tie at H = 2 m (every 5 bays)

Façade			Closed
Jack loads		Inside:	16.5 kN
		Outside:	20.6 kN
Anchor forces	Orthogonal:		2.5 kN
	Parallel:	Short tie:	0.3 kN
		V-shaped tie:	3.2 kN
	V-shaped tie bar:	Max. inclined load:	2.2 kN

9.2.3.12 LOAD CLASS 5 AND 6 NET-CLAD, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS)

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

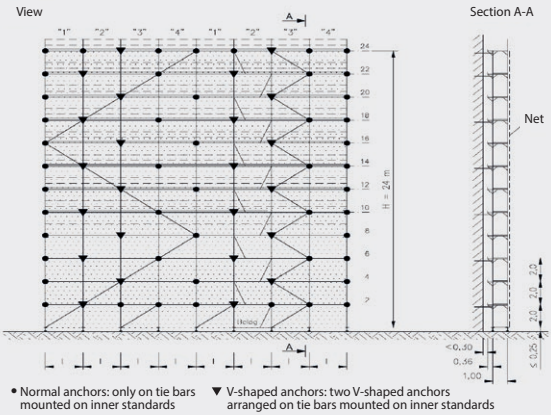
9.2.3.12.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE [25]

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or Vertical frame with base transom 35x35x4.5 (new design)**

LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **25**)



Max. jack extension: 250 mm
Anchorage: 4 m offset
Additional ties at H = 2 m and 24 m

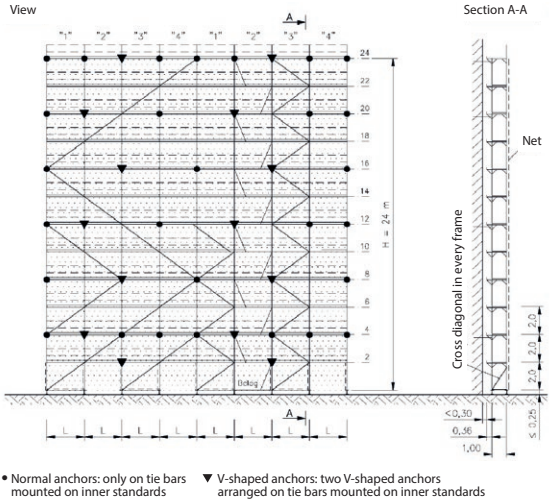
Façade			Partially open
Jack loads		Inside: Outside:	25.1 kN 20.4 kN
Anchor forces	Orthogonal:		3.7 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 4.5 kN
	V-shaped tie bar:	Max. inclined load:	3.2 kN

9.2.3.12.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [26]

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or**
Vertical frame with base transom 35x35x4.5 (new design)

LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **26**)



• Normal anchors: only on tie bars mounted on inner standards ▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m
1 additional V-shaped tie at H = 2 m (every 4 bays)

Façade			Closed
Jack loads		Inside: Outside:	24.9 kN 19.7 kN
Anchor forces	Orthogonal:		2.3 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 4.0 kN
	V-shaped tie bar:	Max. inclined load:	2.9 kN

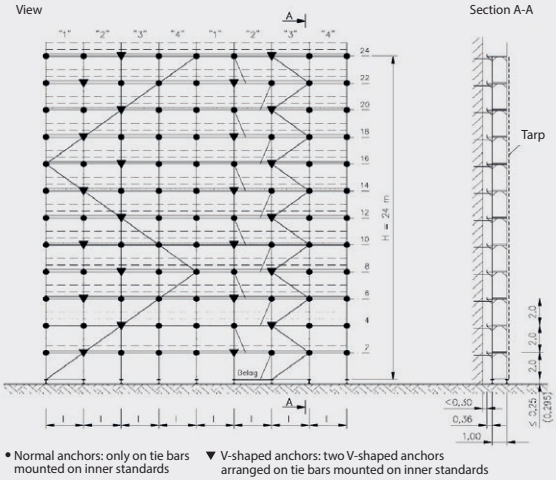
9.2.3.13 LOAD CLASS 5 AND 6 WITH TARPAULIN, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [27] [28]

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or Vertical frame with base transom 35x35x4.5 (new design)**

LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **27 - 28**)



Max. jack extension: 250 mm (in front of closed façade 295 mm)
Anchorage: Every 2 m (every node)
Closed façade: pressure support instead of anchor at every 2nd node at H = 4 m to 22 m (except at H = 2 m and H = 24 m)

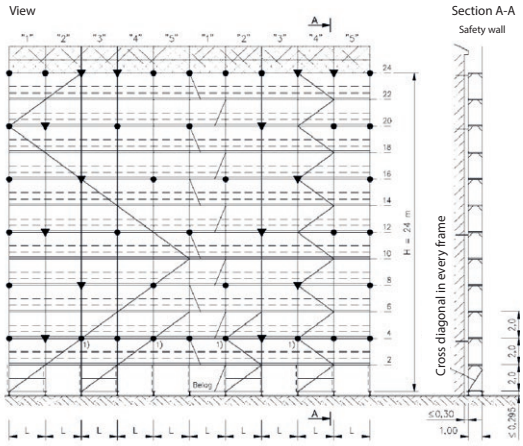
Façade			Partially open	Closed
Jack loads		Inside: Outside:	25.6 kN 20.0 kN	24.9 kN 20.0 kN
Anchor forces	Orthogonal:		Compressive: 4.9 kN Tensile: 4.5 kN	Compressive: 3,8 kN Tensile: 2,6 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 5.2 kN	
	V-shaped tie bar:	Max. inclined load:	3.7 kN	3.7 kN

9.2.3.14 PROTECTIVE WALL BASIC CONFIGURATION [31]

Load class 4 with bay lengths of up to 3.0 m, unclad scaffold:

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **31**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

1) Anchors can be dispensed with in front of closed façades

Max. jack extension: 295 mm
Anchorage: 8 m offset
Additional ties at H = 4 m (only in front of open façade)

Additional measures for protective wall:

Anchorage: Every node anchored at H = 24 m
1 additional V-shaped tie at H = 24 m (every 5 bays)

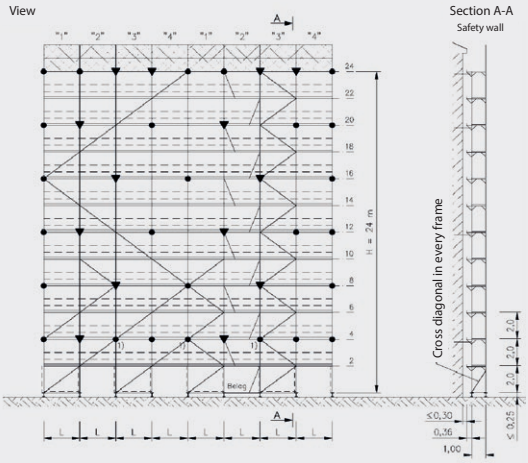
Façade			Partially open
Jack loads		Inside:	15.3 kN
		Outside:	21.6 kN
Anchor forces	Orthogonal: H = 24 m:	Compressive:	3.4 kN
		Tensile:	2.9 kN
	H ≤ 20 m:		2.8 kN
	Parallel:	Short tie:	0.3 kN
		V-shaped tie:	4.9 kN
	V-shaped tie bar:	Max. inclined load:	3.5 kN

9.2.3.15 PROTECTIVE WALL BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [32]

Load class 4 with bay lengths of up to 3.0 m, unclad scaffold:

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **32**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

1) Anchors can be dispensed with in front of closed façades

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m (only in front of open façade)

Additional measures for protective wall:

Anchorage: Every node anchored at H = 24 m
1 additional V-shaped tie at H = 24 m (every 4 bays)

Façade				Partially open
Jack loads			Inside: Outside:	24.0 kN 23.1 kN
Anchor forces	Orthogonal:	H = 24 m:	Compressive: Tensile:	3.5 kN 2.9 kN
		H ≤ 20 m:		2.8 kN
	Parallel:		Short tie: V-shaped tie:	0.1 kN 6.0 kN
	V-shaped tie bar:		Max. inclined load:	4.2 kN

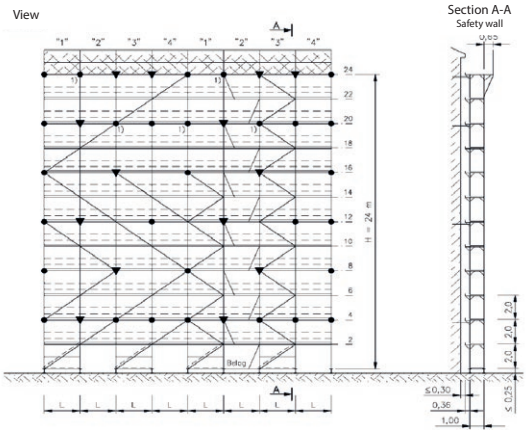
9.2.3.16 PROTECTIVE WALL BRACKET CONFIGURATION 2 (WITH INNER AND OUTER BRACKETS) [33]

Load class 4 with bay lengths of up to 3.0 m, unclad scaffold:

Load class 4 with bay lengths of up to 3.0 m
Unclad scaffold

(Configuration No. **33**)

Vertical frame with base transom 35x35x4.5 (new design)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards
Components can be dispensed with in front of closed façades

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m, 20 m, 24 m

Additional measures for protective wall:

Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

Façade				Partially open
Jack loads			Inside: Outside:	25.1 kN 31.0 kN
Anchor forces	Orthogonal:	H = 24 m: H ≤ 20 m:	Compressive: Tensile:	2.6 kN 2.9 kN 3.7 kN
	Parallel:		Short tie: V-shaped tie:	0.1 kN 6.3 kN
	V-shaped tie bar:		Max. inclined load:	4.5 kN

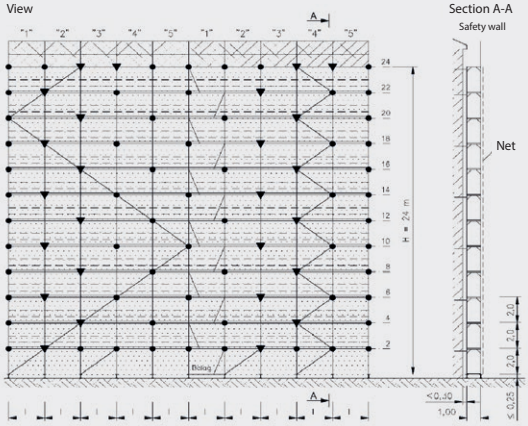
9.2.3.17 PROTECTIVE WALL NET-CLAD, BASIC CONFIGURATION

Load class 4 with bay lengths of up to 3.0 m:

9.2.3.17.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE [34]

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **34**)



• Normal anchors: only on tie bars mounted on inner standards ▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 4 m offset
Additional ties at H = 2 m and 24 m

Additional measures for protective wall:

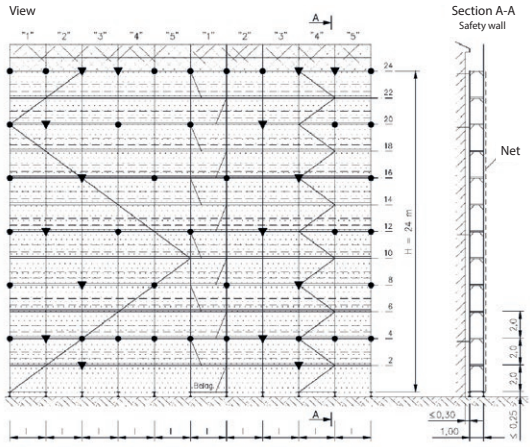
Anchorage: 1 additional V-shaped tie at H = 24 m (every 5 bays)

Façade				Partially open
Jack loads			Inside: Outside:	15.1 kN 20.6 kN
Anchor forces	Orthogonal:	H = 24 m: H ≤ 20 m:	Compressive: Tensile: –	4.0 kN 4.1 kN 4.1 kN
	Parallel:		Short tie: V-shaped tie:	0.3 kN 4.3 kN
	V-shaped tie bar:		Max. inclined load:	3.0 kN

9.2.3.17.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [35]

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **35**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m
1 additional V-shaped tie at H = 2 m (every 5 bays)

Additional measures for protective wall:
Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

				Closed
Anchor forces			Inside: Outside:	15.6 kN 19.3 kN
Anchor forces	Orthogonal:	H = 24 m: H ≤ 20 m:	Compressive: Tensile: 	2.7 kN 2.8 kN 2.6 kN
	Parallel:		Short tie: V-shaped tie:	0.3 kN 3.4 kN
	V-shaped tie bar:		Max. inclined load:	2.4 kN

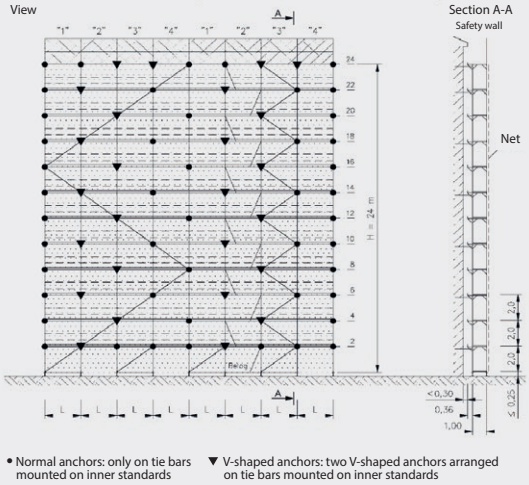
9.2.3.18 PROTECTIVE WALL NET-CLAD, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS)

Load class 4 with bay lengths of up to 3.0 m:

9.2.3.18.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE [36]

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **36**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 4 m offset
Additional ties at H = 2 m and 24 m

Additional measures for protective wall:

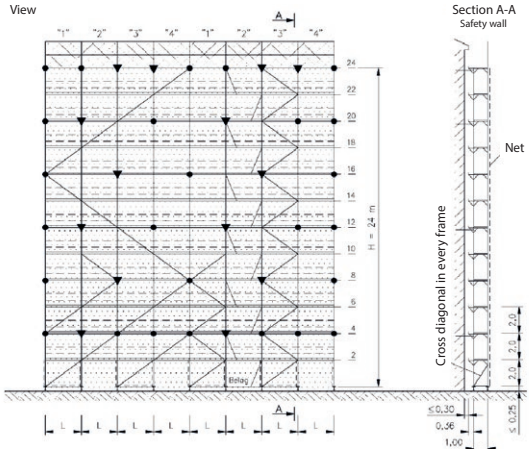
Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

Façade				Partially open
Jack loads			Inside: Outside:	23.6 kN 20.6 kN
Anchor forces	Orthogonal:	H = 24 m:	Compressive: Tensile:	4.1 kN 4.0 kN
		H ≤ 20 m:		4.2 kN
	Parallel:		Short tie: V-shaped tie:	0.1 kN 4.8 kN
	V-shaped tie bar:		Max. inclined load:	3.4 kN

9.2.3.18.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [37]

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **37**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m

Additional measures for protective wall:

Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

Façade			Closed
Jack loads		Inside:	23.7 kN
		Outside:	22.1 kN
Anchor forces	Orthogonal: H = 24 m:	Compressive:	2.8 kN
		Tensile:	2.7 kN
	H ≤ 20 m:		2.6 kN
	Parallel:	Short tie:	0.1 kN
		V-shaped tie:	4.2 kN
	V-shaped tie bar:	Max. inclined load:	3.0 kN

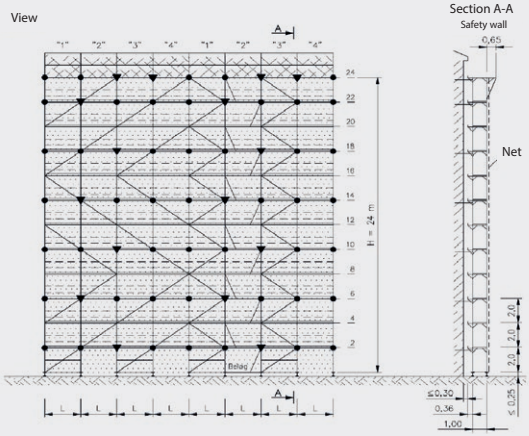
9.2.3.19 PROTECTIVE WALL NET-CLAD, BRACKET CONFIGURATION 2 (WITH INNER AND OUTER BRACKETS)

Load class 4 with bay lengths of up to 3.0 m:

9.2.3.19.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE [38]

(Configuration No. **38**)

Vertical frame with base transom 35x35x4.5 (new design)



Max. jack extension: 250 mm
Anchorage: Every 4 m, first anchorage level at H = 2 m
Anchor every node at H = 22 m and 24 m

Additional measures for protective wall:

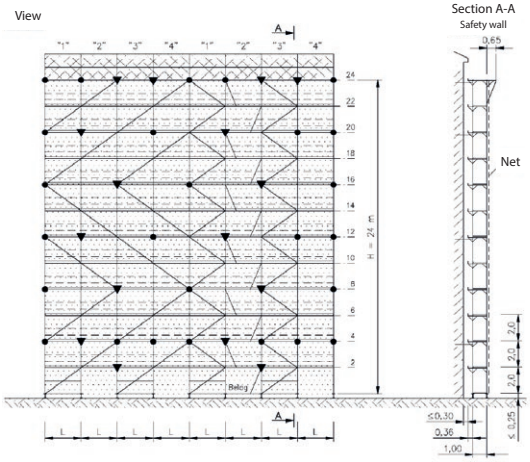
Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

Façade				Partially open
Jack loads			Inside: Outside:	24.2 kN 27.6 kN
Anchor forces	Orthogonal:	H = 24 m:	Compressive: Tensile:	2.4 kN 3.8 kN
		H ≤ 20 m:		4.2 kN
	Parallel:		Short tie: V-shaped tie:	0.1 kN 4.8 kN
	V-shaped tie bar:		Max. inclined load:	3.4 kN

9.2.3.19.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [39]

Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **39**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m
1 additional V-shaped tie at H = 2 m (every 4 bays)

Additional measures for protective wall:

Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

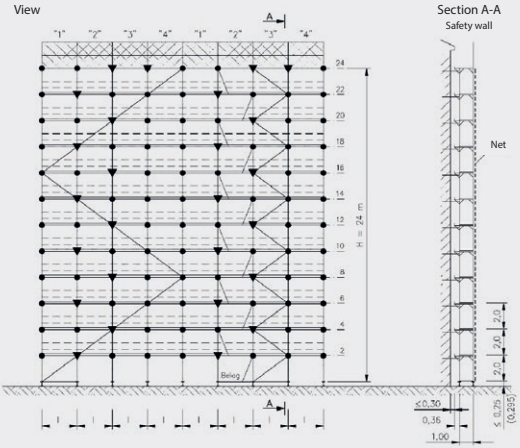
Façade			Closed
Jack loads		Inside:	25.1 kN
		Outside:	29.0 kN
Anchor forces	Orthogonal: H = 24 m:	Compressive:	2.7 kN
		Tensile:	2.9 kN
	H ≤ 20 m:		2.7 kN
	Parallel:	Short tie:	0.1 kN
		V-shaped tie:	4.4 kN
	V-shaped tie bar:	Max. inclined load:	3.1 kN

9.2.3.20 PROTECTIVE WALL TARPAULIN-CLAD, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [40] [41]

Load class 4 with bay lengths of up to 3.0 m:

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **40 - 41**)



Max. jack extension: 250 mm (in front of closed façade 295 mm)
Anchorage: Every 2 m (every node)
Closed façade: pressure support instead of anchor at every 2nd node at H = 4 m to 22 m (except at H = 2 m and H = 24 m)

Additional measures for protective wall:

Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

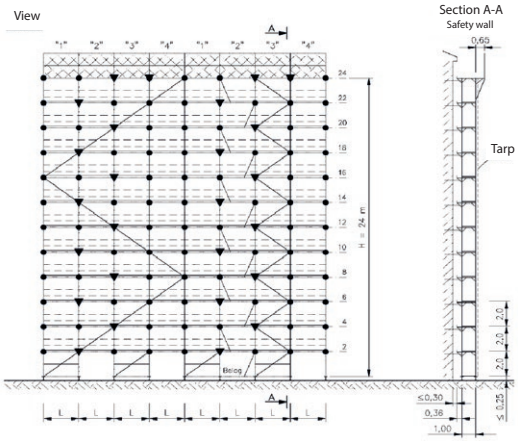
Façade			Partially open	Closed
Jack loads		Inside:	24.6 kN	24.0 kN
		Outside:	20.2 kN	20.2 kN
Anchor forces	Orthogonal:	H = 24 m:	Compressive: 5.2 kN	Compressive: 4.3 kN
			Tensile: 4.7 kN	Tensile: 2.8 kN
		H ≤ 20 m:	Compressive: 5.9 kN	Compressive: 4.7 kN
			Tensile: 5.4 kN	Tensile: 3.0 kN
	Parallel:	Long tie:	---	
		Short tie:	0.1 kN	
		V-shaped tie:	5.3 kN	
	V-shaped tie bar:	Max. inclined load:	4.2 kN	3.8 kN

9.2.3.21 PROTECTIVE WALL WITH TARPAULIN, BRACKET CONFIGURATION 2 (WITH INNER AND OUTER BRACKETS) [42] [43]

Load class 4 with bay lengths of up to 3.0 m:

Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **42 - 43**)



Max. jack extension: 250 mm
Anchorage: Every 2 m (every node)
Closed façade: pressure support instead of anchor at every 2nd node at H = 2 m to 20 m (except at H = 24 m)

Additional measures for protective wall:

Anchorage: Anchor every node at H = 22 m
1 additional V-shaped tie at H = 24 m (every 4 bays)

Façade			Partially open	Closed
Jack loads		Inside: Outside:	24.7 kN 28.5 kN	24.8 kN 28.5 kN
Anchor forces	Orthogonal:	H = 24 m: H ≤ 20 m: 	Compressive: 4.3 kN Tensile: 5.3 kN Compressive: 7.2 kN Tensile: 5.3 kN	Compressive: 3.5 kN Tensile: 3.0 kN Compressive: 5.7 kN Tensile: 3.1 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 5.4 kN	
	V-shaped tie bar:	Max. inclined load:	5.1 kN	4.0 kN

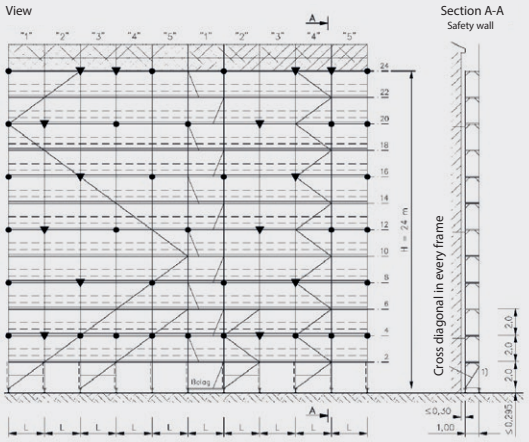
9.2.3.22 PROTECTIVE WALL LOAD CLASS 5 AND 6, BASIC CONFIGURATION [51]

Unclad scaffold

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or Vertical frame with base transom 35x35x4.5 (new design)**

LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

((Configuration No. **51**)



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Q-diagonals can be dispensed with in front of closed façades

Max. jack extension: 295 mm
Anchorage: 8 m offset
Additional ties at H = 4 m

Additional measures for protective wall:

Anchorage: 1 additional V-shaped tie at H = 24 m (every 5 bays)

Façade				Partially open
Jack loads			Inside: Outside:	17.6 kN 21.4 kN
Anchor forces	Orthogonal:	H = 24 m:	Compressive: Tensile:	4.4 kN 4.2 kN
		H ≤ 20 m:		3.8 kN
	Parallel:		Short tie: V-shaped tie:	0.3 kN 4.9 kN
	V-shaped tie bar:		Max. inclined load:	3.5 kN

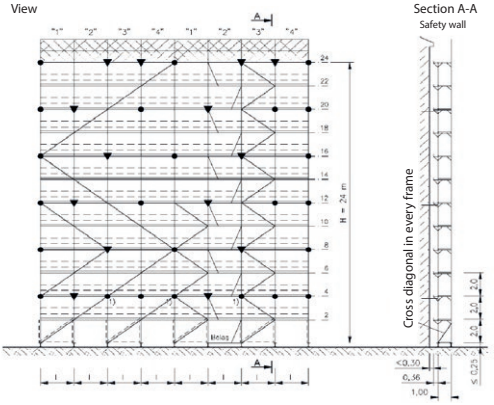
9.2.3.23 PROTECTIVE WALL LOAD CLASS 5 AND 6, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [52]

Unclad scaffold

Load class 5 with bay lengths of up to 2.50 m

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or**
Vertical frame with base transom 35x35x4.5 (new design)
LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **52**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards
1) Anchors can be dispensed with in front of closed façades

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m (only in front of open façade)

Additional measures for protective wall:

Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

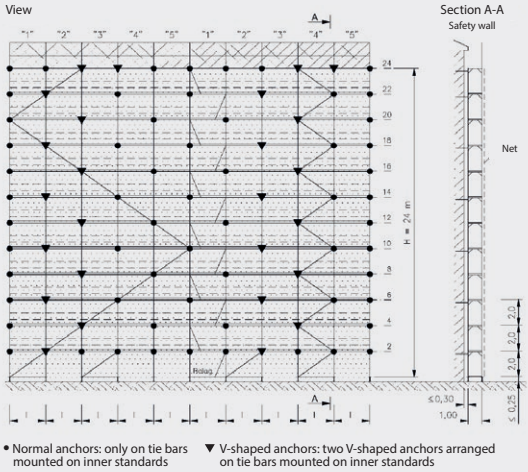
Façade			Partially open
Jack loads		Inside:	26.5 kN
		Outside:	22.3 kN
Anchor forces	Orthogonal: H = 24 m:	Compressive:	4.6 kN
		Tensile:	3.9 kN
	H ≤ 20 m:		3.8 kN
	Parallel:	Short tie:	0.1 kN
		V-shaped tie:	6.1 kN
	V-shaped tie bar:	Max. inclined load:	4.3 kN

9.2.3.24 PROTECTIVE WALL LOAD CLASS 5 AND 6, NET-CLAD, BASIC CONFIGURATION [53]

9.2.3.24.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or**
Vertical frame with base transom 35x35x4.5 (new design)
LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **53**)



Max. jack extension: 250 mm
Anchorage: 4 m offset
Additional ties at H = 2 m and 24 m

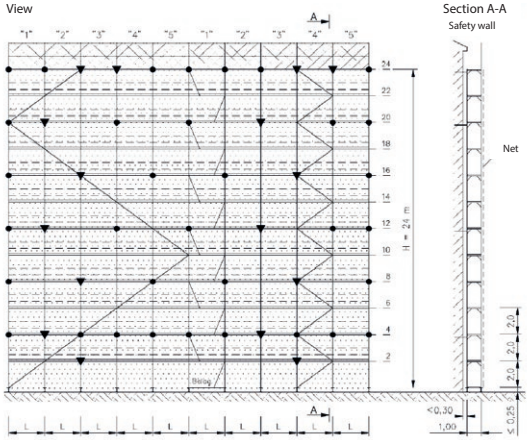
Additional measures for protective wall:
Anchorage: 1 additional V-shaped tie at H = 24 m (every 5 bays)

Façade				Partially open
Jack loads			Inside: Outside:	15.7 kN 20.3 kN
Anchor forces	Orthogonal:	H = 24 m: H ≤ 20 m:	Compressive: Tensile: –	3.3 kN 3.4 kN 3.5 kN
	Parallel:		Short tie: V-shaped tie:	0.3 kN 3.9 kN
	V-shaped tie bar:		Max. inclined load:	2.7 kN

9.2.3.24.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [54]

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or**
Vertical frame with base transom 35x35x4.5 (new design)
LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **54**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m
1 additional V-shaped tie at H = 2 m (every 5 bays)

Additional measures for protective wall:
Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

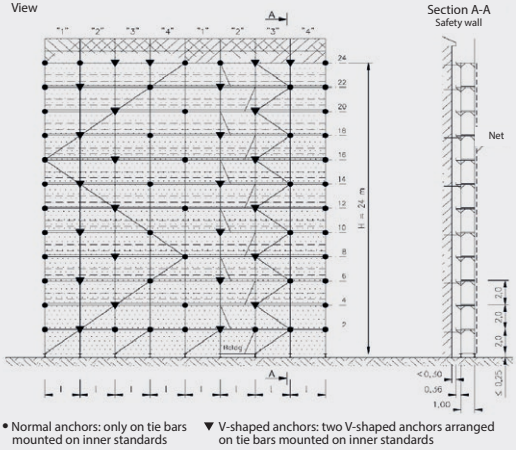
Façade			Closed
Jack loads		Inside:	16.4 kN
		Outside:	20.6 kN
Anchor forces	Orthogonal: H = 24 m:	Compressive:	2.3 kN
		Tensile:	2.3 kN
	H ≤ 20 m:		2.2 kN
	Parallel:	Short tie:	0.3 kN
		V-shaped tie:	3.2 kN
	V-shaped tie bar:	Max. inclined load:	2.3 kN

9.2.3.25 PROTECTIVE WALL LOAD CLASS 5 AND 6, NET-CLAD, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS)

9.2.3.25.1 SCAFFOLD IN FRONT OF PARTIALLY OPEN FAÇADE [55]

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or**
Vertical frame with base transom 35x35x4.5 (new design)
LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **55**)



Max. jack extension: 250 mm
Anchorage: 4 m offset
Additional ties at H = 2 m and 24 m

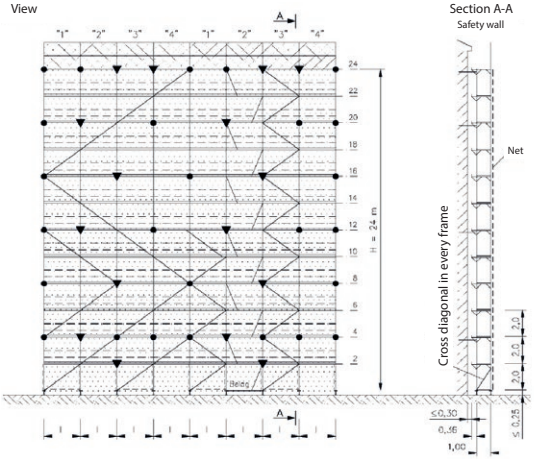
Additional measures for protective wall:
Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

Façade			Partially open
Jack loads		Inside:	25.0 kN
		Outside:	20.4 kN
Anchor forces	Orthogonal: H = 24 m:	Compressive:	3.5 kN
		Tensile:	3.3 kN
	H ≤ 20 m:		3.5 kN
	Parallel:	Short tie:	0.1 kN
		V-shaped tie:	4.5 kN
	V-shaped tie bar:	Max. inclined load:	3.2 kN

9.2.3.25.2 SCAFFOLD IN FRONT OF CLOSED FAÇADE [56]

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or**
Vertical frame with base transom 35x35x4.5 (new design)
LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **56**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m and 24 m
1 additional V-shaped tie at H = 2 m (every 4 bays)

Additional measures for protective wall:
Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

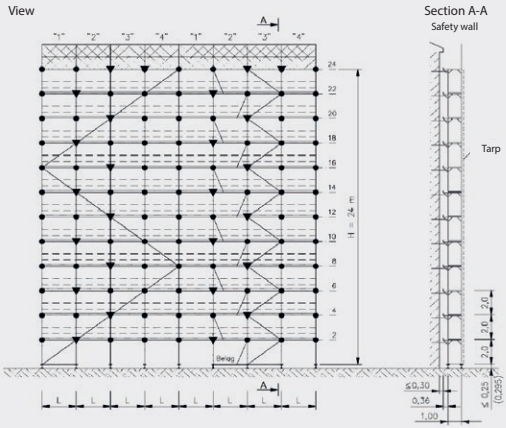
Façade			Closed
Jack loads		Inside:	25.1 kN
		Outside:	19.7 kN
Anchor forces	Orthogonal: H = 24 m:	Compressive:	2.4 kN
		Tensile:	2.3 kN
	H ≤ 20 m:		2.2 kN
	Parallel:	Short tie:	0.1 kN
		V-shaped tie:	4.0 kN
	V-shaped tie bar:	Max. inclined load:	2.9 kN

9.2.3.26 PROTECTIVE WALL LOAD CLASS 5 AND 6, TARPAULIN, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [57] [58]

(Configuration No. **57 - 58**)

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or Vertical frame with base transom 35x35x4.5 (new design)**

LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**



Max. jack extension: 250 mm (in front of closed façade 295 mm)
Anchorage: Every 2 m (every node)
Closed façade: pressure support instead of anchor at every 2nd node at H = 4 m to 22 m (except at H = 2 m and H = 24 m)

Additional measures for protective wall:

Anchorage: 1 additional V-shaped tie at H = 24 m (every 4 bays)

Façade			Partially open	Closed
Jack loads		Inside: Outside:	25.5 kN 20.0 kN	25.4 kN 20.0 kN
Anchor forces	Orthogonal:	H = 24 m:	Compressive: 4.3 kN Tensile: 3.9 kN	Compressive: 3,6 kN Tensile: 2,3 kN
		H ≤ 20 m:	Compressive: 4.9 kN Tensile: 4.5 kN	Compressive: 4,0 kN Tensile: 2,6 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 5.2 kN	
	V-shaped tie bar:	Max. inclined load:	3.7 kN	3.7 kN

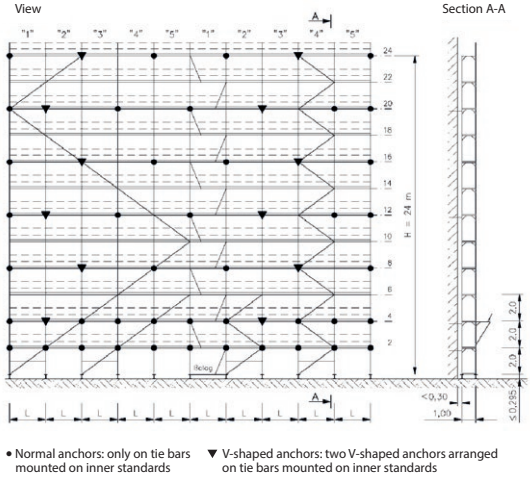
9.2.3.27 PROTECTIVE ROOF BASIC CONFIGURATION [61]

Unclad scaffold of load class 4 with bay lengths of up to 3.0 m:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **61**)



• Normal anchors: only on tie bars mounted on inner standards ▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 295 mm
Anchorage: 8 m offset
Additional ties at H = 4 m (only in front of open façade)

Additional measures for protective roof:
Anchorage: Anchor every node at H = 2 m and H = 4 m

Façade			Partially open	Closed
Jack loads		Inside: Outside:	15.4 kN 22.2 kN	15.1 kN 22.2 kN
Anchor forces	Orthogonal:		4.2 kN	1.5 kN
	Parallel:	Short tie: V-shaped tie:	0.3 kN 4.7 kN	
	V-shaped tie bar:	Max. inclined load:	3.3 kN	

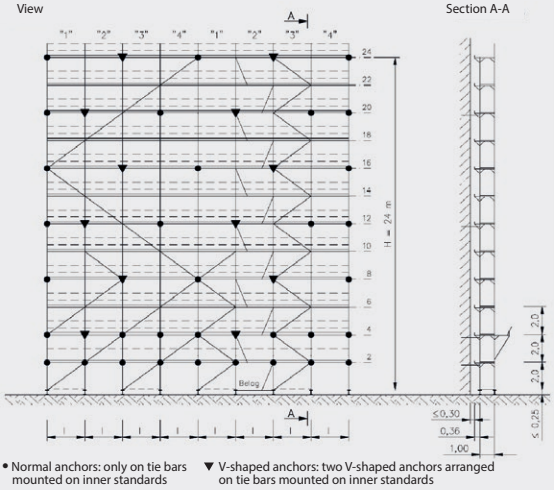
9.2.3.28 PROTECTIVE ROOF BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [62]

Unclad scaffold of load class 4 with bay lengths of up to 3.0 m:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **62**)



Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m (only in front of open façade)

Additional measures for protective roof:

Anchorage: Anchor every node at H = 2 m and H = 4 m

Façade			Partially open	Closed
Jack loads		Inside: Outside:	24.2 kN 24.6 kN	23.6 kN 24.6 kN
Anchor forces	Orthogonal:		4.2 kN	1.7 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 6.0 kN	
	V-shaped tie bar:	Max. inclined load:	4.2 kN	

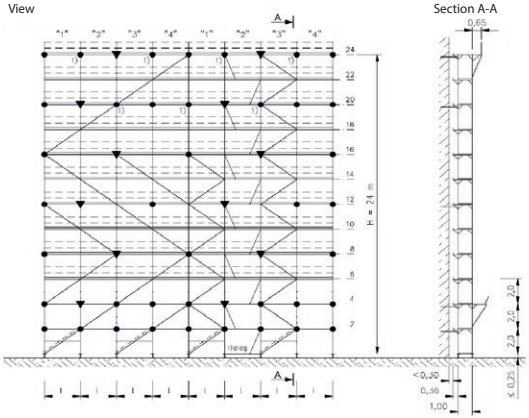
9.2.3.29 PROTECTIVE ROOF BRACKET CONFIGURATION 2 (WITH INNER AND OUTER BRACKETS) [63]

Unclad scaffold of load class 4 with bay lengths of up to 3.0 m:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

Vertical frame with base transom 35x35x4.5 (new design)

(Configuration No. **63**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards
Components can be dispensed with in front of closed façades

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m, 20 m, 24 m

Additional measures for protective roof:

Anchorage: Anchor every node at H = 2 m and H = 4 m

Façade			Partially open	Closed
Jack loads		Inside: Outside:	24.3 kN 32.8 kN	24.0 kN 32.8 kN
Anchor forces	Orthogonal:		3.7 kN	1.6 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 6.2 kN	
	V-shaped tie bar:	Max. inclined load:	4.4 kN	

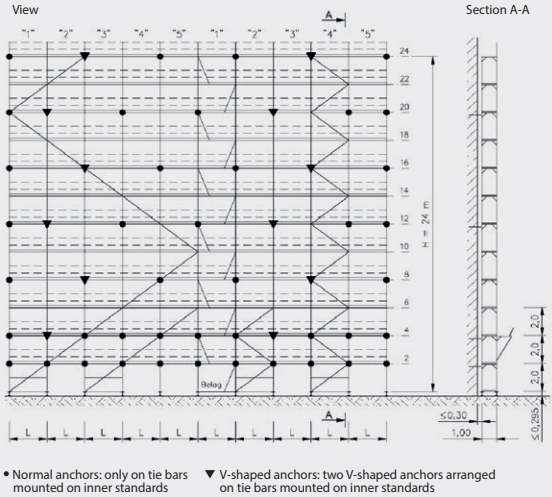
9.2.3.30 PROTECTIVE ROOF LOAD CLASS 5 AND 6, BASIC CONFIGURATION [64]

Unclad scaffold:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or**
Vertical frame with base transom 35x35x4.5 (new design)
LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **64**)



• Normal anchors: only on tie bars mounted on inner standards ▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 295 mm
Anchorage: 8 m offset
Additional ties at H = 4 m

Additional measures for protective roof:

Anchorage: Anchor every node at H = 2 m and H = 4 m

Façade			Partially open	Closed
Jack loads		Inside: Outside:	16.0 kN 22.3 kN	15.8 kN 22.3 kN
Anchor forces	Orthogonal:		3.7 kN	1.4 kN
	Parallel:	Short tie: V-shaped tie:	0.3 kN 4.7 kN	
	V-shaped tie bar:	Max. inclined load:	3.4 kN	

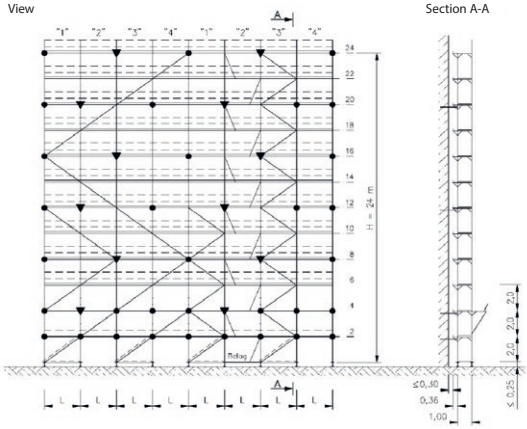
9.2.3.31 PROTECTIVE ROOF LOAD CLASS 5 AND 6, BRACKET CONFIGURATION 1 (WITH INNER BRACKETS) [65]

Unclad scaffold:

The protective wall in the special configurations is verified as an independent unit in its own right in the upper section of some design versions. The weight of the protective wall is however already included here to enable the base area of the scaffolding to be correctly assessed and assembled.

LC 5 to L = 2.50 m: **Vertical frame with base transom 40x20x1.5 (old design) or Vertical frame with base transom 35x35x4.5 (new design)**
LC 6 to L = 2.0 m: **Vertical frame with base transom 35x35x4.5 (new design)**

(Configuration No. **65**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: 8 m offset
Additional ties at H = 4 m

Additional measures for protective roof:

Anchorage: Anchor every node at H = 2 m and H = 4 m

Façade			Partially open	Closed
Jack loads		Inside: Outside:	25.9 kN 22.1 kN	25.9 kN 22.1 kN
Anchor forces	Orthogonal:		3.7 kN	1.5 kN
	Parallel:	Short tie: V-shaped tie:	0.1 kN 6.0 kN	
	V-shaped tie bar:	Max. inclined load:	4.3 kN	

9.2.3.32 PASSAGE FRAMES BASIC CONFIGURATION [71] [74]

Unclad scaffold:

(Configuration No. **71 + 74**)

6 Passage frames basic configuration

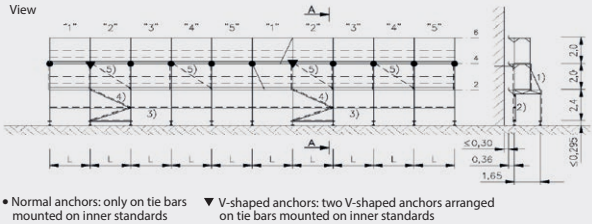
Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)
Passage frames as per Appendix 38/39 (vertical tubes on the lattice girder with higher yield strength 320 N/mm²)

Passage frames as per Appendix 71 may no longer be used

Only the additional measures are represented
Other structural designs as per the various configurations

The anchors indicated are to be fitted in addition insofar as they are not already included in the corresponding configuration.

Pay attention to V-shaped anchors at H = 4m when required!



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 295 mm
Anchorage: Anchor every node at H = 4 m
Bracing:
1) Cross brace Ø 48.3 x 3.2 outside over the passage frame with standard couplers
2) Standard reinforcement Ø 48.3 x 3.2 with 3 swivel couplers
3) Longitudinal ledgers inside and outside in every bay
4) Diagonal braces inside and outside as well as longitudinal ledgers inside and outside in every fourth bay
5) Diagonal braces inside in every second bay

LOAD CLASS 4 WITH BAY LENGTH OF 3.0 M [71]

Façade			Partially open	Closed
Jack loads		Inside:	25.0 kN	24.7 kN
		Outside:	12.1 kN	11.9 kN
Anchor forces	Orthogonal:		4.2 kN	2.0 kN
	Parallel:	Long tie:	---	
		Short tie:	0.3 kN	
		V-shaped tie:	5.5 kN	
	V-shaped tie bar:	Max. inclined load:	3.9 kN	

LOAD CLASS 5 WITH BAY LENGTH OF 2.5 M [74]

Façade			Partially open	Closed
Jack loads		Inside:	25.9 kN	25.6 kN
		Outside:	12.1 kN	12.0 kN
Anchor forces	Orthogonal:		3.7 kN	1.8 kN
	Parallel:	Long tie:	---	
		Short tie:	0.3 kN	
		V-shaped tie:	5.3 kN	
	V-shaped tie bar:	Max. inclined load:	3.8 kN	

9.2.3.33 PASSAGE FRAMES BRACKET CONFIGURATION 1 (ONLY INNER BRACKETS) [72] [75]

Unclad scaffold:

Vertical frame with base transom 40x20x1.5 (old design) or

Vertical frame with base transom 35x35x4.5 (new design)
Passage frames as per Appendix 38/39 (vertical tubes on the lattice girder with higher yield strength 320 N/mm²)

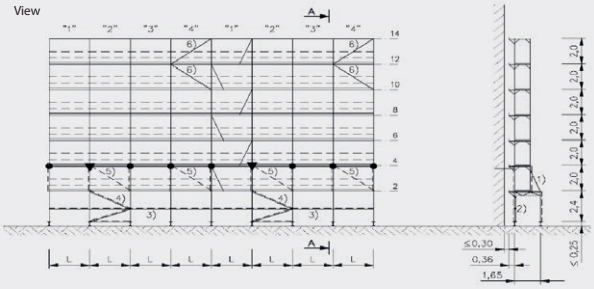
Passage frames as per Appendix 71 may no longer be used

(Configuration No. **72 + 75**)

Only the additional measures are represented
Other structural designs as per the various configurations

The anchors indicated are to be fitted in addition insofar as they are not already included in the corresponding configuration.

Pay attention to V-shaped anchors at H = 4m when required!



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: Anchor every node at H = 4 m
Bracing:

1) Cross brace Ø 48.3 x 3.2 outside over the passage frame with standard couplers
2) Standard reinforcement Ø 48.3 x 3.2 with 3 swivel couplers
3) Longitudinal ledgers inside and outside in every bay
4) Diagonal braces inside and outside as well as longitudinal ledgers inside and outside in every fourth bay
5) Diagonal braces inside in every second bay
6) Additional diagonal braces are required outside on the second run of diagonals up to a height of H = 14 m

LOAD CLASS 4 WITH BAY LENGTH OF 3.0 M [72]

Façade			Partially open	Closed
Jack loads		Inside:	34.7 kN	34.5 kN
		Outside:	13.2 kN	12.7 kN
Anchor forces	Orthogonal:		4.2 kN	2.1 kN
	Parallel:	Long tie:	---	
		Short tie:	0.1 kN	
		V-shaped tie:	6.7 kN	
	V-shaped tie bar:	Max. inclined load:	4.8 kN	

LOAD CLASS 5 WITH BAY LENGTH OF 2.5 M [75]

Façade			Partially open	Closed
Jack loads		Inside:	36.3 kN	36.1 kN
		Outside:	13.2 kN	12.9 kN
Anchor forces	Orthogonal:		3.8 kN	1.9 kN
	Parallel:	Long tie:	---	
		Short tie:	0.1 kN	
		V-shaped tie:	6.6 kN	
	V-shaped tie bar:	Max. inclined load:	4.7 kN	

9.2.3.34 PASSAGE FRAMES BRACKET CONFIGURATION 2 (WITH INNER AND OUTER BRACKETS) [73]

Unclad scaffold:

Vertical frame with base transom 35x35x4.5 (new design)

Passage frames as per Appendix 38/39 (vertical tubes on the lattice girder with higher yield strength 320 N/mm²)

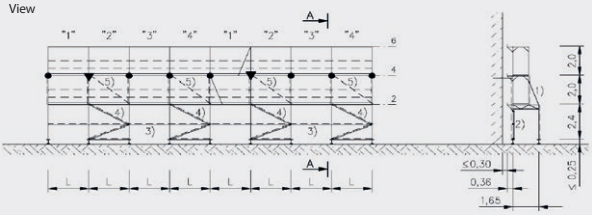
Passage frames as per Appendix 71 may no longer be used

(Configuration No. **73**)

Only the additional measures are represented
Other structural designs as per the various configurations

The anchors indicated are to be fitted in addition insofar as they are not already included in the corresponding configuration.

Pay attention to V-shaped anchors at H = 4m when required!



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm
Anchorage: Anchor every node at H = 4 m
Bracing:
1) Cross brace Ø 48.3 x 3.2 outside over the passage frame with standard couplers
2) Standard reinforcement Ø 48.3 x 3.2 with 3 swivel couplers
3) Longitudinal ledgers inside and outside in every bay
4) Diagonal braces inside and outside as well as longitudinal ledgers inside and outside in every second bay
5) Diagonal braces inside in every second bay

LOAD CLASS 4 WITH BAY LENGTH OF 3.0 M [73]

Façade			Partially open	Closed
Jack loads		Inside: Outside:	38.6 kN 16.6 kN	38.2 kN 16.8 kN
Anchor forces	Orthogonal:		4.3 kN	2.3 kN
	Parallel:	Long tie: Short tie: V-shaped tie:	--- 0.1 kN 6.3 kN	
	V-shaped tie bar:	Max. inclined load:	4.5 kN	

9.2.3.35 BRIDGING BASIC CONFIGURATION [81] [84]

Unclad scaffold:

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

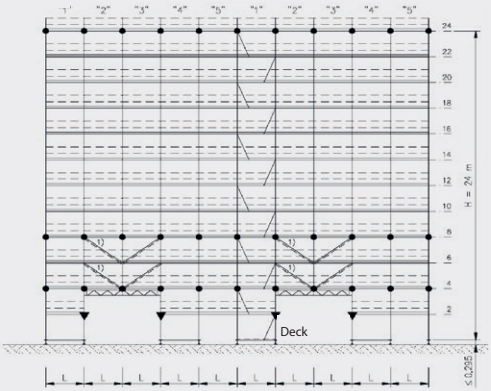
(Configuration No. **81 + 84**)

Only the additional measures are represented
Other structural designs as per the various configurations

The anchors indicated are to be fitted in addition insofar as they are not already included in the corresponding configuration.

Pay attention to V-shaped anchors at H = 4m when required! The lattice girders are to be braced horizontally every 1.5 m!

View



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 295 mm

Anchorage: Additionally, every node is to be anchored at the heights H = 4 and H = 8 and with open façades at a height of H = 24 m: the additional anchorage at a height of H = 24 m can be dispensed with in the case of closed façades
V-shaped ties are to be fitted at H = 2 m at the nodes next to the bridging

Bracing: 1) Framework with tubes Ø 48.3 x 3.2 and standard couplers over the bridging girders outside and inside

LOAD CLASS 4 WITH BAY LENGTH OF 3.0 M [81]

Façade			Partially open	Closed
Jack loads		Inside: Outside:	22.9 kN 29.5 kN	22.8 kN 29.5 kN
Anchor forces	Orthogonal:		4.1 kN	3.6 kN
	Parallel:	Long tie: Short tie: V-shaped tie:	--- 0.1 kN 5.3 kN	
	V-shaped tie bar:	Max. inclined load:	3.8 kN	

LOAD CLASS 5 WITH BAY LENGTH OF 2.5 M [84]

Façade			Partially open	Closed
Jack loads		Inside: Outside:	23.8 kN 28.7 kN	23.8 kN 28.7 kN
Anchor forces	Orthogonal:		4.5 kN	4.2 kN
	Parallel:	Long tie: Short tie: V-shaped tie:	--- 0.1 kN 5.3 kN	
	V-shaped tie bar:	Max. inclined load:	3.8 kN	

9.2.3.36 BRIDGING BRACKET CONFIGURATION 1 [82] [85] (WITH INNER BRACKETS)

Unclad scaffold:

Vertical frame with base transom 40x20x1.5 (old design) or
Vertical frame with base transom 35x35x4.5 (new design)

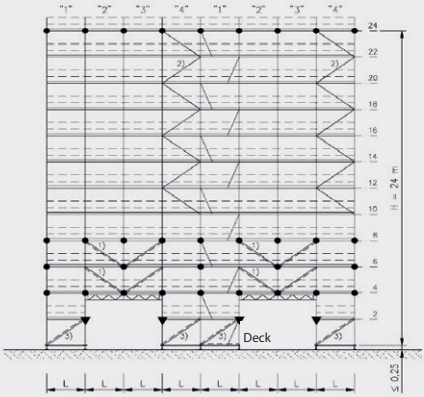
(Configuration No. **82 + 85**)

Only the additional measures are represented
Other structural designs as per the various configurations

The anchors indicated are to be fitted in addition insofar as they are not already included in the corresponding configuration.

Pay attention to V-shaped anchors at H = 4m when required! The lattice girders are to be braced horizontally every 1.5 m!

View



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm

Anchorage: Additionally, every node is to be anchored at the heights H = 4, H = 8 and H = 24 m and at a height of H = 6 m every second node V-shaped ties are to be fitted at H = 2 m at the nodes next to the bridging

Bracing:

1) Framework with tubes Ø 48.3 x 3.2 and standard couplers over the bridging girders outside and inside
2) Additional diagonal braces on the second run of diagonals at a height of H = 10 m to H = 24 m i.e. run of diagonals up to 24 m in every second bay
3) Inner diagonal braces Ø 48.3 x 3.2 with swivel couplers

LOAD CLASS 4 WITH BAY LENGTH OF 3.0 M [82]

Façade			Partially open	Closed
Jack loads		Inside: Outside:	35.0 kN 29.6 kN	35.0 kN 29.9 kN
Anchor forces	Orthogonal:		4.0 kN	3.0 kN
	Parallel:	Long tie: Short tie: V-shaped tie:	--- 0.1 kN 5.9 kN	
	V-shaped tie bar:	Max. inclined load:	4.2 kN	

LOAD CLASS 5 WITH BAY LENGTH OF 2.5 M [85]

Façade			Partially open	Closed
Jack loads		Inside: Outside:	37.2 kN 30.1 kN	37.2 kN 30.2 kN
Anchor forces	Orthogonal:		3.6 kN	2.8 kN
	Parallel:	Long tie: Short tie: V-shaped tie:	--- 0.1 kN 5.9 kN	
	V-shaped tie bar:	Max. inclined load:	4.2 kN	

9.2.3.37 BRIDGING BRACKET CONFIGURATION 2 (WITH INNER AND OUTER BRACKETS) [83]

Unclad scaffold:

Vertical frame with base transom 35x35x4.5 (new design)

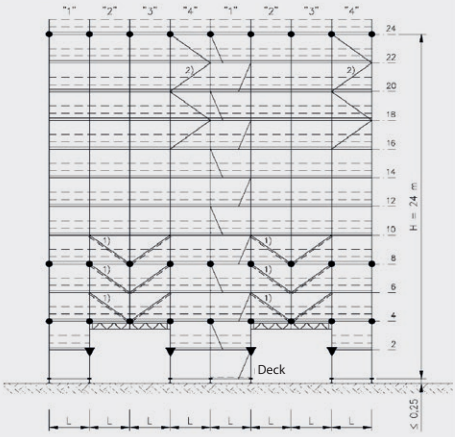
(Configuration No. **83**)

Only the additional measures are represented
Other structural designs as per the various configurations

The anchors indicated are to be fitted in addition insofar as they are not already included in the corresponding configuration.

Pay attention to V-shaped anchors at H = 4m when required! The lattice girders are to be braced horizontally every 1.5 m!

View



• Normal anchors: only on tie bars mounted on inner standards

▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Max. jack extension: 250 mm

Anchorage: Additionally, every node is to be anchored at the heights H = 4 and H = 8 and with closed façades also at a height of H = 24 m
V-shaped ties are to be fitted at H = 2 m at the nodes next to the bridging

Bracing:

1) Framework with tubes Ø 48.3 x 3.2 and standard couplers over the bridging girders outside and inside
2) Additional diagonal braces on the second run of diagonals at a height of H = 16 m to H = 24 m i.e. run of diagonals up to 24 m in every second bay

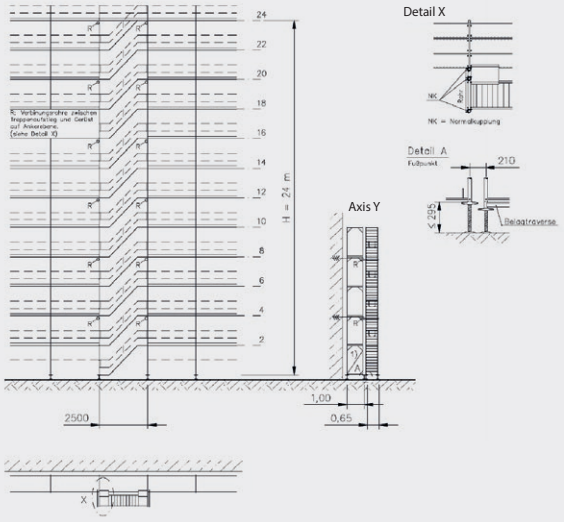
LOAD CLASS 4 WITH BAY LENGTH OF 3.0 M [83]

Façade			Partially open	Closed
Jack loads		Inside: Outside:	35.8 kN 37.7 kN	35.9 kN 37.3 kN
Anchor forces	Orthogonal:		3.2 kN	1.4 kN
	Parallel:	Long tie: Short tie: V-shaped tie:	--- 0.1 kN 6.1 kN	
	V-shaped tie bar:	Max. inclined load:	4.3 kN	

9.2.3.38 SINGLE-FLIGHT STAIRWAY ASCENT [91]

Unfavourable in front of bracket configuration 2:

(Configuration No. **91**)



Only the additional measures are represented
Other structural designs as per the various configurations

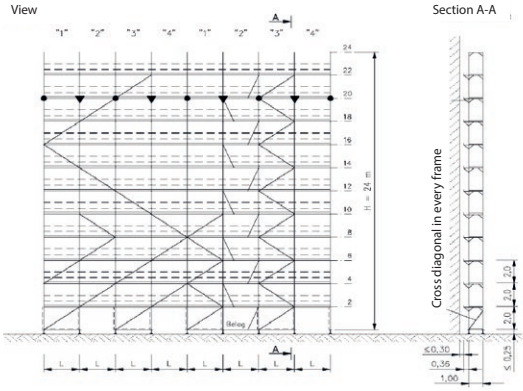
Anchorage: An additional V-shaped tie at every anchorage level
Bracing: 1) Transverse diagonal brace in foot section

Façade		Partially open
Max. jack loads	Stairway ascent	6.5 kN
Anchor forces	Orthogonal (additional):	0.75 kN

9.2.3.39 TOPMOST LEVEL NOT ANCHORED

9.2.3.39.1 LOAD CLASS 4 WITH BAY LENGTHS OF UP TO 3.0 M [101]

(Configuration No. **101**)



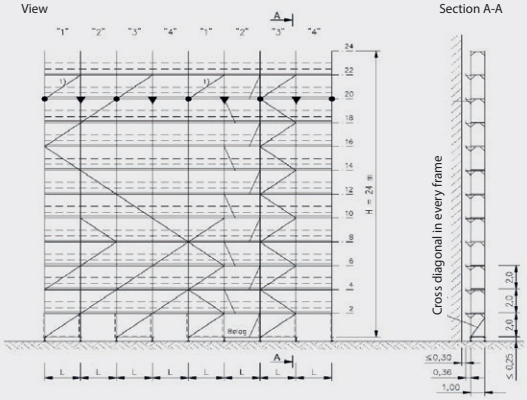
Anchorage: Every node is to be anchored at the topmost anchorage level
An additional V-shaped tie at the topmost anchorage level
(every 4 scaffold bays)

Façade			Partially open
Jack loads		Inside: Outside:	23.5 kN 23.3 kN
Anchor forces	Orthogonal:		4.3 kN
	Parallel:	Long tie: Short tie: V-shaped tie:	--- 0.1 kN 5.9 kN
	V-shaped tie bar:	Max. inclined load:	4.2 kN

9.2.3.39.2 LOAD CLASS 5 WITH BAY LENGTHS OF UP TO 2.5 M [102]

Most unfavourable: in front of bracket configuration 1 (with inner brackets)

(Configuration No. **102**)



• Normal anchors: only on tie bars mounted on inner standards
▼ V-shaped anchors: two V-shaped anchors arranged on tie bars mounted on inner standards

Anchorage:	Every node is to be anchored at the topmost anchorage level An additional V-shaped tie at the topmost anchorage level (every 4 scaffold bays)
Bracing:	1) 1 additional vertical diagonal brace (every 4 scaffold bays) over the topmost anchorage level

Façade			Partially open
Jack loads		Inside: Outside:	25.2 kN 22.4 kN
Ankerkräfte	Orthogonal:		3.8 kN
	Parallel:	Long tie: Short tie: V-shaped tie:	--- 0.1 kN 5.8 kN
	V-shaped tie bar:	Max. inclined load:	4.1 kN

9.3 ANCHOR FORCES AND FOUNDATION LOADS

Table 9: Anchor forces for configurations without any special fittings
Load class 4 for bay lengths of 3.0 m, load class 5 and 6 for bay lengths of 2.5 m and 2.0 m

Bay length	Load class	Anchor arrangement	Inner brackets	Outer brackets	Net-clad	Tarpaulin-clad	Partially open façade	Closed façade	Anchor forces [kN]				
									Orthogonal		Parallel		Max. inclined load
									Compressive	Tensile	Short tie	V-shaped tie	V-shaped tie
L = 3.0 m	Load class 4	8v					X		4.2		0.3	5.3 [2)]	3.8 [2)]
		8v						X	1.6				
		8v	X				X		4.2		0.1	6.0	4.2
		8v	X					X	1.7				
		8v	X	X			X		3.7		0.1	6.3 [1)]	4.5 [1)]
		4v	X	X				X	1.6				
		4v			X		X		4.6		0.3 [1)]	4.3	3.3
		8v			X			X	3.0		0.3	3.4	2.4
		4v	X		X		X		4.4		0.1	4.8	3.4
		8v	X		X			X	2.8		0.1	4.2	3.0
		4-2m	X	X	X		X		4.2 [1)]		0.1	4.8	3.4
		8v	X	X	X			X	3.0		0.1	4.4	3.1
		2	X			X	X		5.9	5.4	0.1	5.4	4.2
		2d	X			X		X	4.7 [1)]	3.1			3.8
		2	X	X		X	X		7.2 [1)]	5.3	0.1	5.4	5.1 [1)]
		2d	X	X		X		X	5.7 [1)]	3.1			4.0 [1)]
L = 2.5 m and L = 2.0 m	Load class 5 and 6	8v					X		3.8 [1)]		0.3	5.3 [2)]	3.8 [2)]
		8v						X	1.4				
		8v	X				X		3.8 [1)]		0.1	6.1 [1)]	4.3
		8v	X					X	1.5				
		4v			X		X		3.8		0.3	3.9	2.8
		8v			X			X	2.5		0.3	3.2	2.3 [1)]
		4v	X		X		X		3.7		0.1	4.5	3.2
		8v	X		X			X	2.3		0.1	4.0	2.9
		2	X			X	X		4.9	4.5	0.1	5.2	3.7
		2d	X			X		X	4.0 [1)]	2.6			3.7

Table 10: Anchor forces for configurations with protective wall

Bay length	Load class	Cladding			Partially open façade	Closed façade	Anchor forces [kN]				
							Orthogonal		Parallel		Max. Inclined load
		Unclad	Net-clad	Tarpaulin-clad			Compressive	Tensile	Short tie	V-shaped tie	V-shaped tie
L = 3.0 m	Load class 4	X			X		3.5	2.9	see Table 9		
			X		X		4.1	4.1			
			X			X	2.8	2.9			
				X	X		5.2	5.3			
				X		X	4.3	3.0			
L = 2.5 m + L = 2.0 m	Load class 5 and 6	X			X		4.6	4.2	see Table 9		
			X		X		3.5	3.4			
			X			X	2.4	2.3			
				X	X		4.3	3.9			
				X		X	3.6	2.3			

Table 11: Anchor forces for configurations with protective roof

Bay length	Load class	Inner brackets	Outer brackets	Net-clad	Tarpaulin-clad	Partially open façade	Closed façade	Anchor forces [kN]				
								Orthogonal		Parallel		Max. Inclined load
								Compressive	Tensile	Short tie	V-shaped tie	V-shaped tie
L = 3.0 m	Load class 4					X		4.2		see Table 9		
							X	1.5				
		X				X		4.2				
		X					X	1.7				
		X	X			X		3.7				
		X	X				X	1.6				
L = 2.5 m + L = 2.0 m	Load class 5 and 6					X		3.7		see Table 9		
							X	1.4				
		X				X		3.7				
		X					X	1.5				

Table 12: Anchor forces for configurations with passage frames

Bay length	Inner brackets	Outer brackets	Net-clad	Tarpaulin-clad	Partially open façade	Closed façade	Anchor forces [kN]				
							Orthogonal		Parallel		Max. Inclined load
							Compressive	Tensile	Short tie	V-shaped tie	V-shaped tie
L = 3.0 m					X		3)		3)	5.5	3.9
						X	2.0				
	X				X		3)		3)	6.7	4.8
	X					X	2.1				
	X	X			X		4.3		3)	3)	3)
	X	X				X	2.3				
L = 2.5 m + L = 2.0 m					X		3)		3)	5.3	3.8
						X	1.8				
	X				X		3)		3)	6.6	4.7
	X					X	1.9				

3) s. Table 9

Table 13: Anchor forces for configurations with bridging girders

Bay length	Inner brackets	Outer brackets	Net-clad	Tarpaulin-clad	Partially open façade	Closed façade	Anchor forces [kN]				
							Orthogonal		Parallel		Max. Inclined load
							Compressive	Tensile	Short tie	V-shaped tie	V-shaped tie
L = 3.0 m					X		4)		see Table 9		
						X	3.6				
	X				X		4)				
	X					X	3.0				
	X	X			X		4)				
	X	X				X	4)				
L = 2.5 m + L = 2.0 m					X		4.5		see Table 9		
						X	4.2				
	X				X		4)				
	X					X	2.7				

Further values regarding anchor forces:

Front stairway or ladder ascents:

Orthogonal to façade:	increase the values in Table 9 by 0.75 kN
Parallel to the façade:	values as in Table 9

Topmost level not anchored:

Orthogonal to façade:	4,3 kN (bay length 3.0 m) All other values as in above tables

Table 14: Foundation loads for load class 4

Configurations L = 3.0 m, load class 4

Number	Inner brackets	Outer brackets	Net-clad	Tarpaulin-clad	Protective wall	Protective roof	Passage frames	Bridging	Stairway ascent	Ladder ascent	Top level not anchored	Partially open façade	Closed façade	Jack extension length [mm]	Foundation loads [kN]		
															Inside	Outside	Ascent
1												X	X	295	16.2	21.5	---
2	X											X	X	250	24.9	22.8	---
3	X	X										X	X	250	25.1	30.7	---
4+5			X									X	X	250	15.7	20.5	---
6+7	X		X									X	X	250	23.8	22.1	---
8+9	X	X	X									X	X	250	25.2	29.1	---
10+11	X			X								X	X	250	24.7	20.2	---
12+13	X	X		X								X	X	250	24.9	28.4	---
31					X							X		295	15.3	21.6	---
32	X				X							X		250	24.0	23.1	---
33	X	X			X							X		250	25.1	31.0	---
34+35			X		X							X	X	250	15.6	20.6	---
36+37	X		X		X							X	X	250	23.7	22.1	---
38+39	X	X	X		X							X	X	250	25.1	29.0	---
40+41	X			X	X							X	X	250	24.6	20.2	---
42+43	X	X		X	X							X	X	250	24.8	28.5	---
61					(x)	X						X	X	295	15.4	22.2	---
62	X				(x)	X						X	X	250	24.2	24.6	---
63	X	X			(x)	X						X	X	250	24.3	32.8	---
71					(x)		X					X	X	295	25.0	12.1	---
72	X				(x)		X					X	X	250	34.7	13.2	---
73	X	X			(x)		X					X	X	250	38.6	16.8	---
81					(x)	(x)		6m				X	X	295	22.9	29.5	---
82	X				(x)	(x)		6m				X	X	250	35.0	29.9	---
83	X	X			(x)	(x)		6m				X	X	250	35.9	37.7	---
91	X	X			(x)				1L			X	X	250	s.a.	s.a.	6,5
92	X	X			(x)					X		X	X	250	s.a.	s.a.	6,5
101	X										X	X	X	s.a.	23.5	23.3	---

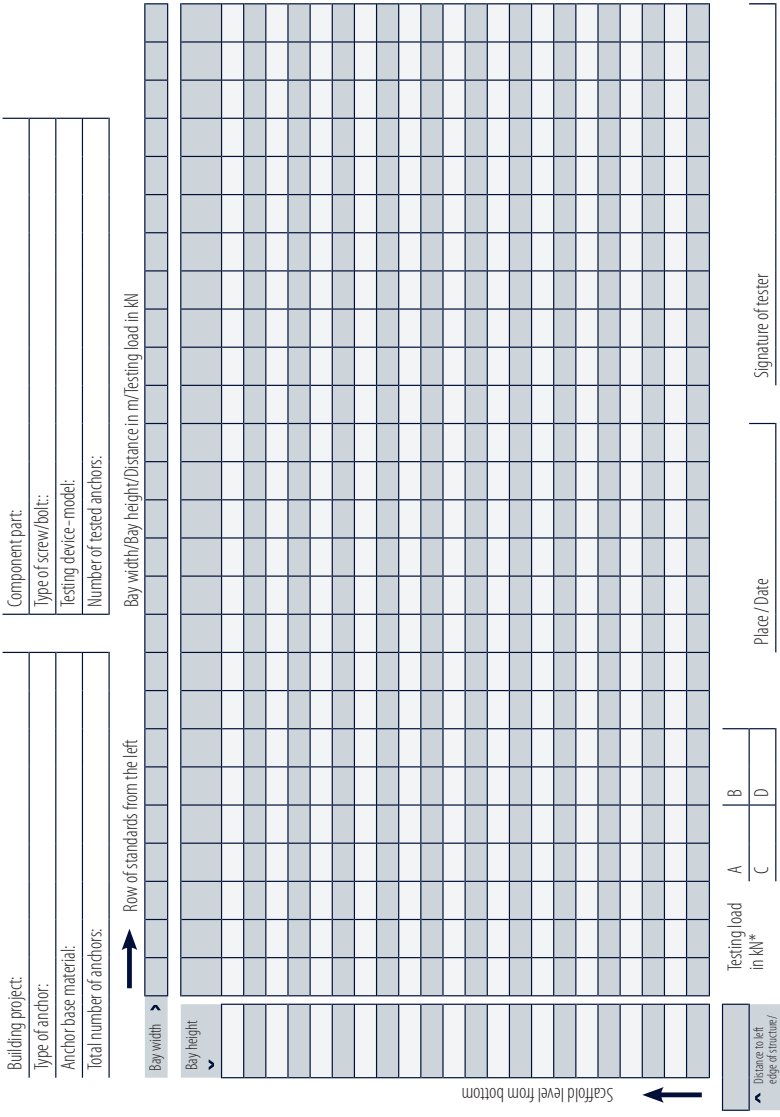
Table 15: Foundation loads for load class 5 and 6

Configurations L = 2.5 m, load class 5 and L = 2.0 m, load class 6

Number	Inner brackets	Outer brackets	Net-clad	Tarpaulin-clad	Protective wall	Protective roof	Passage frames	Bridging	Stairway ascent	Ladder ascent	Top level not anchored	Partially open façade	Closed façade	Jack extension length [mm]	Foundation loads [kN]		
															Inside	Outside	Ascent
21												X	X	295	16.8	21.3	---
22	X											X	X	250	26.1	20.4	---
23+24			X									X	X	250	16.5	20.6	---
25+26	X		X									X	X	250	25.1	20.4	---
27+28	X			X								X	X	250	25.6	20.0	---
51					X							X		295	17.6	21.4	---
52	X				X							X		250	26.5	22.3	---
53+54			X		X							X	X	250	16.4	20.6	---
55+56	X		X		X							X	X	250	25.1	20.4	---
57+58	X			X	X							X	X	250	25.5	20.0	---
64					(x)	X						X	X	295	16.0	22.3	---
65	X				(x)	X						X	X	250	25.9	22.1	---
74					(x)		X					X	X	295	25.9	12.1	---
75	X				(x)		X					X	X	250	36.3	13.2	---
84					(x)	(x)		5m/4m				X	X	295	23.8	28.7	---
85	X				(x)	(x)		5m/4m				X	X	250	37.2	30.2	---
91	X				(x)				1L			X	X	250	s.a.	s.a.	6.5
92	X				(x)					X		X	X	250	s.a.	s.a.	6.5
102	X										X	X	X	s.a.	25.2	22.4	---

10 ADDITIONAL TECHNICAL INFORMATION

10.1 EXAMPLE OF AN ANCHORAGE PROTOCOL



11 NOTES

GENERAL TERMS AND CONDITIONS OF SALE, DELIVERY AND PAYMENT OF RUX GMBH

§ 1 – Scope

1. These General Terms and Conditions shall apply exclusively; any terms and conditions of orderer that are contrary to or deviate from our Terms and Conditions shall be deemed unaccepted unless expressly agreed to in writing. Our General Terms and Conditions of Sale, Delivery and Payment shall also apply when we carry out the delivery to the orderer without reservation although we are aware of contrary or deviating terms and conditions on the part of the orderer.

2. Our General Terms and Conditions of Sale, Delivery and Payment shall also apply to all future transactions with the orderer.

§ 2 – Quotations

1. All parts and elements of our quotations are submitted without engagement.

2. We reserve the right of ownership and copyright to illustrations, drawings, calculations and other documentation. The documents mentioned may not be made accessible to third parties without our express written consent.

§ 3 – Prices and Terms of Payment

1. Insofar as nothing to the contrary has been agreed contractually, our prices are quoted "ex works", excluding packing and freight costs; such shall be invoiced separately.

2. All prices indicated are net prices; they are quoted exclusive of the statutory level of VAT valid on the day of delivery.

3. Insofar as nothing to the contrary has been agreed contractually, the orderer shall be deemed as being in default at the latest 30 days after receipt of invoice or request for payment insomuch that default has not occurred earlier on the basis of a dunning letter having been sent. The orderer shall not be entitled to make any deductions for discount without a specific written agreement.

4. The orderer shall only be entitled to offsetting rights when same's counter claims have been deemed legally binding, are uncontested or have been agreed by us. Moreover, the orderer shall only be entitled to assert retention rights when the counter claims arise from the same contractual relationship as the claim for payment.

5. Any order values below our minimum order value of EUR 50.00 shall be subject to an administration fee of EUR 20.00.

§ 4 – Delivery and Delivery Dates

1. Any prospective periods and dates for delivery and services that we mention shall always be interpreted as being approximate unless a fixed period or a fixed date has been expressly confirmed or agreed. Insofar as shipments have been agreed, delivery periods and delivery dates shall always refer to that point in time when delivery is made to the forwarder, carrier or other third party commissioned with the transportation.

2. Should we be in default with the delivery for reasons for which we are responsible, orderer's claims to compensation for the delay shall be limited to an amount of 0.5% of the value of the delivery for each completed week of delay, but restricted to a maximum amount of 5% of the value of the delivery. This limitation shall not apply when the default is a result of wilful intent, gross negligence or an infringement of essential contractual obligations (these are obligations that need to be satisfied to enable the contract to be properly fulfilled in the first place and whose observation our contractual partner may generally rely on).

3. Any claims for compensation on the part of the orderer for delays in delivery as well as any claims for compensation in lieu of the delivery that go beyond the limits mentioned in Clauses 1. and 2. above shall be deemed as excluded in all cases of a delay in delivery, even after expiry of any deadline that may have been set us for delivery. This shall not be applicable in cases of wilful intent and gross negligence or cases of injury to life, body and health where there is a mandatory liability; a change of the burden of proof to the disadvantage of the orderer shall not apply in this case. The orderer may only withdraw from the contract within the scope of the statutory requirements insofar as we are responsible for the delay in delivery.

4. Upon our request, the orderer shall be obliged to declare within a reasonable period of time whether, on account of the delay in delivery, same will withdraw from the contract and/or demand compensation in lieu of the delivery or insist on performance.

5. Should the orderer default in acceptance or infringe other obligations to cooperate, we shall be entitled to insist on compensation including any additional expenditure for the damage we incur. In this case, the risk of accidental destruction or of a coincidental deterioration of the purchased item shall pass to the orderer at that point in time when same is in default of acceptance.

6. Any acts of God or operational disruptions arising in our facilities or those of our suppliers which, through no fault of our own, temporarily prevent our delivering the contractual object at the agreed time or within the agreed period shall modify the dates and periods mentioned under Clauses 1. to 5. of this Paragraph by the duration of the disruptions caused by these circumstances. The orderer may withdraw from the contract when corresponding disruptions lead to a delay in performance of more than four months. Other rights to withdraw shall remain unaffected by this.

7. The adherence to agreed delivery dates or rightfully set delivery periods presupposes that our sub-suppliers punctually supply us with the ordered input materials or purchased parts necessary for the fulfilment of the order (reservation of self-supply). Should, as a consequence of unpunctual delivery by our sub-suppliers, we not be able to observe the agreed or set delivery dates, we shall not be deemed as being in default when the input material was ordered punctually and we have otherwise made every reasonable effort to ensure prompt delivery of the input material.

§ 5 – Transfer of Risk

1. Insofar as nothing to the contrary has been agreed contractually, "ex works" delivery shall be deemed as agreed. This shall also apply when the purchased item is sent to another address at the request of the orderer. Risk shall then transfer to the orderer when delivery of the purchased item is made to the transporting party.

2. Insofar as such is desired by the orderer, we shall take out transport insurance coverage for the shipment; the costs incurred are to be borne by the orderer.

3. Generally-speaking, the material is supplied unpacked and not protected against corrosion. In the case of material that is supplied packed, the orderer shall assume the obligation of unpacking and disposal of the packaging at own expense.

§ 6 – Warranty for Defects

1. Any warranty rights on the part of the orderer presuppose that same has properly fulfilled its obligations with regard to the inspection and making of complaints about defects pursuant to § 377 of the German Commercial Code (HGB). § 377 of the German Commercial Code shall also apply correspondingly when we perform just work on behalf of the orderer. Moreover, the delivered goods have to be stored and processed or used in a proper and appropriate manner. Proper and appropriate storage in the case of wooden material, for example, would include its ventilation. A proper and appropriate handling of the goods when assembling or dismantling scaffolding would require the observation of all prescribed technical requirements – including the DIN standards – and adherence to all approval regulations and state guidelines.

2. Insofar as the purchased item has a defect, we are always to be approached first and foremost for rectification as per § 439 of the German Civil Code (BGB).

3. Should we not be willing or able to perform rectification or should such extend beyond a reasonable period of time for reasons for which we are responsible or should rectification fail for other reasons, the orderer shall at own discretion be entitled either to withdraw from the contract or to demand a lowering of the purchase price (reduction).

4. Insofar as nothing to the contrary has been agreed below, any more extensive claims on the part of the orderer – irrespective of the legal foundation – shall be deemed excluded. We shall not therefore be liable for damage that has not occurred directly to the delivered object; in particular, we shall not be liable for lost earnings or other financial losses incurred by the orderer.

The above exemption from liability shall not apply when the cause of damage is the result of wilful intent or gross negligence or in cases of injury to life, body and health. Moreover, it shall not apply when a guarantee has been assumed regarding the condition of the object or its durability.

The above exemption from liability shall also not apply to such damage

caused by the culpable infringement of essential contractual obligations (these are obligations that need to be satisfied to enable the contract to be properly fulfilled in the first place and whose observation our contractual partner may generally rely on). Our liability in such circumstances shall be limited to the contractually-typical, foreseeable amount of damage provided it is not a case of wilful intent or gross negligence or when we have assumed guarantees.
5. Warranty claims on the part of the orderer shall be limited to twelve months. This shall not apply when legislation as per § 438 Clause 1 [2] of the German Civil Code (Building Structures and Components for Building Structures), § 479 Clause 1 of the German Civil Code (Right of Recourse) and § 634a Clause 1 [2] of the German Civil Code (Construction Defects) stipulate longer periods.

§ 7 – Total Liability
1. Any more extensive liability for compensation and reimbursement of expenditure than that envisaged in § 6 – irrespective of the nature of the claims asserted – shall be deemed excluded. This shall not apply to claims asserted against us pursuant to §§ 1 and 4 of the Product Liability Act. This exemption from liability shall likewise not apply in cases of wilful intent, gross negligence and injury to life, body and health or in cases of the infringement of essential contractual obligations (these are obligations that need to be satisfied to enable the contract to be properly fulfilled in the first place and whose observation our contractual partner may generally rely on).
The claim to compensation from an infringement of essential contractual obligations shall however be limited to the contractually-typical, foreseeable amount of damage insofar as it is not a case of wilful intent of gross negligence or there is liability due to a case of injury to life, body and health. A change of the burden of proof to the disadvantage of the orderer shall not apply in this case.
2. Insofar as our liability is excluded or limited, the same shall also apply to the personal liability of our employees, workers, co-workers, representatives and agents.

§ 8 – Retention of Title
1. We reserve the right of ownership to the purchased item until full payment of the purchase price including the incidental expenses (freight, packing etc.). In the event of any behaviour on the part of the orderer that is contrary to the contractual obligations, in particular in a case of default in payment, we shall be entitled to withdraw from the contract and repossess the purchased item. We shall be authorised to remarket the purchased item after repossessing it. After deducting the appropriate amount for remarketing costs, the remaining proceeds shall be set off against the obligation of the orderer.
2. The orderer shall be obliged to treat the purchased item with care. Orderer shall, at own expense, take out adequate reinstatement-value insurance coverage for the item against the risks of fire, water damage and theft. The orderer shall carry out any maintenance or repair work without delay – should such become necessary – at own expense.
3. The orderer shall be obliged to notify us immediately in writing in the event of seizure or other interventions by third parties. In such a case, the orderer shall also be obliged to support us to the full in the judicial and non-judicial assertion of our rights, in particular to make the necessary documents available.
4. The orderer shall be entitled to resell the purchased item in the ordinary course of business. However, same shall herewith assign to us as of now all claims in the amount of the final invoice amount (including value added tax) which shall accrue to same towards its customers or third parties from the reselling. This assignment is regardless of whether the purchased item is resold either with or without any further processing. We hereby accept this assignment. The orderer shall remain entitled to collect the claim within the scope of the ordinary course of business. This entitlement shall lapse when the orderer does not meet its payment obligations from the proceeds obtained or when same is in default with payment. It shall also lapse when insolvency or settlement proceedings are opened against the assets of the orderer or when the orderer suspends payments.
In such cases we shall be entitled to collect the assigned claim ourselves. The orderer shall be obliged to furnish us with all the information needed for the collection and to hand over all the associated documentation. In such a case the orderer shall also be obliged to inform the debtor (third parties) of the assignment.
5. The processing or modification of the purchased item by the orderer shall always be carried out on our behalf. Should the purchased item be processed together with other objects not belonging to us, we shall acquire co-ownership of the new object in the relationship of the value of the purchased item to the other processed objects at the point in time of processing. The same reservation of title shall apply to the object thus created as to the purchased item conditionally supplied.
6. Should the purchased item be inseparably combined with other objects not belonging to us, we shall acquire co-ownership of the new object in the relationship of the value of the purchased item to the other combined objects at the point in time of combination. Should the combination be such that the object of the orderer is to be regarded as the main object, it shall be deemed as agreed that the orderer transfers proportional co-ownership to us. The orderer shall safeguard the sole or co-ownership thus created on our behalf.
7. At orderer's request, we undertake to release the security – to which we are entitled – insofar as the realisable value of our security exceeds the secured claim by more than 10 percent; the selection of the security to be released shall be incumbent on us. In this case the orderer shall be obliged to mark the scaffolding material in its possession in such a way that, if necessary, it is possible to unequivocally identify the material still in our ownership. Should an assignment of claims be waived, the orderer shall be obliged to disclose upfront any and all claims from the sale of scaffolding material.

§ 9 – Place of Fulfilment, Applicable Law, Court of Jurisdiction
1. Unless anything to the contrary has been agreed, the place of fulfilment shall be the registered offices of our company. These are located in Hagen.
2. The law of the Federal Republic of Germany shall apply exclusively to all business relationships with us. The applicability of the CISG (UN Sales Law) shall be deemed as excluded.
3. Insofar as the orderer is a qualified businessperson, the courts of the Federal Republic of Germany shall have jurisdiction internationally for any and all legal disputes.
The court of jurisdiction shall be the registered offices of the company in all cases. However, we shall also be entitled to file for legal proceedings at the orderer's general court of jurisdiction. These provisions regarding jurisdiction shall also apply to any legal proceedings related to bills of exchange or cheques.
4. Should the orderer violate any requirements of VAT law, in particular regarding the required provision of a VAT ID number, the orderer shall be obliged to compensate us for any taxation disadvantage which may ensue from such. We reserve the right to assert more extensive claims for damages.

§ 10 – Concluding Provisions
Should the contract or these General Terms and Conditions of Sale, Delivery and Payment contain any loopholes, such legally valid provisions shall be deemed as agreed that close such loopholes and which the contractual parties would have agreed upon with a view to the commercial objective of the contract and the purpose of the General Terms and Conditions of Sale, Delivery and Payment if they had known about the loopholes.

As of 4 July 2016

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