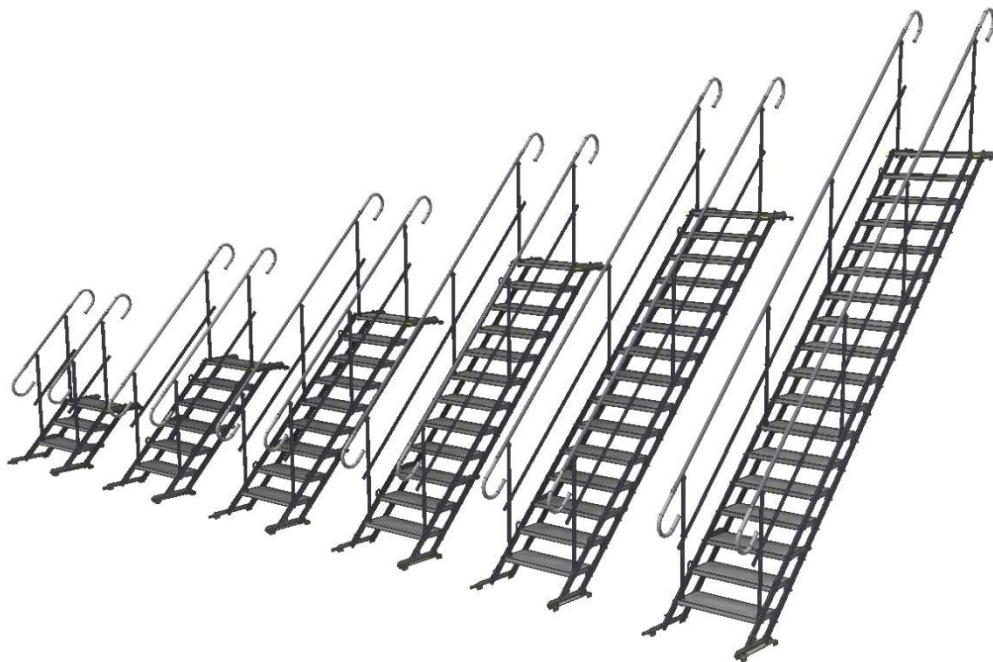

Appendix no. 1

Installation manual

of TAS temporary staircase



Robert Cieśla

Piotr Abram

Miłosz Muzyka

.....
(Prepared by)

.....
(Verified by)

.....
(Approved by)

Issue 8.o, July 2020

List of revisions

No.	FULL NAME	DEPARTMENT	REVISION DATE	SCOPE OF CHANGES	COMMENTS
1	Robert Cieřła	BR	5.10.2018	Amendment to paragraphs 4 and 5	
2	Piotr Abram	BR	30/10/2018	Update of element weight, number of connectors. Amendment of point 4.4	
3	Robert Cieřła	BR	29/11/2018	Amendment to paragraph 5	
4	Robert Cieřła	BR	6.03.2019	Update on TAS-B Footbridge	
5	Piotr Abram	BR	23/01/2020	Update on TAS-WB truss	
6	Robert Cieřła	BR	23/03/2020	Update on scaffolding bracket	
7	Piotr Abram	BR	22/07/2020	Update - point 5	
8	Piotr Abram	BR	15/11/2023	Update - new grades	
9					
10					
11					
12					
13					
14					
15					

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1. General Safety Principles

The installation instructions are included as an appendix to the TAS trench stair technical documentation. The excavation steps consist of components according to the specifications attached to the delivery.

Read this manual before starting installation and use. Incorrect installation or use can lead to a risk to health or life.

Due to the considerable size and weight of the individual components, special care must be taken during transport, installation and use of the staircase.

Keep this manual as a source of information for users of the staircase and its service personnel.

1. Installation or use of the staircase which is not in accordance with the contents of these instructions may adversely affect the performance of the product and/or be a source of danger.
2. The manufacturer is not responsible for any damage caused by incorrect installation of the product or its misuse.
3. No modifications to the construction of the staircase components are permitted.
4. The staircase is designed for use in an industrial environment, i.e. for use by adults who comply with health and safety regulations, are trained and are not under the influence of alcohol.
5. It is not permitted to be under the stairs while they are being used by others.
6. Do not allow the simultaneous use of the staircase by a number of persons having more weight than the permitted load of the staircase.
7. Stairs are used to move people to reach the lower levels of deep excavations as well as in the opposite direction. Staying on the steps as well as placing objects that are not stair equipment in these areas is against the operating rules.
8. Do not use the stairs to transport objects other than tools, instruments, etc.
9. Since in most cases the support for the staircase is unpaved ground, the possibility of the ground slipping and becoming wet must be taken into account, which can disturb the stability of the staircase.
10. If there is a risk of falling from height, a safety harness should always be used during assembly and disassembly.

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2. Components

The basic elements of the TAS staircase for excavation are the steps together with the railings. These staircases, are available in 3, 6, 9, 12, 15 and 18 steps and in widths of 700 mm and 1000 mm. The variants can be connected to each other using connectors and supports.

The system makes it possible to create an overhead walkway over an obstacle using a platform that connects to a staircase of 3 or 6 steps. It is also possible to create a footbridge (e.g. over an excavation) with 3, 6, 9 or 12 step stairs, and with the use of an additional truss with 15 or 18 step stairs.

By replacing the bottom foot and the top foot in the staircase, it is possible to mount on scaffolding systems based on the 48.3 mm diameter round profile.



Fig. 1. Components

Tab 1. Stair markings (Sets include stairs with handrails)

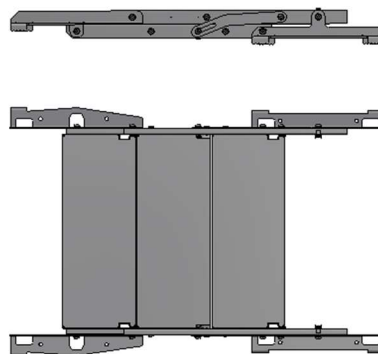
No.	Diagram designation	Description
1	TAS-3A	Stairs 3 steps width 708 mm
2	TAS-6A	Stairs 6 steps width 708 mm
3	TAS-9A	Stairs 9 steps width 708 mm
4	TAS-12A	Stairs 12 steps width 708 mm
5	TAS-15A	Stairs 15 steps width 708 mm
6	TAS-18A	Stairs 18 steps width 708 mm
7	TAS-3B	Stairs 3 steps width 1000 mm
8	TAS-6B	Stairs 6 steps width 1000 mm
9	TAS-9B	Stairs 9 steps width 1000 mm
10	TAS-12B	Stairs 12 steps width 1000 mm
11	TAS-15B	Stairs 15 steps width 1000 mm
12	TAS-18B	Stairs 18 steps width 1000 mm

Tab 2. Additional accessories

No.	Diagram designation	Description
13	TAS-K3	Footbridge 3 steps 708 mm
14	TAS-K4	Footbridge 3 steps 1000 mm
15	TAS-WB1	Truss 01
16	TAS-WB2	Truss 02
17	TAS-WB3	Beam

System components

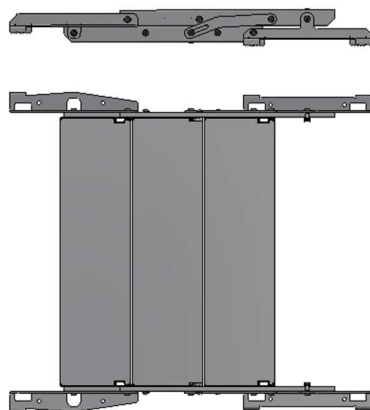
TAS-S3A



Weight: 31.31 kg

Dimensions: 1358x898x126

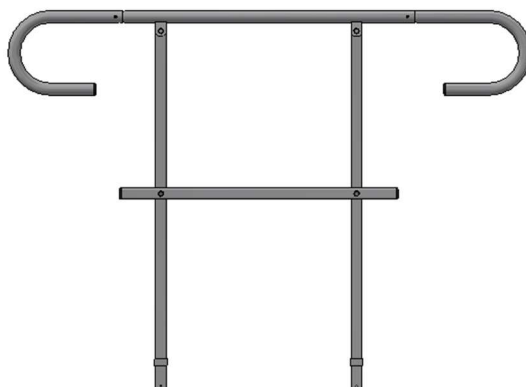
TAS-S3B



Weight: 40.6 kg

Dimensions: 1358x1198x135

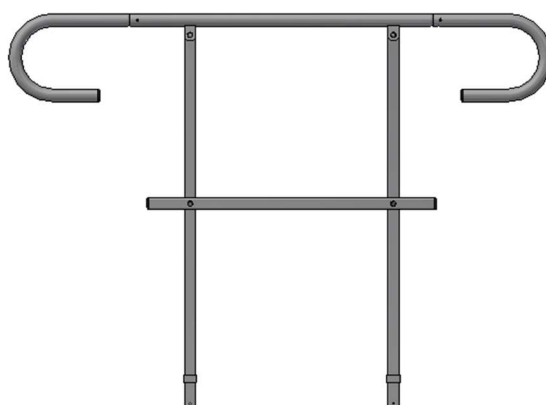
TAS-BP3



Weight: 8.18 kg

Dimensions: 1444x1045x34

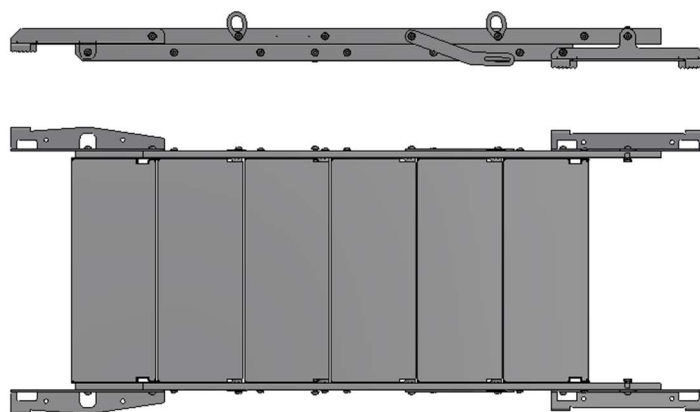
TAS-BL3



Weight: 8.18 kg

Dimensions: 1444x1045x34

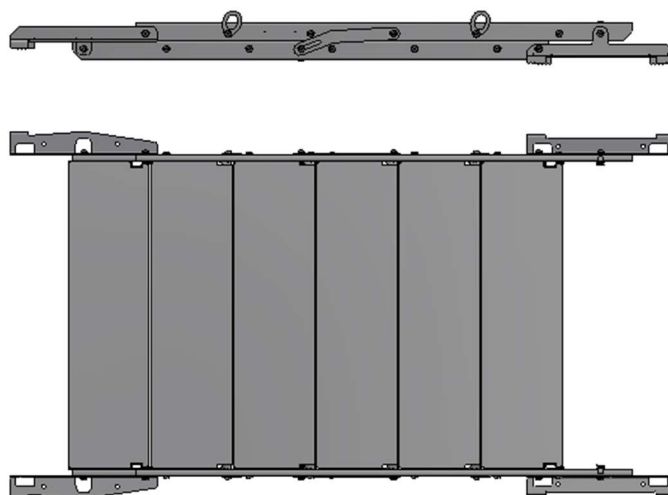
TAS-S6A



Weight: 53.26 kg

Dimensions: 2167,5x898x126

TAS-S6B



Weight: 71.86 kg

Dimensions: 2167,5x1198x135

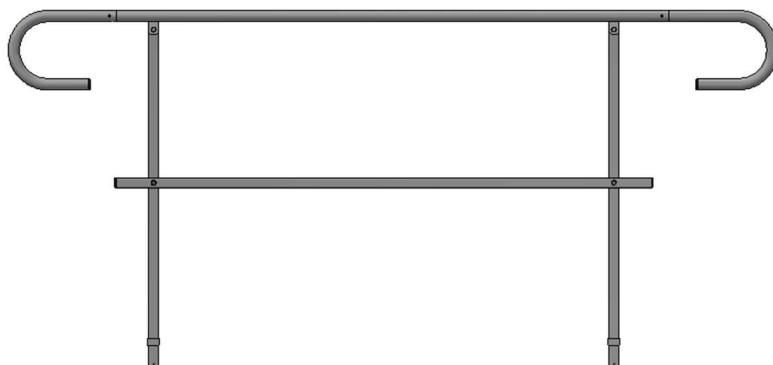
TAS-BL6



Weight: 10.96 kg

Dimensions: 2254x1045x34

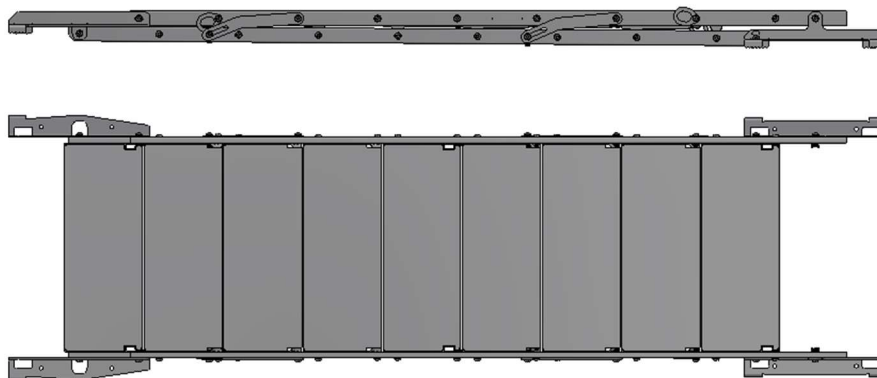
TAS-BP6



Weight: 10.96 kg

Dimensions: 2254x1045x34

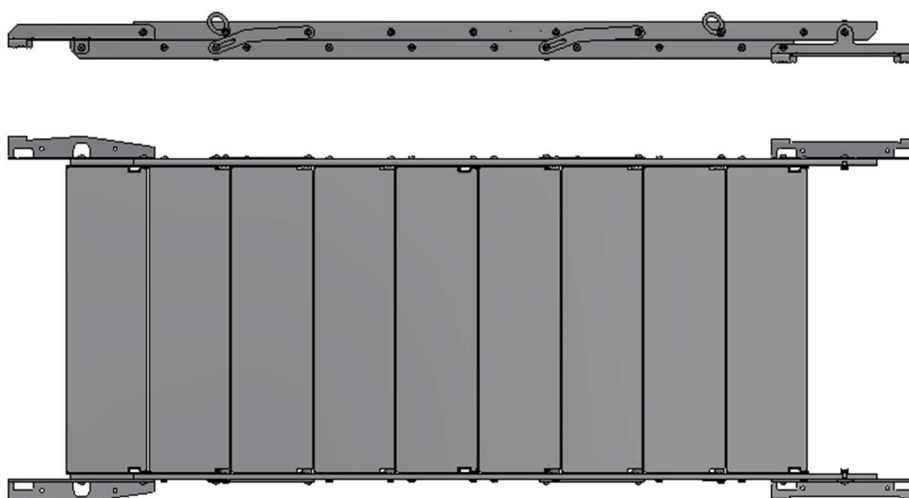
TAS-S9A



Weight: 76.45 kg

Dimensions: 2977,5x898x126

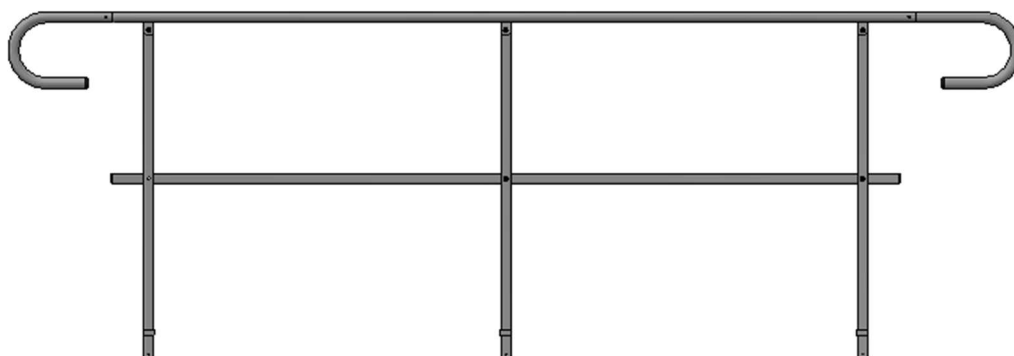
TAS-S9B



Weight: 104.4 kg

Dimensions: 2977,5x1198x135

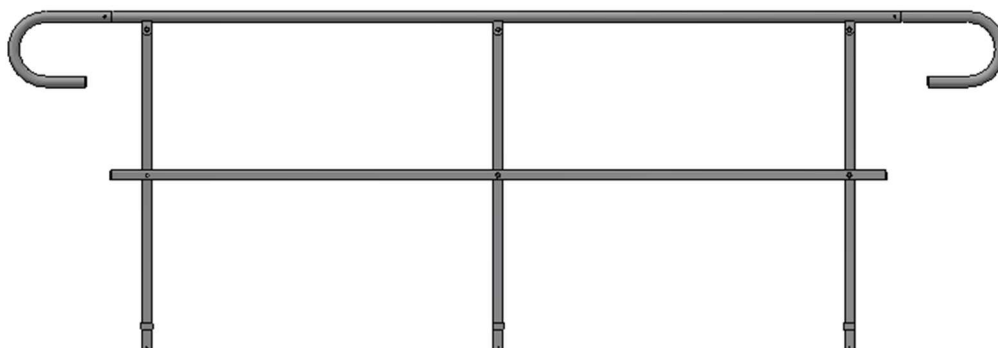
TAS-BL9



Weight: 15.1 kg

Dimensions: 3064x1045x34

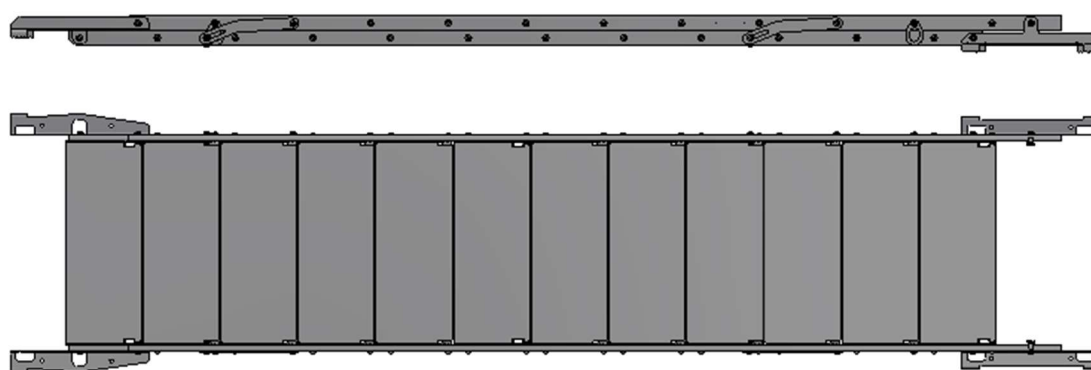
TAS-BP9



Weight: 15.1 kg

Dimensions: 3064x1045x34

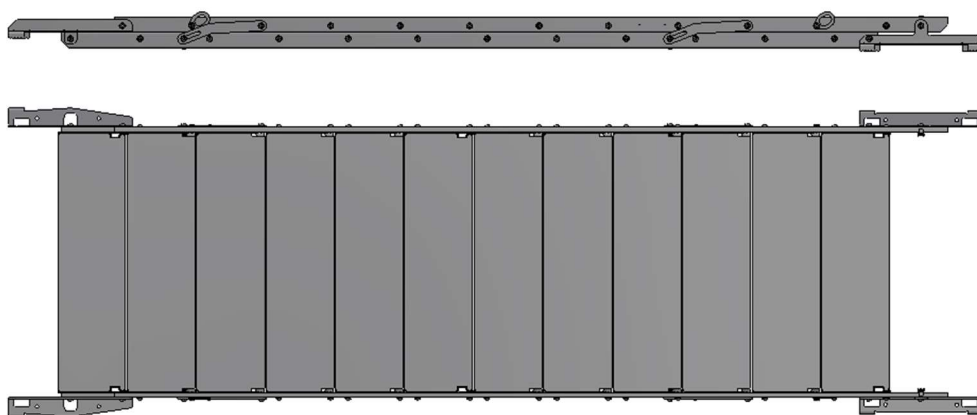
TAS-S12A



Weight: 98.18 kg

Dimensions: 3787,5x898x126

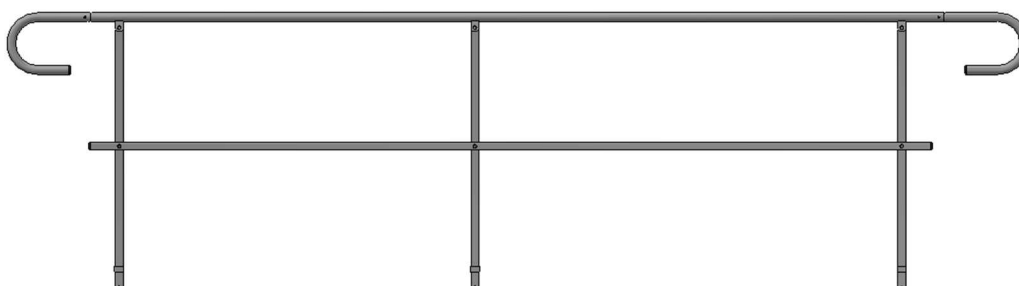
TAS-S12B



Weight: 135.5 kg

Dimensions: 3787,5x1198x135

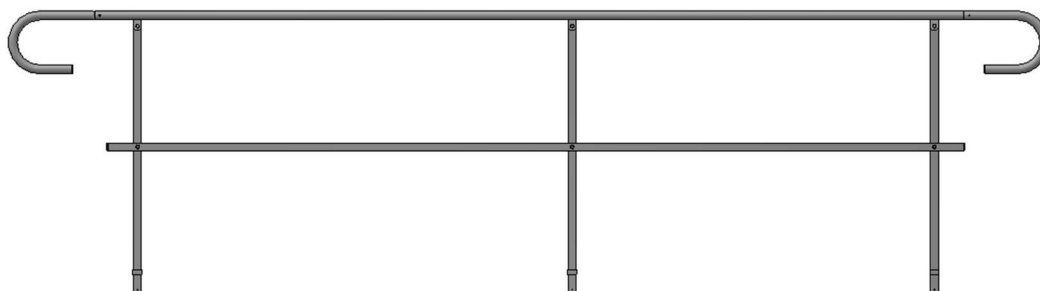
TAS-BL12



Weight: 17.9 kg

Dimensions: 3874x1045x34

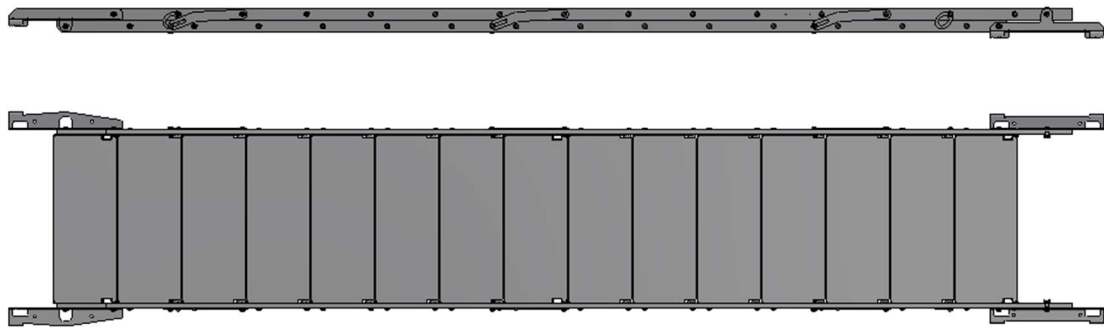
TAS-BP12



Weight: 17.9 kg

Dimensions: 3874x1045x34

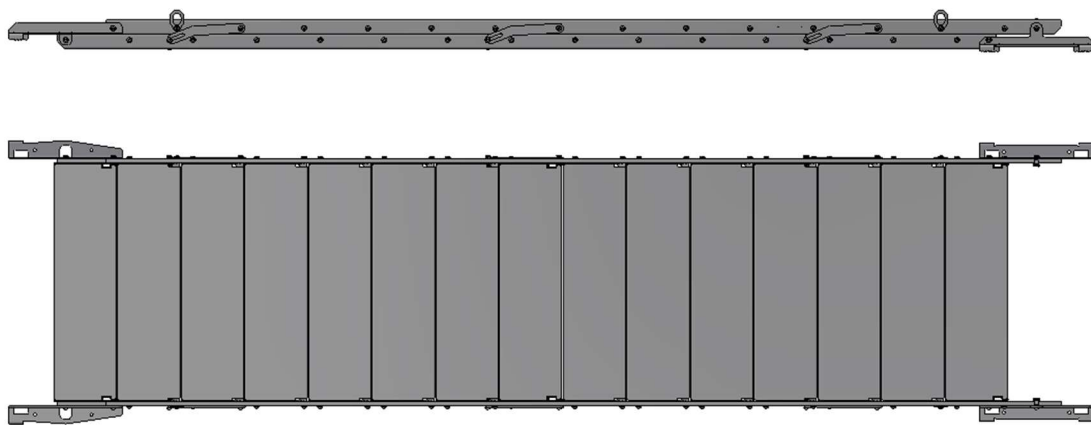
TAS-S15A



Weight: 120.93 kg

Dimensions: 4597,5x898x126

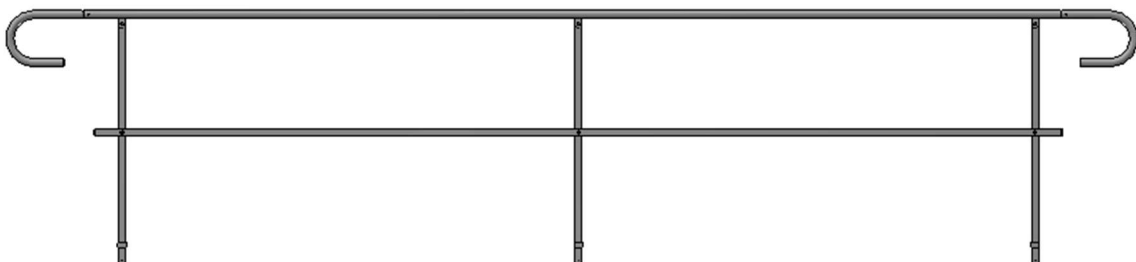
TAS-S15B



Weight: 167.64 kg

Dimensions: 4597,5x898x135

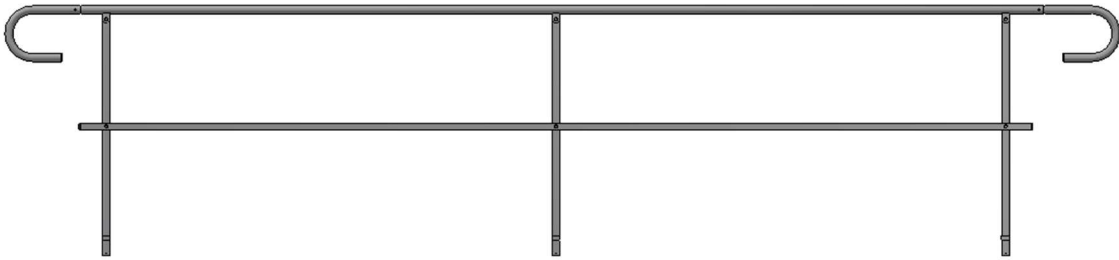
TAS-BL15



Weight: 20.67 kg

Dimensions: 4684x1045x34

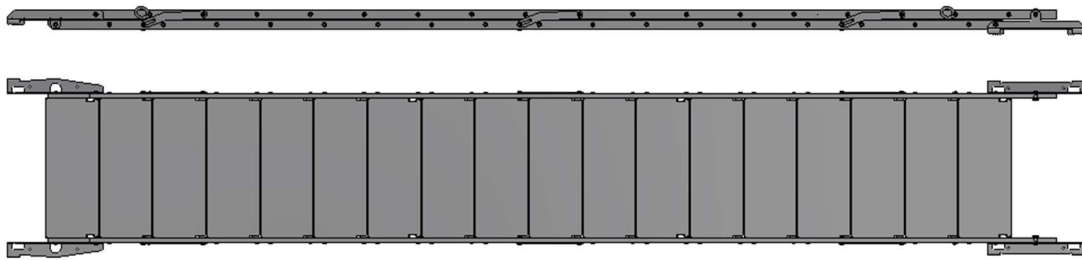
TAS-BP15



Weight: 20.67 kg

Dimensions: 4684x1045x34

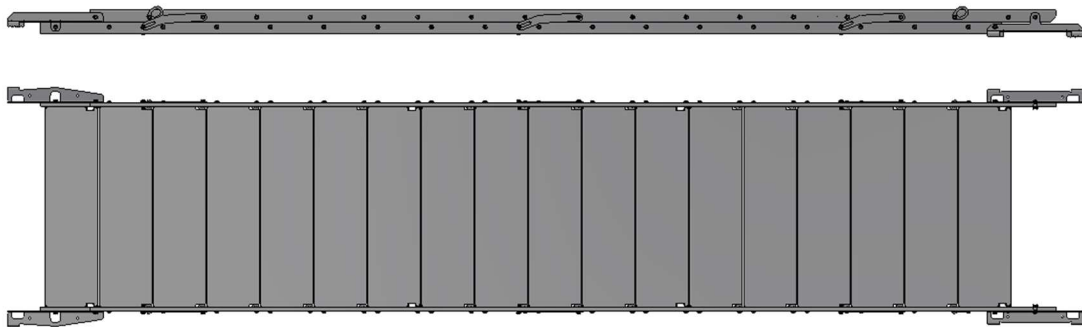
TAS-S18A



Weight: 142.97 kg

Dimensions: 5407,5x898x126

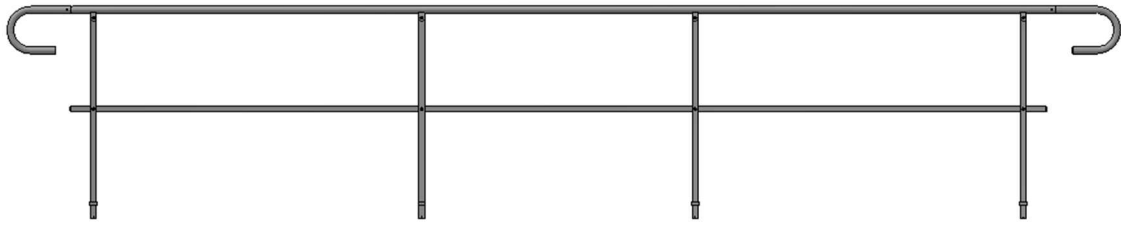
TAS-S18B



Weight: 199 kg

Dimensions: 5407,5x1045x1135

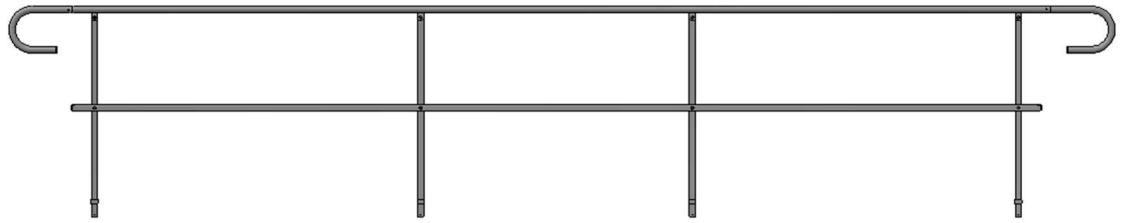
TAS-BL18



Weight: 24.81 kg

Dimensions: 5494x1045x34

TAS-BP18



Weight: 24.81 kg

Dimensions: 5494x1045x34

TAS-L5



Weight: 2.7 kg

Dimensions: 740x57x20

TAS-L6



Weight: 3 kg

Dimensions: 740x72x25

TAS-L13



Weight: 2.8 kg

Dimensions: 715x90x8

TAS-L12



Weight: 2.7 kg

Dimensions: 740x62x25

TAS-PR1



Weight: 10.28 kg

Dimensions: 3268,5x250x52,5

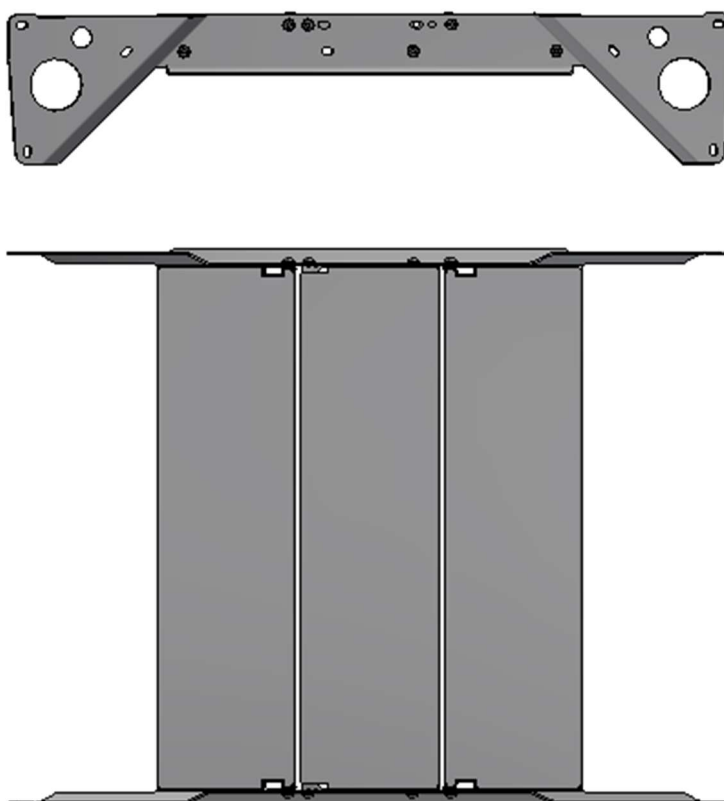
TAS-PR5



Weight: 25.401 kg

Dimensions: 3389x264x100

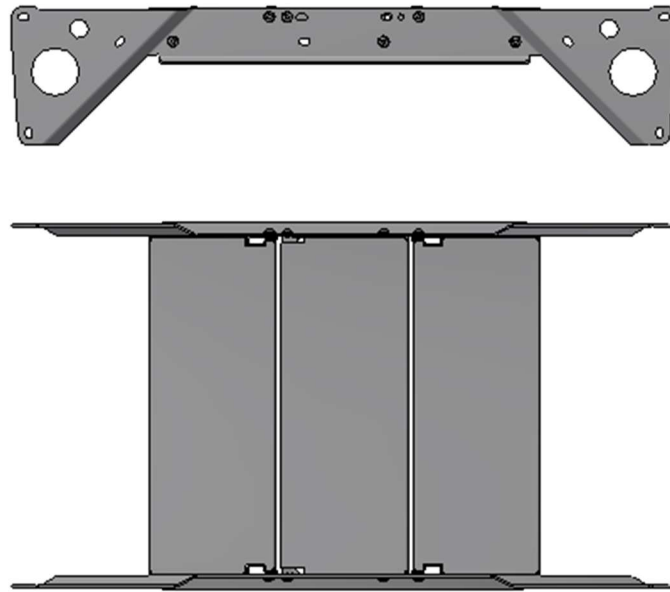
TAS-K4



Weight: 50 kg

Dimensions: 1386x1068x287

TAS-K3



Weight: 45 kg

Dimensions: 1386x768x287

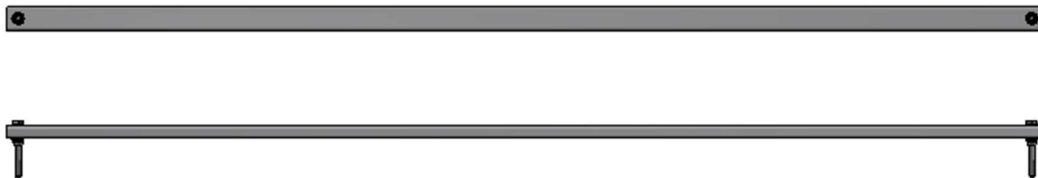
TAS-PH3



Weight: 2.4 kg

Dimensions: 1185x92x34

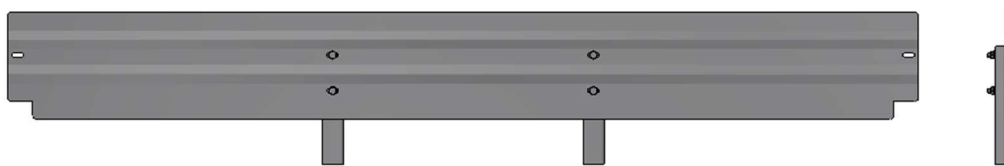
TAS-PR3



Weight: 1.6 kg

Dimensions: 1291x30x20

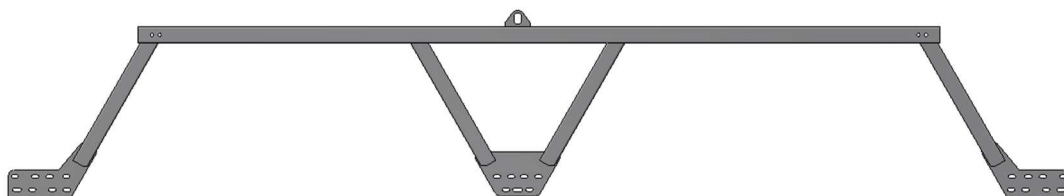
D-TAS-064



Weight: 2.27 kg

Dimensions: 1290x213x20

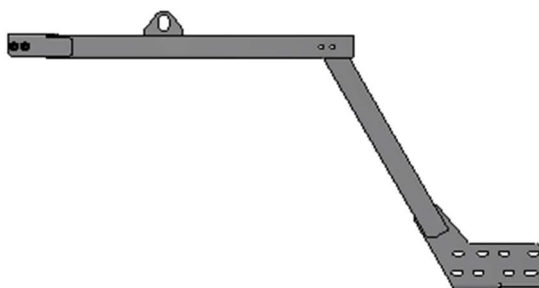
TAS-WB1



Weight: 28.5 kg

Dimensions: 4106x735x94

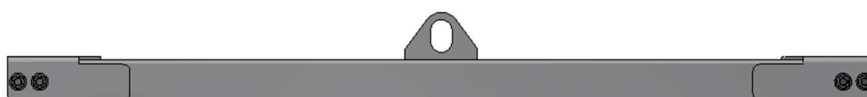
TAS-WB2



Weight: 8.9 kg

Dimensions: 1410x735x94

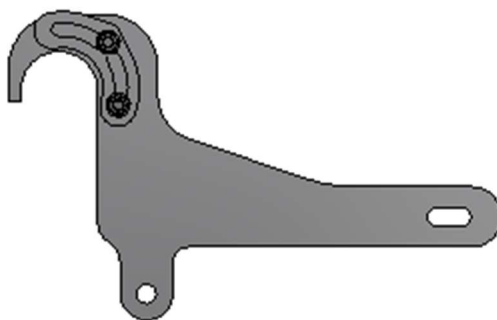
TAS-WB3



Weight: 6.2 kg

Dimensions: 1201x125x48

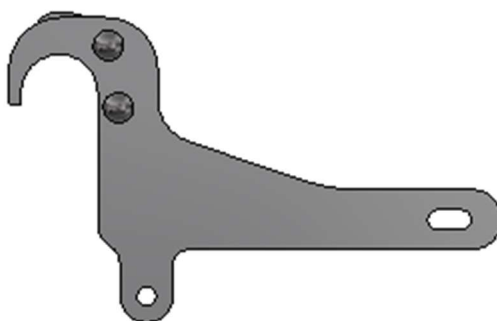
TAS-L15



Weight: 1.3kg

Dimensions: 327,5x288,5x12

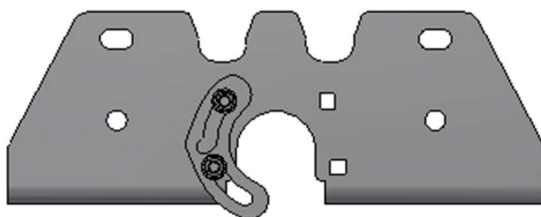
TAS-L14



Weight: 1.3 kg

Dimensions: 327,5x288,5x12

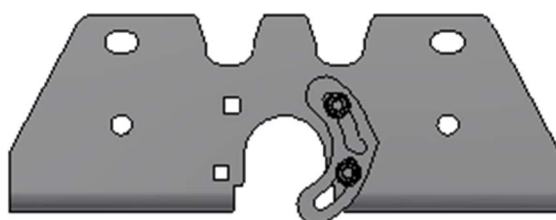
TAS-L16



Weight: 2.1 kg

Dimensions: 340x121x51

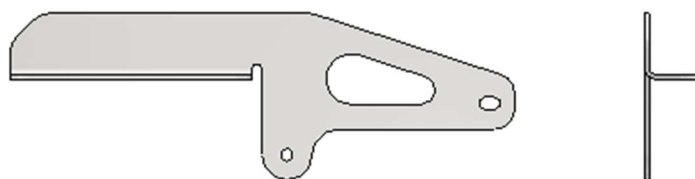
TAS-L17



Weight: 2.1 kg

Dimensions: 340x121x51

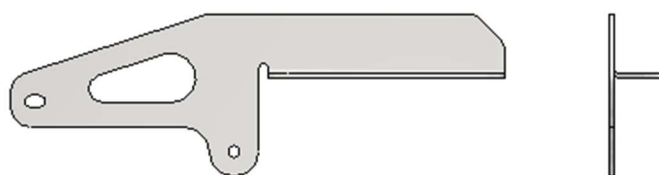
TAS-SGLH



Weight: 1.827 kg

Dimensions: 501x165x55

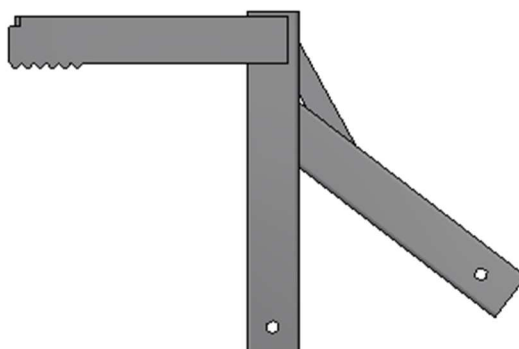
TAS-SGPH



Weight: 1.827 kg

Dimensions: 501x165x55

TAS-L26



Weight: 2 kg

Dimensions: 500x330x28

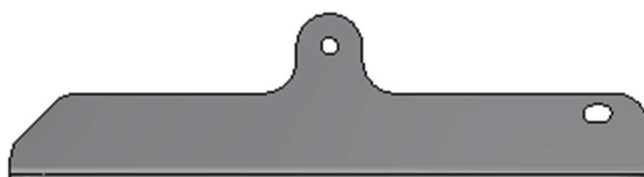
TAS-SDLH



Weight: 2.15 kg

Dimensions: 480x125x55

TAS-SDLH



Weight: 2.15 kg

Dimensions: 480x125x55

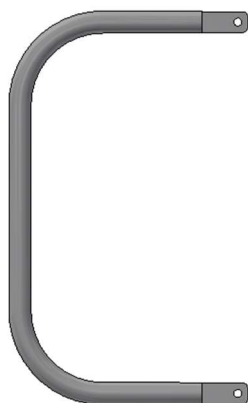
TAS-O1



Weight: 5.769 kg

Dimensions: 929x156x75

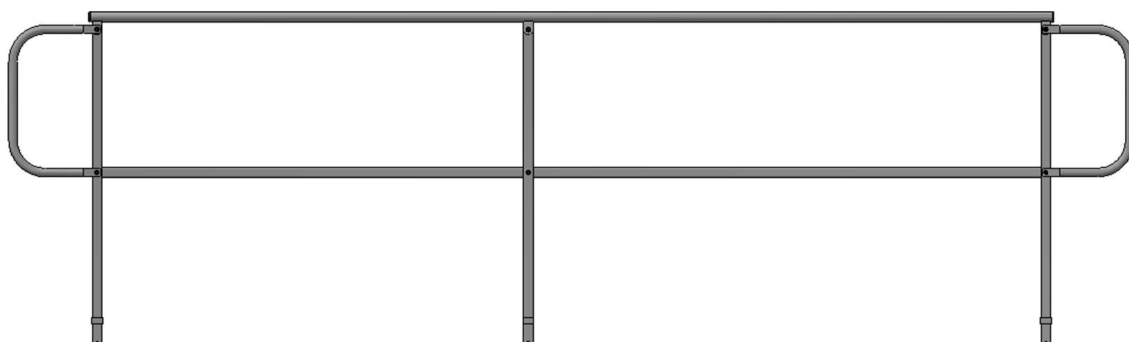
TAS-BU



Weight: 1.2 kg

Dimensions: 475x388x27

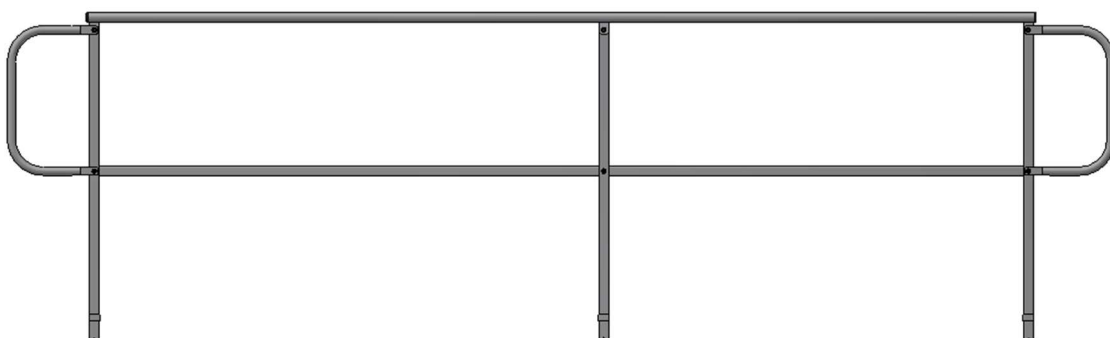
TAS-BL12H



Weight: 16.5 kg

Dimensions: 3523x1045x45

TAS-BP12H



Weight: 16.5 kg

Dimensions: 3523x1045x45

Tab 3. List of fasteners

#	Fasteners	TAS-3 A/B	TAS-6 A/B	TAS-9 A/B	TAS-12 A/B	TAS-15 A/B	TAS-18 A/B
		Volume					
1	Bolt ISO 7380 8-ZN – M12 × 40	18	30	44	56	70	83
2	Nut ISO 10511 8-ZN – M12	18	30	44	56	70	83
3	ISO 7089 washer ZN-12 – 200 HV	18	30	44	56	70	83
4	Bolt ISO 4014 8-ZN M8 × 40	4	4	6	6	6	8
5	Bolt ISO 4014 8-ZN M8 × 45	4	4	5	6	6	8
6	Nut ISO 10511 ZN – M8	8	8	11	12	12	16
7	ISO 7089 washer ZN-8 – 200 HV	16	16	22	24	24	32
10	Screw DIN 7504K 4.2x16 zinc electroplated	8	8	8	8	8	8

Tab 4. List of accessory fasteners

No.	Fastener	TAS-K3	TAS-K4
11	Nut ISO 4032 8-ZN – M12	4	4
12	Nut ISO 10511 ZN – M12	12	12
13	Nut ISO 4032 8-ZO – M6	8	8
14	Nut ISO 10511 ZN – M8	4	4
15	ISO 7089 washer ZN-12 – 200 HV	24	24
16	ISO 7089 washer ZO-6 – 200 HV	16	16
17	ISO 7089 washer ZN-8 – 200 HV	8	8
18	bolt ISO 4762 8-ZN – M12 × 25	4	4
19	bolt ISO 4762 8-ZN – M12 × 30	12	12
20	bolt ISO 4017 8-ZO – M6 × 30	8	8
21	bolt ISO 4014 8-ZN – M8 × 65	4	4

Tab 5. Components to form a footbridge from the TAS-15 and TAS-18 steps

Index/Kit	15	15+15	15+18	18+18	18
TAS-15 A/B	1	2	1	0	0
TAS-18 A/B	0	0	1	2	1
TAS-WB1	2	4	4	4	2
TAS-WB2	0	0	2	4	2
TAS-WB3	0	2	2	2	0

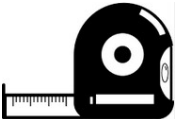
Tab 6. Tightening torques MA for class 8.8 bolts

Diameter	Momentum in Nm
M8	23
M10	46
M12	79

Approximate tightening torques for coarse threaded stud bolts for a friction factor of $\mu_c = 0.15$

3. List of tools needed for installation of TAS staircase.

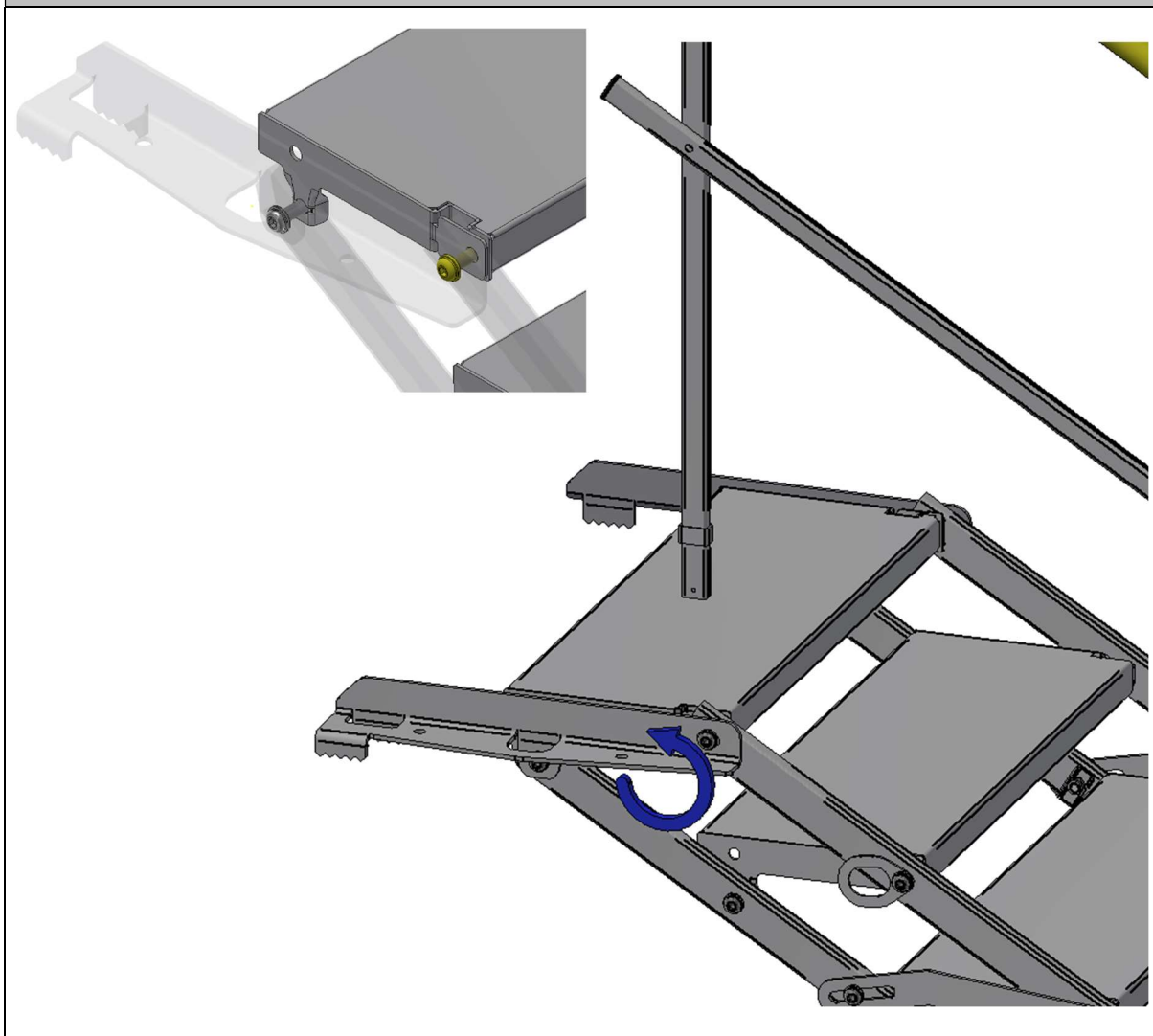
Tab 7. List of tools

	Wrenches: 19, 18, 13, 10
	Wrenches: 8, 10
	Screwdriver
	Spirit level
	Measuring tape
	Lifting device with a lifting capacity of min. 1 t when assembling long sets

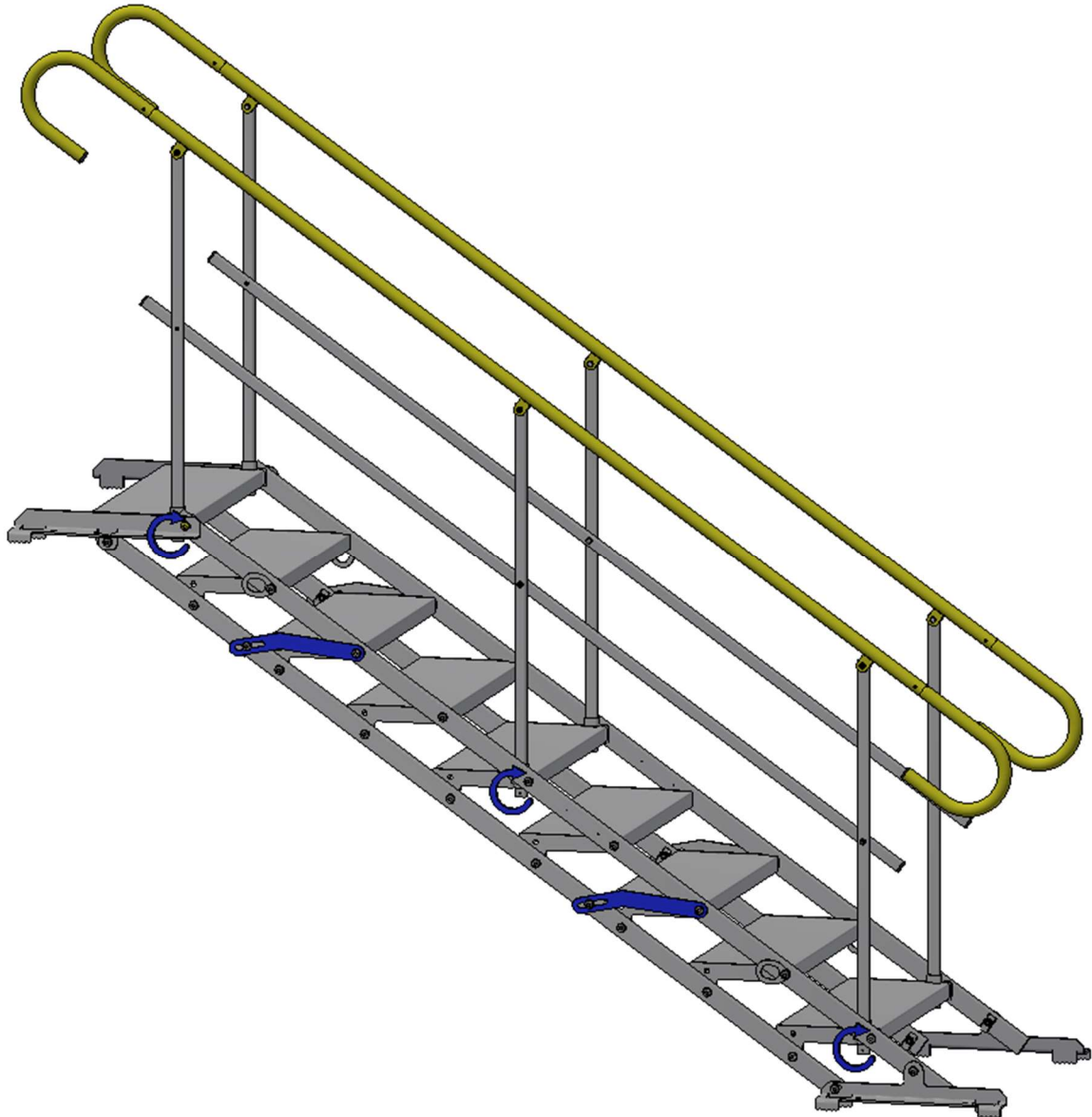
4. TAS staircase assembly operations

The following shows the method and sequence of installation of the TAS staircase

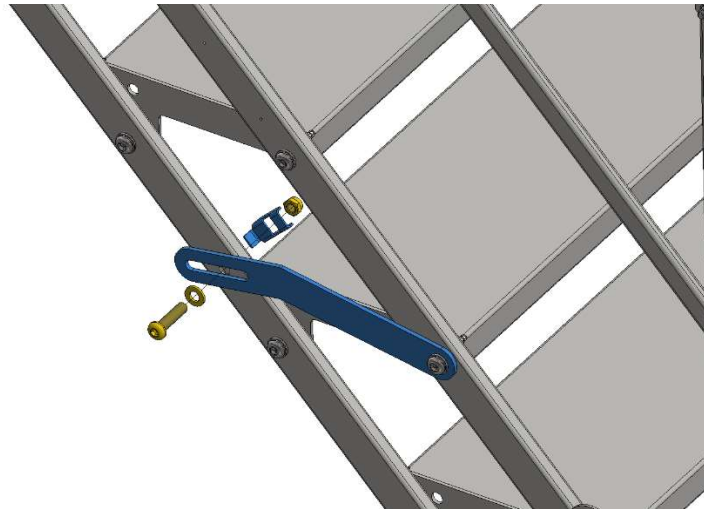
4.1. Installing the railings to the steps - To install the railings, loosen all bolts on the steps with sockets for the railing posts. Then slide the posts into the slots.



4.2. Tighten the railing locks - After fitting the railing, set the target angle of the stairs and then tighten the post lock bolts and the lock bolts. Each time the angle of the stairs is adjusted, the locking bolts of the stairs must be loosened and tightened.



4.3. Stairs 15, 18 steps are supplied with pre-assembled interlocks, the interlock must be fitted. Remove the bolt (item 4), together with the washer (item 3), put through the other side of the lock (oval hole), tighten.



4.4. In order to ensure the rigidity of the staircase, the bolts securing all locks must be tightened. Tighten connections with approximately 60% of the tightening torque prescribed for the diameter and class of connector, see Table 6. In order to improve the stiffness of the steps, it is recommended that all step connections are tightened.



4.5. Linking staircase

4.5.1. Removal of handrail ends - unscrew the screws securing the handrail ends on both sides at one end of the stairs. Remove the lower ends on one staircase and the upper ends on the other.



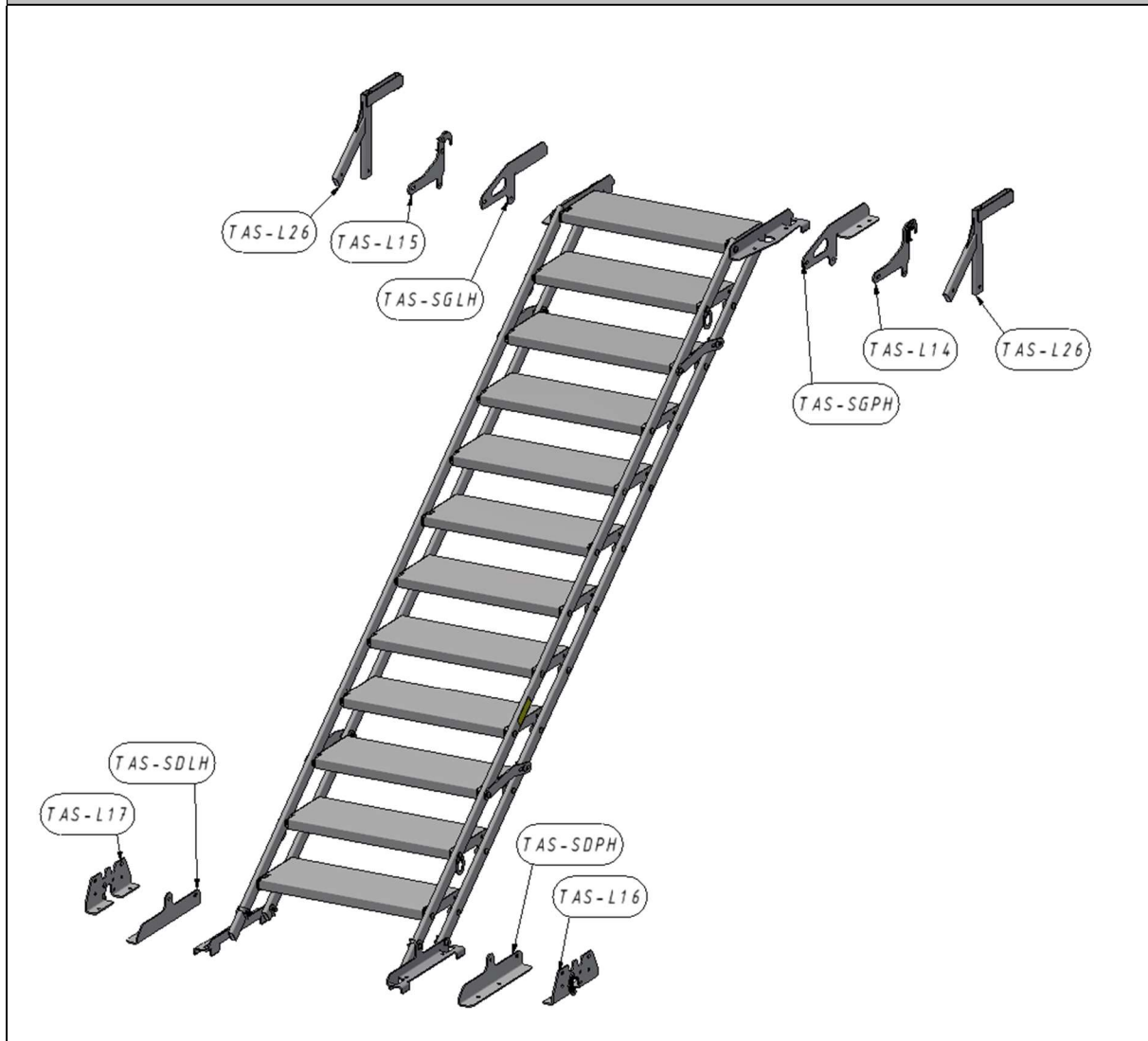
4.5.2. Removal of the foot stair treads - Unbolt the bolt connections (pos. 3,4,5) with which the stair treads are bolted to the stringers. Remove the bottom feet in one staircase and the top feet in the other.



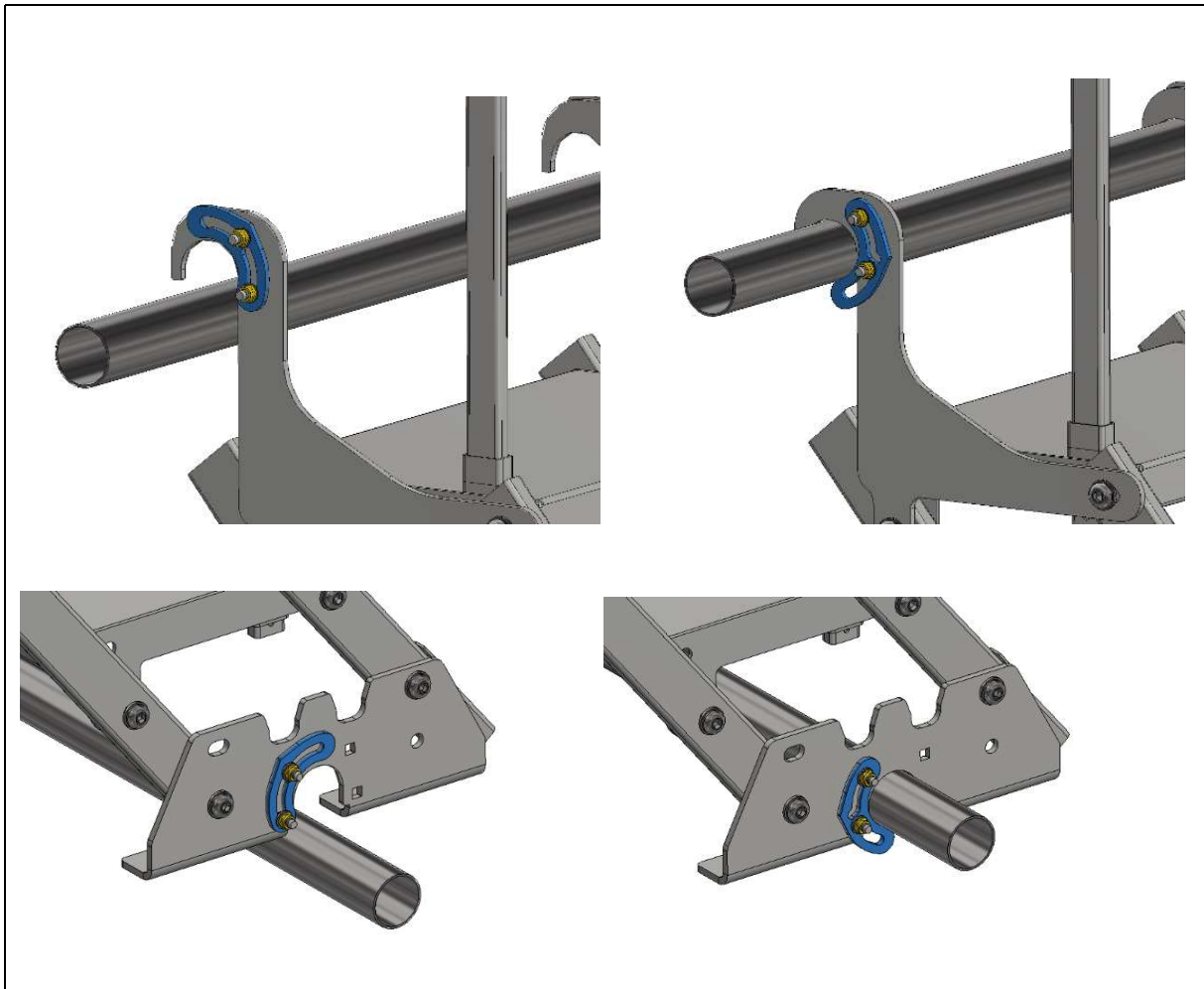
4.5.3. Depending on the need, standard TAS stair treads can be replaced with application-specific treads:

- TAS-L26 allow the staircase to be lowered relative to the top mounting edge, providing an additional step.
- TAS-L14, TAS-L15, TAS-L16, TAS-L17 is a set of feet allowing the staircase to be mounted on a scaffolding tube with a diameter of 48 mm.
- TAS-SGLH, TAS-SGPH, TAS-SDLH, TAS-SDPH is a set for mounting on flat hard surfaces such as concrete, steel plates, wood.

The footings are assembled by dismantling the standard footings according to section 4.5.2 and then screwing them on using the same fasteners.

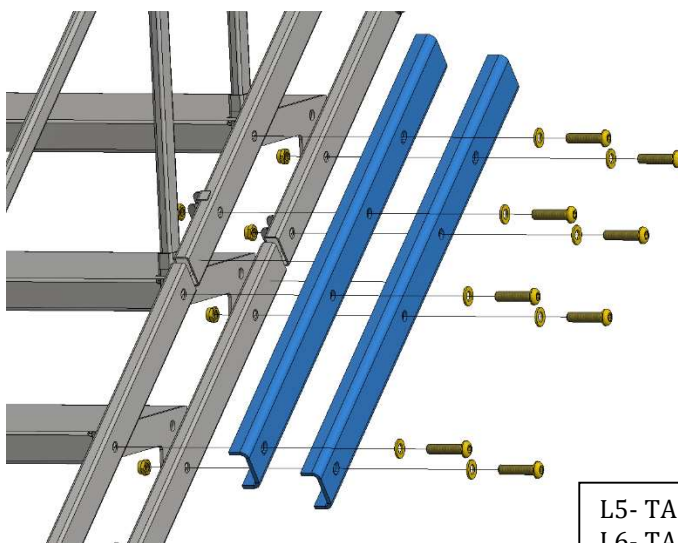


Handles TAS-L14, TAS-L15, TAS-L16, TAS-L17 are equipped with ratchets to secure the feet against unintentional removal.



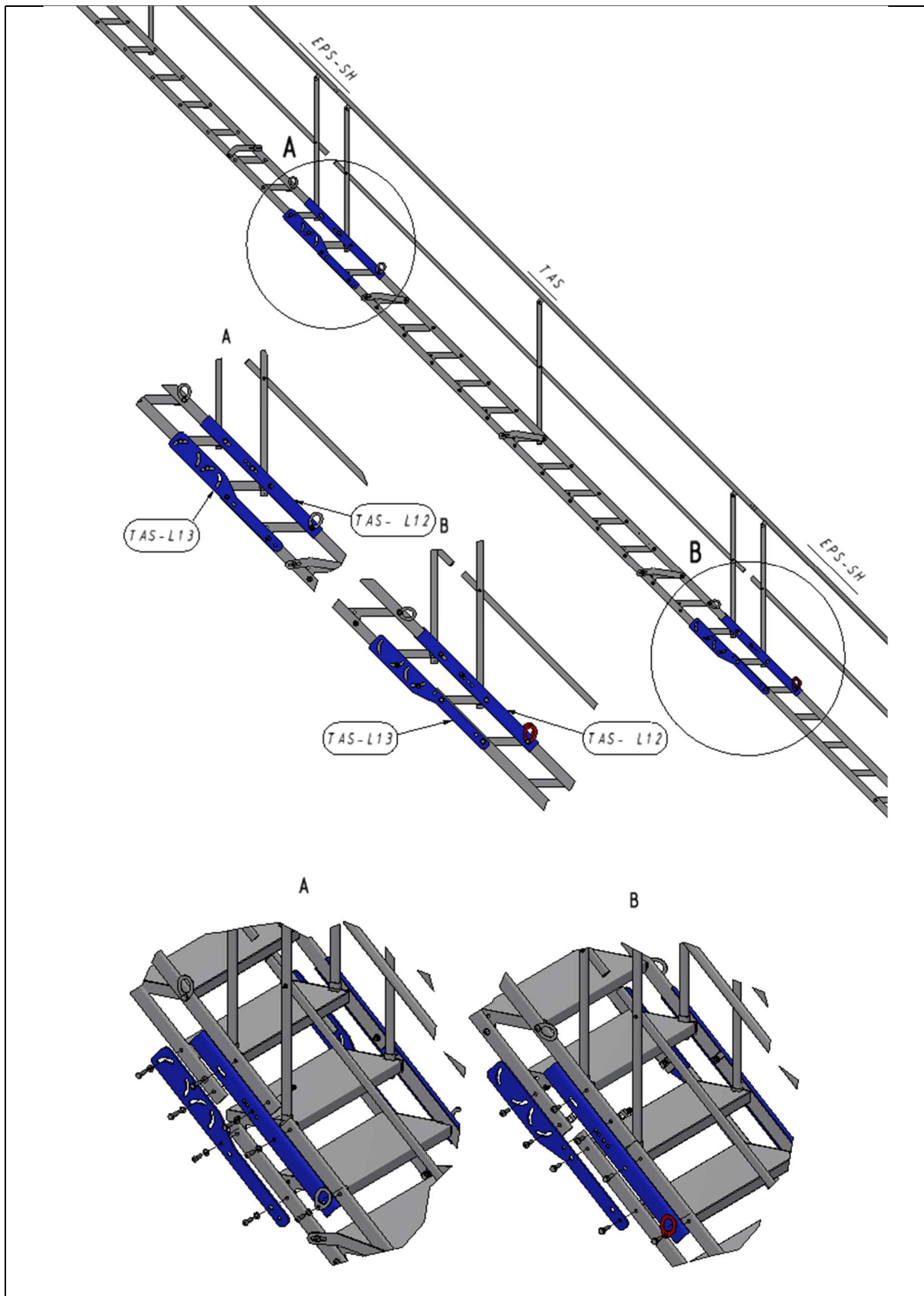
4.5.4. Mounting connector L5/L6 - fold the stairs with the ends without feet towards each other. Unscrew the bolts securing the steps located in the fastener range.

Place 4 L5/L6 fasteners on the stringers, then tighten all bolt connections (items 3,4,5) - 16 pcs.



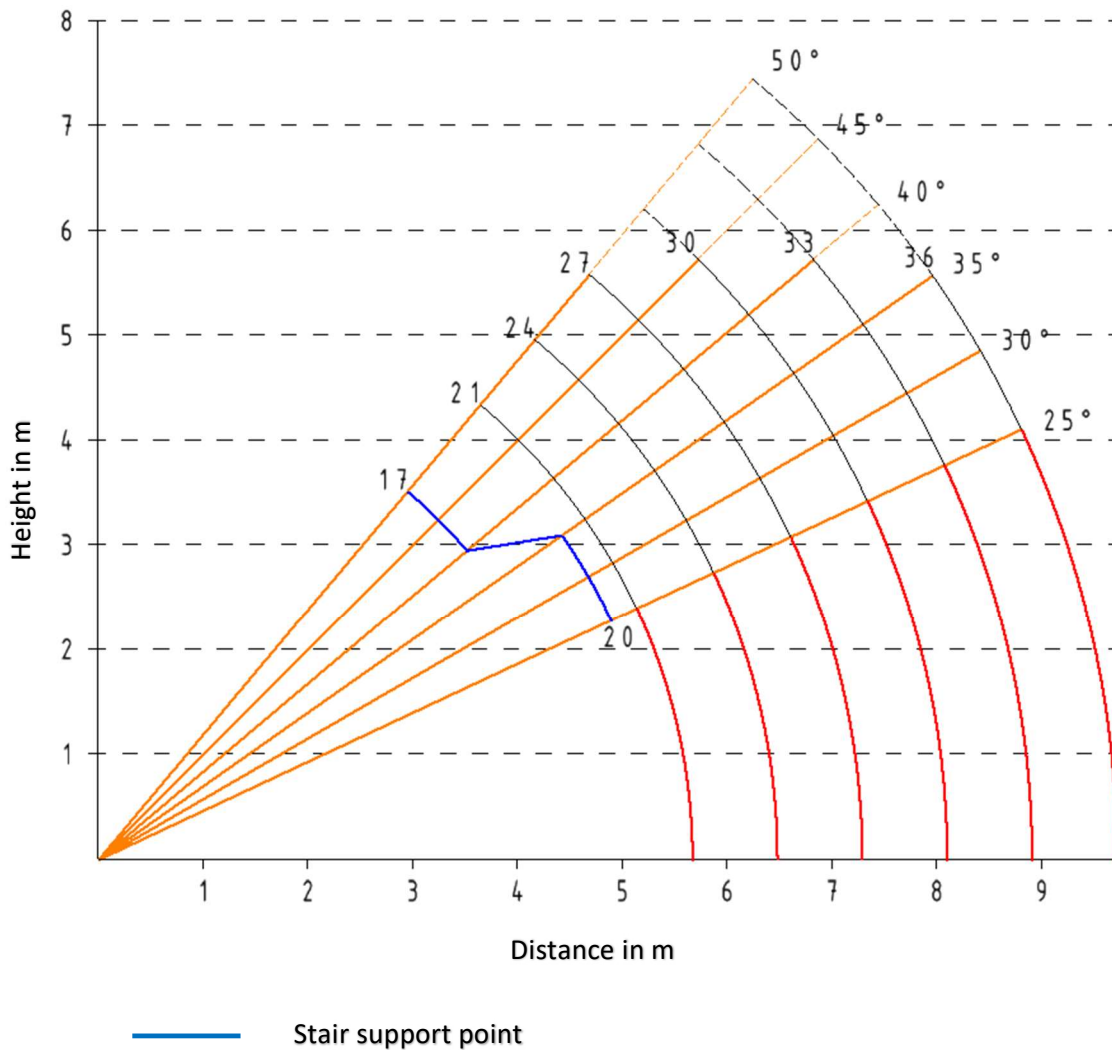
L5- TAS A (Width 700mm)
L6- TAS B (Width 1000mm)

4.5.5. Combining the old EPS-SH staircase with the newer TAS staircase



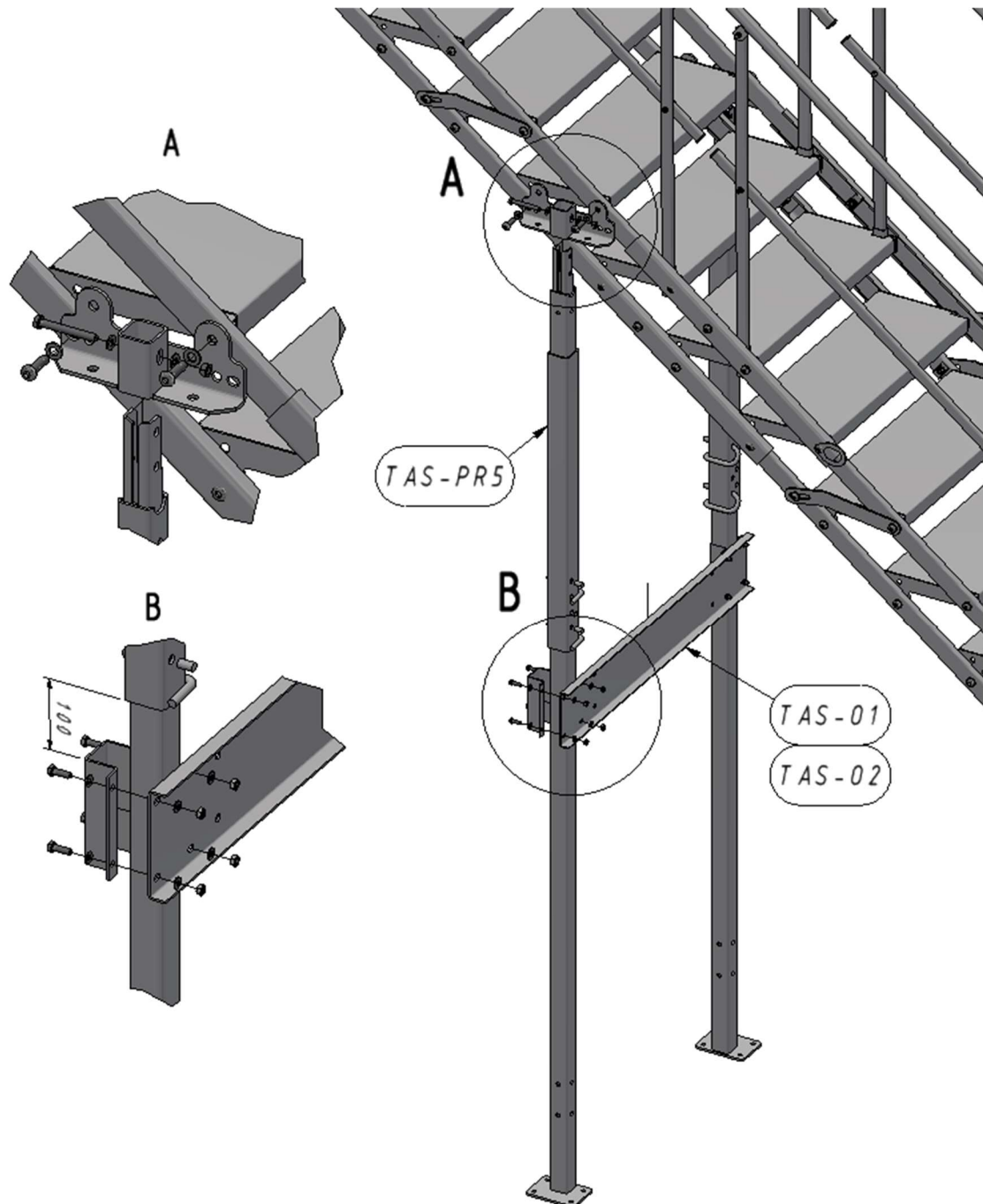
4.6. When combining 15 and 18 step stairs, it is necessary to support the entire combined flight. The support columns should be bolted to a stable concrete base. Using one

support in the middle, it is permissible to combine a maximum of two 18 + 18 steps in this case the support should be installed under the twentieth step. When combining two staircases with less than 18 steps. The support should be mounted under the seventeenth step.

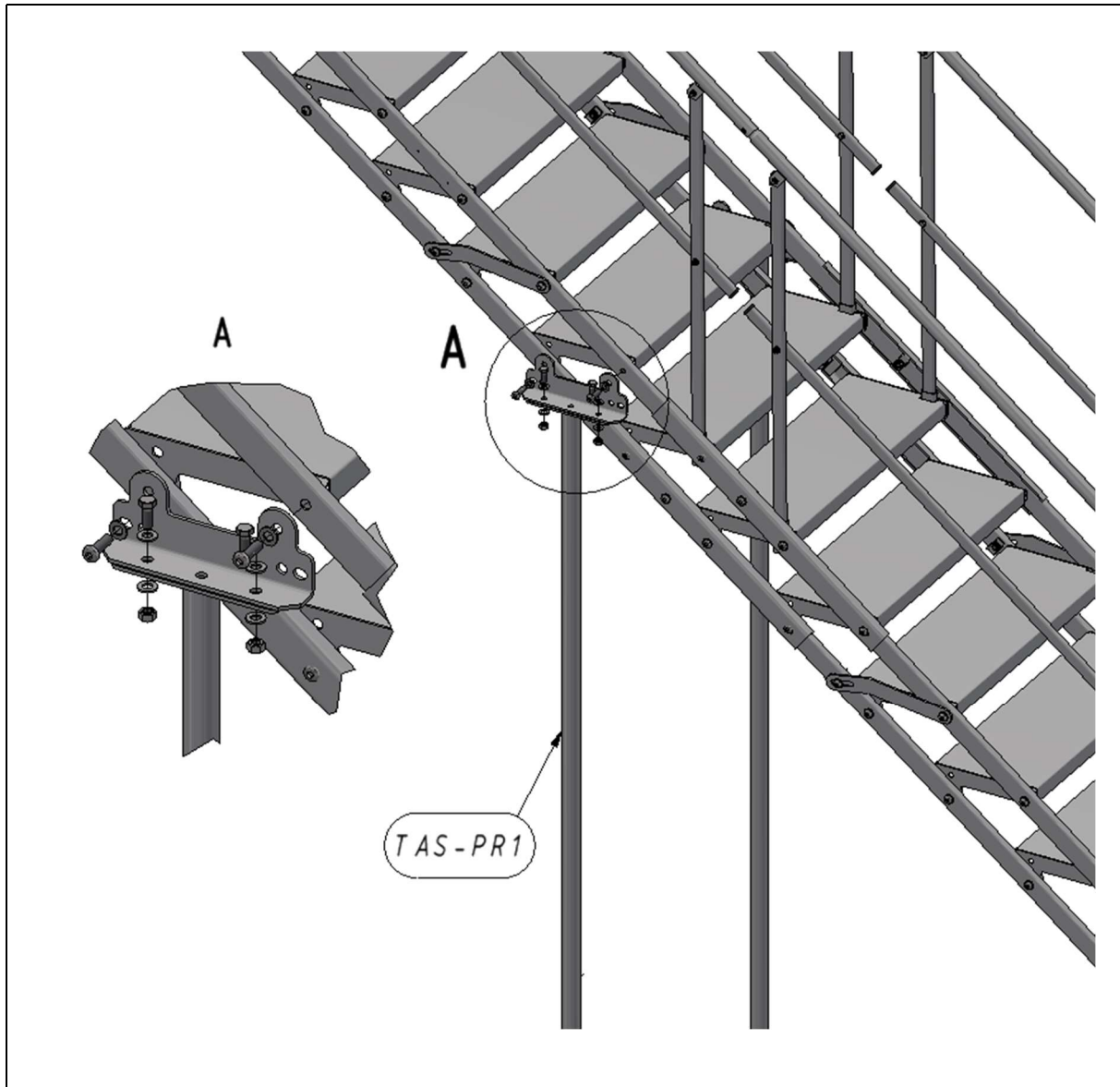


4.6.1 Mounting of the TAS-PR5 support- Mount the support by bolting the support console using the step bolts. Once the supports are in place, bolt the column bracing TAS-O1 for

TAS A 700mm stairs or TAS-O2 for TAS B 1000mm stairs. The PR5 support is used when the total number of steps exceeds 22.



4.6.2. Mounting of the TAS-PR1 support- Mount the support by bolting the support console using the step bolts. The PR1 support can be used when the total number of steps in the flight does not exceed 22 degrees.

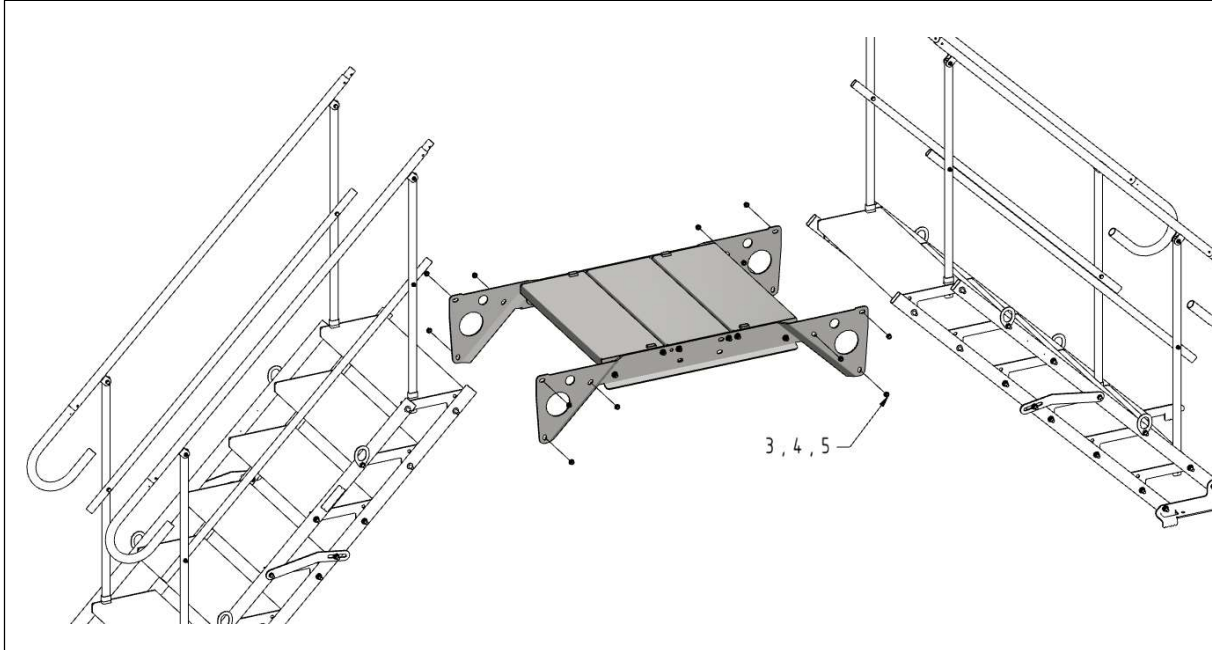


4.8. Installation of the footbridge

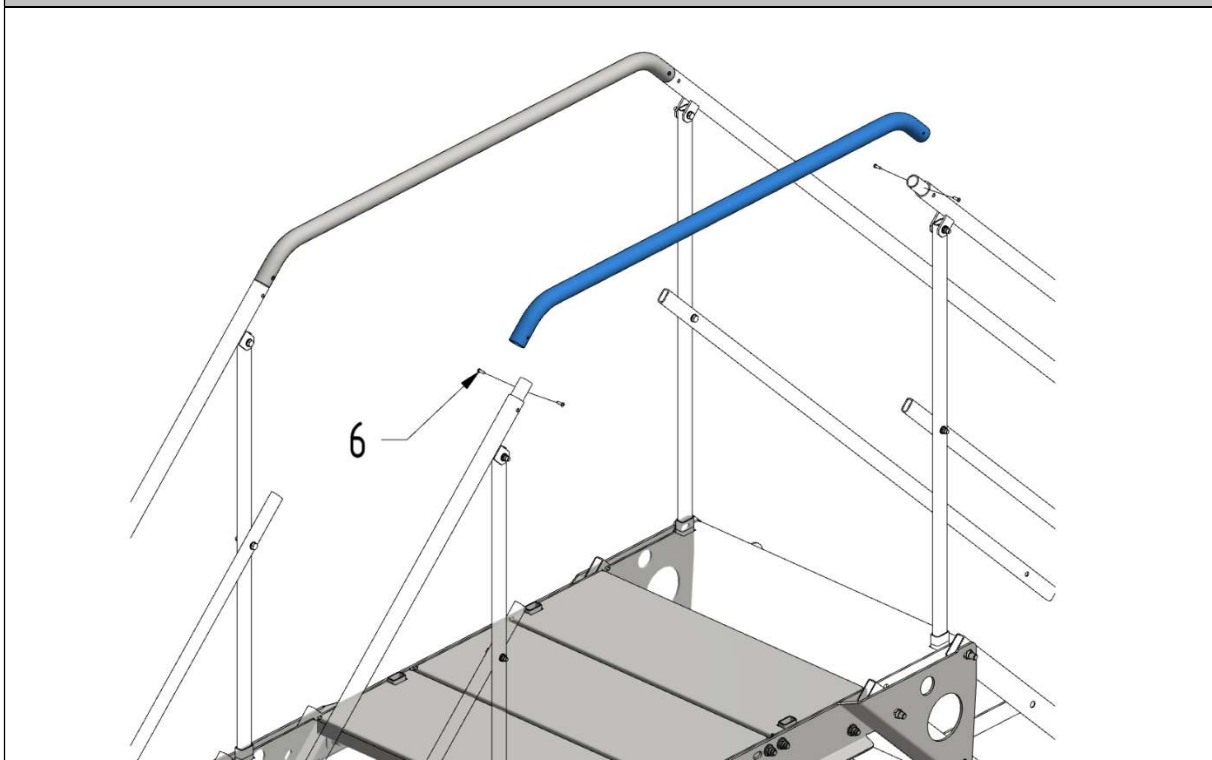
4.7.1. The dismantling of elements from the staircase should:

1. Remove top feet see section 4.5.2

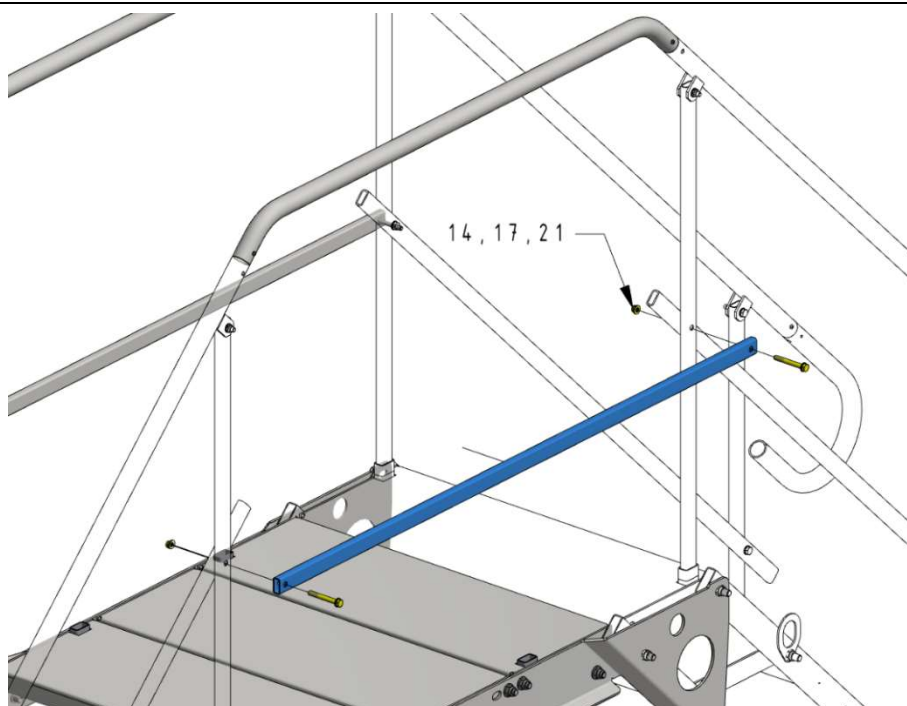
2. Remove the upper handrail ends see section 4.5.1



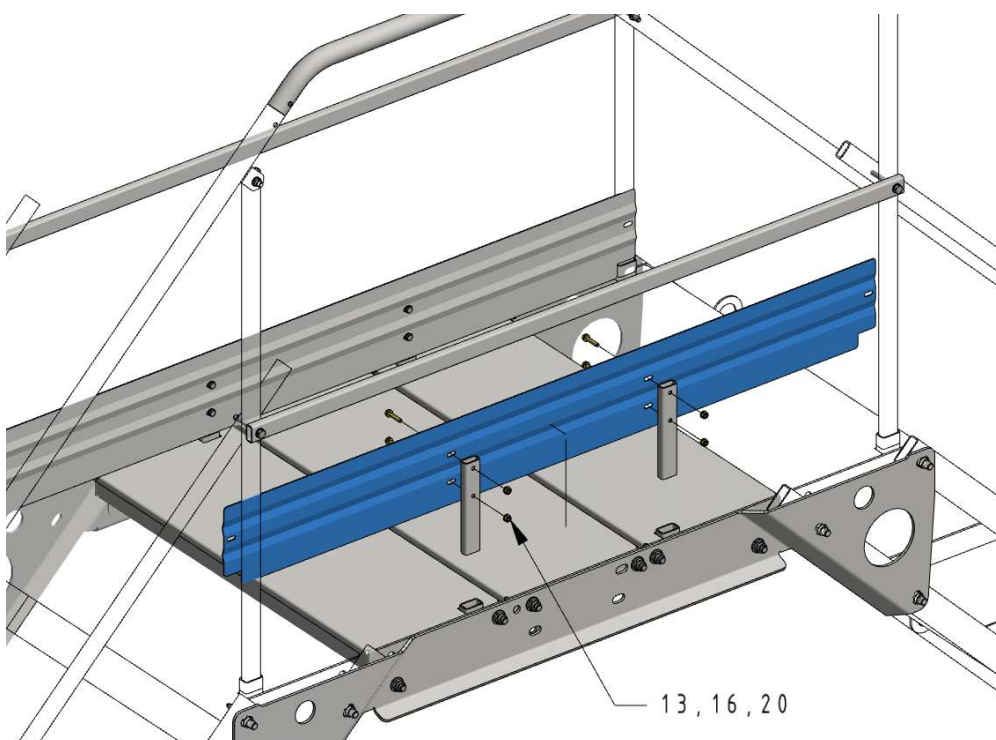
4.7.2. Installation of the handrail - Slide the handrail onto the handrail ends and screw in place with screws.



4.7.3. Assembly of the crossbar - The crossbar is screwed to the stair posts

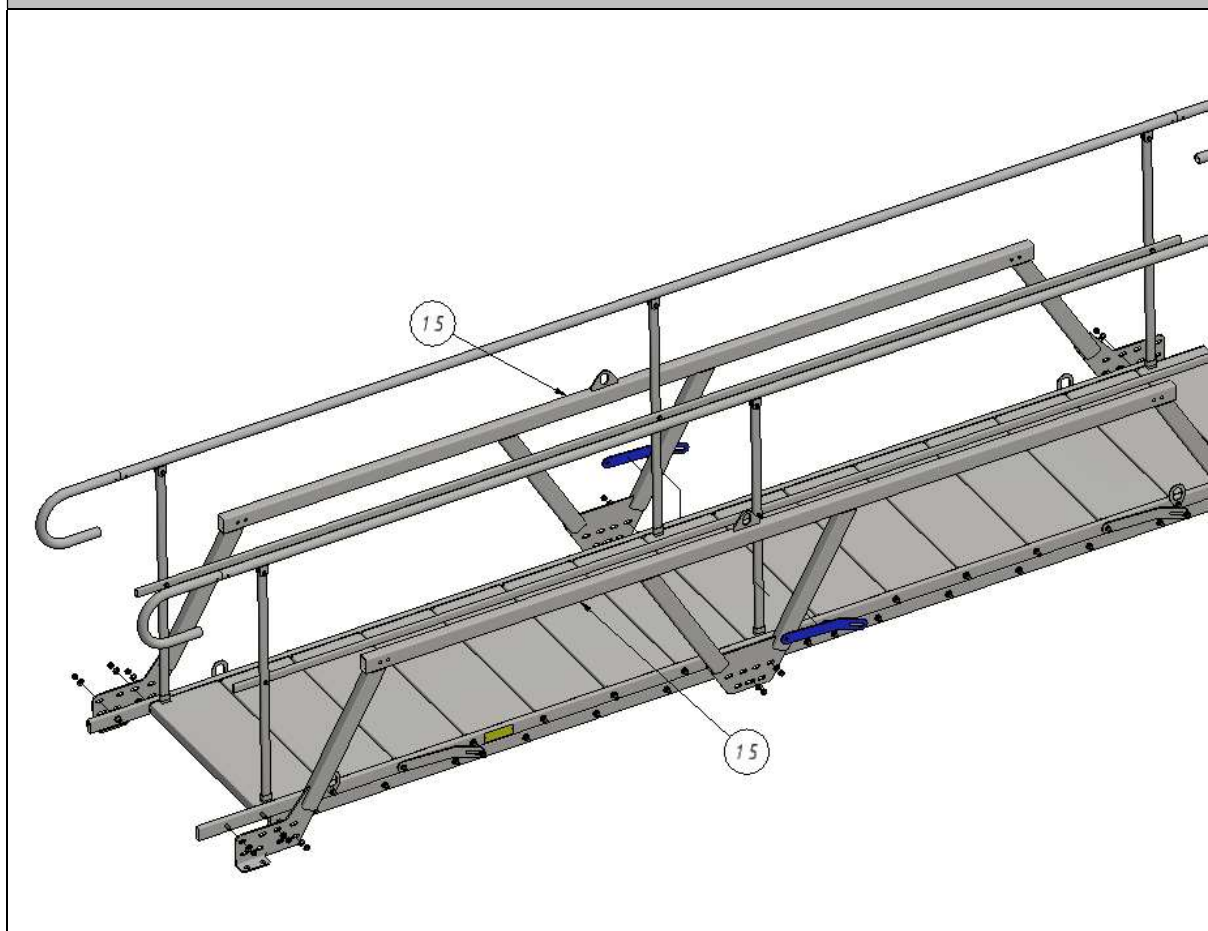


4.7.4. Assembling the toeboard - The toeboards should be screwed to the D-TAS-063 and inserted into the holes in the footbridge

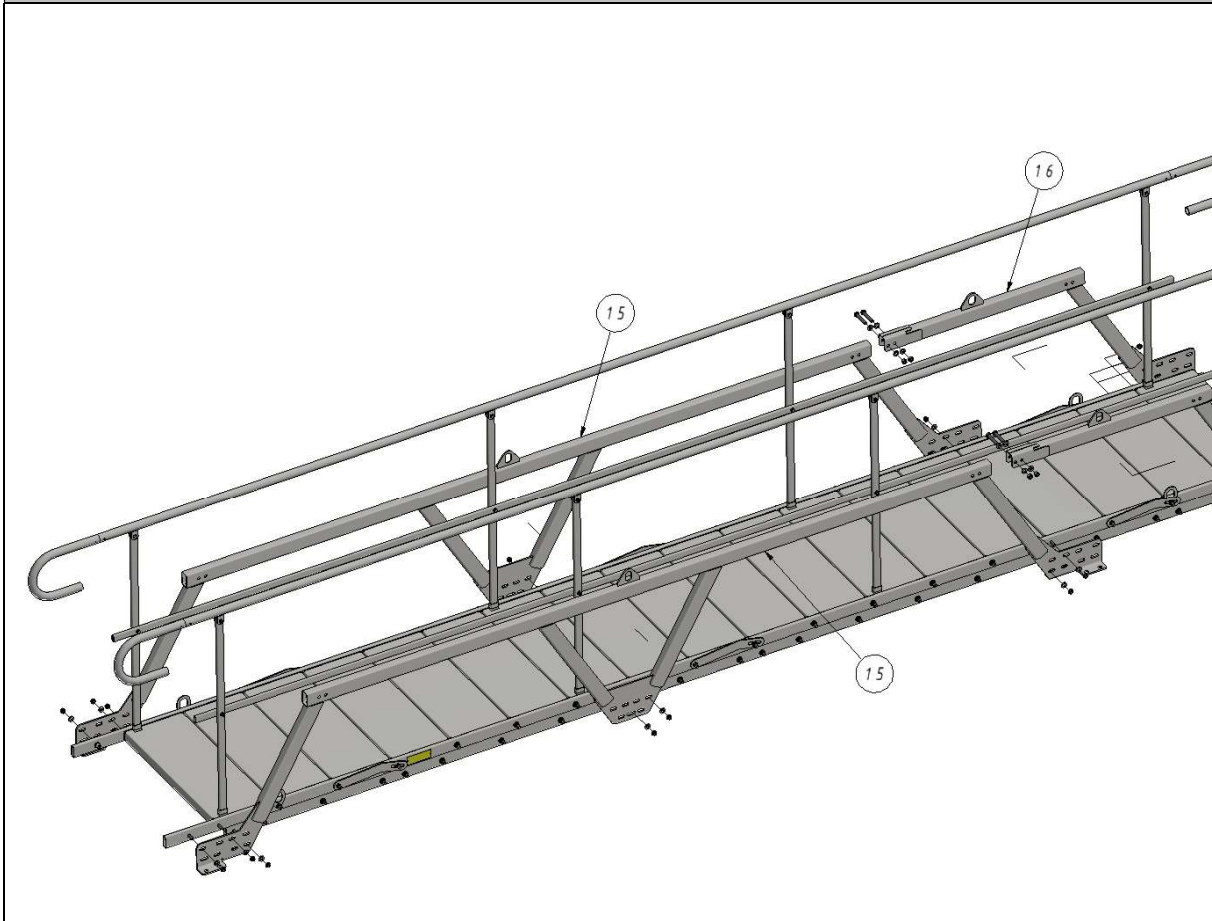


4.8. Assembly of the truss

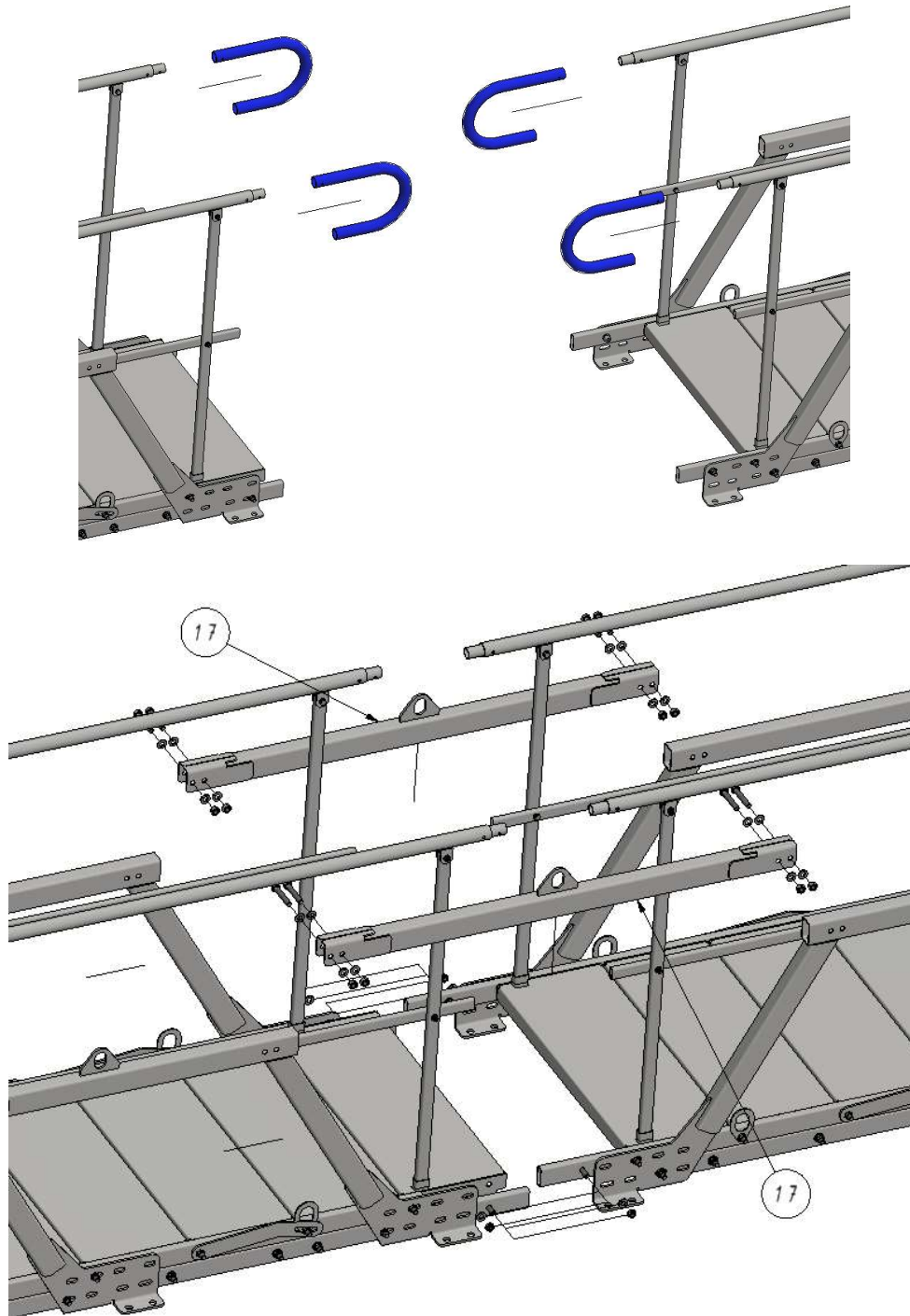
4.8.1. When installing the TAS-WB1 truss to a staircase with 15 steps, the central connectors TAS-L4 must be removed. The truss is bolted together with bolts for mounting the steps.



4.8.2. When fitting the truss to a staircase with 18 steps, the TAS-L4 connectors do not need to be removed. The TAS-WB1 truss is screwed with the bolts used for mounting the steps, the TAS-WB2 element is screwed to the TAS-WB1 element using the connectors included in the TAS-WB1 element set.



4.8.3. When connecting two staircases with a truss, they should be bolted together at the base using the connectors used to assemble the steps and fastened together at the top with the TAS-WB3 beam using the connectors included in the TAS-WB3 beam set. The ends of the railings must be removed before joining the stairs. The fastener sets used to connect the truss elements to the stairs should be tightened using 60% of the torque shown in Tab. 5.



4.9.2 Installation of supplementary railing. Unscrew the nuts, slide on the railing tighten the nuts



5. Installation of stairs and footbridge

Assembly should take place on a pre-prepared substrate that is level and provides a stable support for the staircase throughout its service life. Due to the temporary use of the staircase, assembly on reinforced concrete slabs, concrete blocks or wooden blocks is permitted. If timber blocks and blocks are used, it is a prerequisite that they are set into a hardened gravel bed with an effective drainage system in a secure and stable manner. When installing on the ground, an effective drainage system is required. In addition, the staircase must be anchored using the holes in the base feet; if the staircase is installed on the ground, the minimum anchor length is 40 cm.

It is possible to combine stairs to create a circulation route leading to the building floors. In this case, a combination of two stairs with a maximum of no more than 24 steps and a maximum of two combined stairs in a flight is permitted. (E.G. $12+12=24$, $18+6=24$). It is necessary to support the flight halfway along its length; two PR-1 supports should be used for this purpose.

The distance from the edge of the excavation and the angle of the stairs are shown in Figure 3.

Stairs of 3, 6, 9, 12 steps can be used as a footbridge over the excavation, the minimum distance at which the footbridge must support the edge of the excavation on one side and the other side is $D = \min 500 \text{ mm}$. The 15-step and 18-step staircase can be used as a footbridge after the installation of a truss in the form of TAS-WB1 and TAS-WB2 elements. It is possible to combine 15 and 18 step staircases equipped with trusses into 15+15, 15+18, 18+18 step staircase configurations, the number of elements is shown in Tab. 5. In this case, the minimum distance at which the footbridge must butt up against the edge of the excavation on one side and the other side is $D = \min. 700\text{mm}$. In addition, the footbridge must be anchored to the ground.

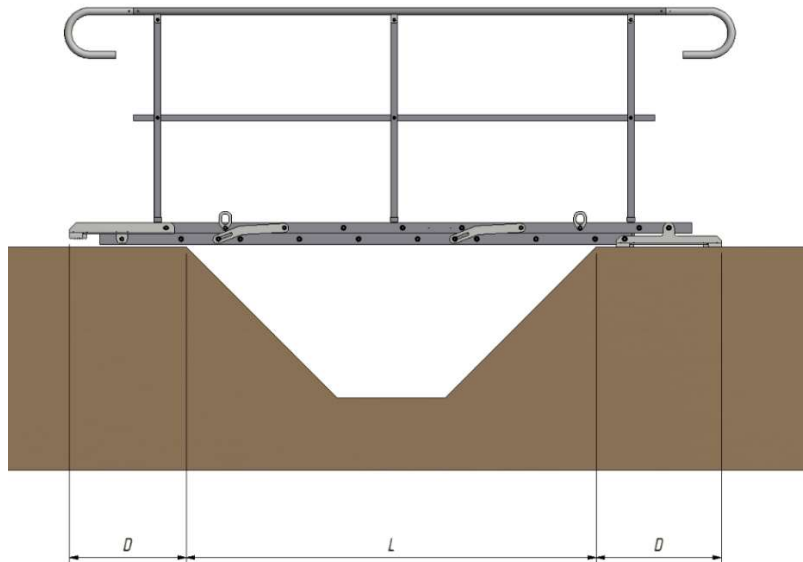


Fig. 2. Footbridge over the trench.

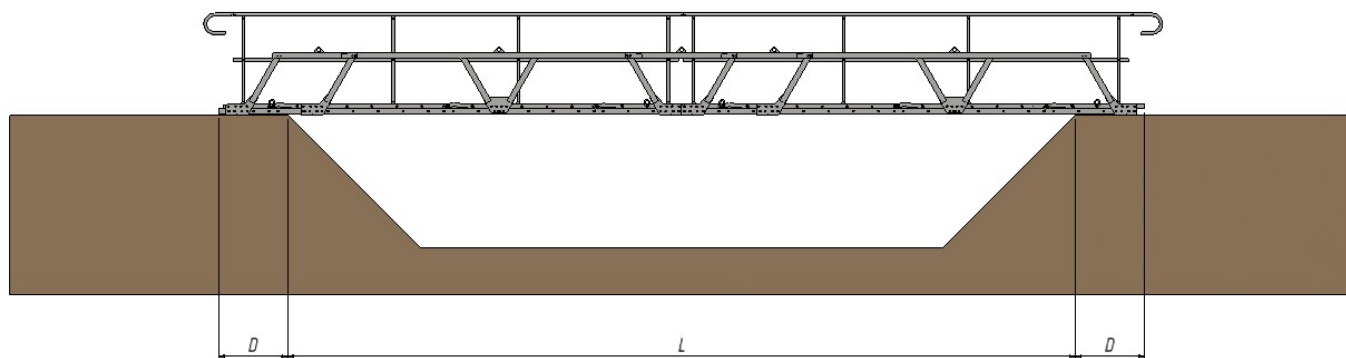


Fig. 3. Footbridge of two stairs reinforced with a truss.

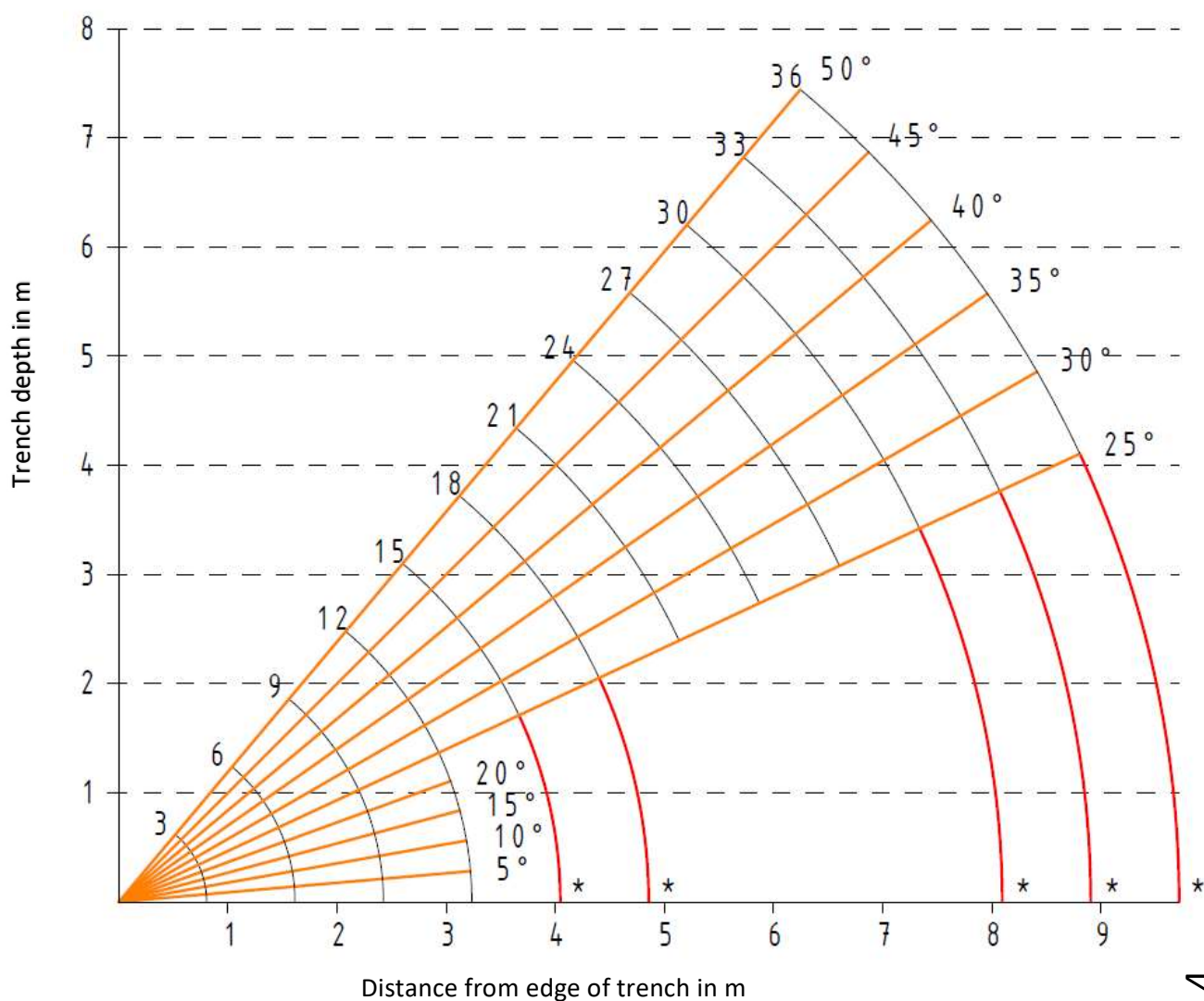


Fig. 4. Angle of inclination and distance from the edge.
* footbridge reinforced with a truss.

The stairs must be installed in the excavation with at least two skilled workers and a crane.

1. Prior to installation, the installation zone must be demarcated so that it does not interfere with ongoing construction work and does not create a hazard.
2. Determine the location of the foundation of the stairs so that they do not interfere with the construction work being carried out and do not create a hazard.
3. Prepare the location of the stairs
4. Lift the stairs using a lifting device and place in the excavation on the prepared ground
5. Rest the whole against the top edge of the trench.
6. Immobilise by anchoring and tightening the locks.

For 15- and 18-degree staircases, it is recommended to set the angle of the staircase in advance and to tighten all bolt connections to approximately 60% of the tightening torque prescribed for the respective diameter and class of connector, see Table 5.

6. Operating conditions

The basis for the proper use of the staircase is its correct positioning. This mainly concerns the proper levelling of the substrate on which the stairs will be placed. Too much deviation from the horizontal will cause all the steps to be misaligned, which can cause operational difficulties and the danger of an accident. Therefore, the staircase should be checked periodically to ensure that the substrate on which it stands has not moved, which could cause the staircase to deviate from the horizontal, and the threaded connections should also be checked to ensure that they are tight.



To ensure proper operation when using the staircase, the following steps must be taken when assembling the individual components.

- restrain the lower part of the staircase to prevent sliding and rising
- restrain the top of the staircase by ensuring that it is supported by a stable edge in the form of a concrete block or wooden block.
- Tighten the lock



Adjustment and setting activities also include checking and possibly tightening bolt connections.

7. Dismantling

Before dismantling, a safety zone must be defined. Removal of the footbridge involves pulling it down from above the excavation using a lifting device after first ensuring that it is not restrained to either edge of the excavation. The dismantling of the staircase must be carried out in the reverse order to the installation. The operation should be carried out by at least two qualified personnel.

8. Disposal

Store, manage or dispose of packaging and used equipment in accordance with the current recommendations and requirements set out in the Waste Act of 27.04.2001 (J.L. 2001 No. 62 item 628) as amended.