ALFIX
SECURELY SCAFFOLDED

NATIONAL TECHNICAL APPROVAL

ALFIX MODUL MULTI

Deutsches Institut für Bautechnik DIBt

Notification

on extending the period of validity of national technical approval as of 13 October 2011

Approval Body for Construction Products & Types of Construction
Bautechnisches Prüfamt (Structural Engineering Testing Body)
A public agency managed jointly by the Federal and Länder (State) Governments
Member of the EOTA, UEAtc and WFTAO

Date: 29 September 2016 | **Reference number:** 33-1.8.22-34/16

Approval number:

Z-8.22-906

Period of validity

from: **13 October 2016**
to: **14 October 2021**

Applicant:

Alfix GmbH
Langhennersdorfer Straße 15
D-09603 Großschirma
Germany

Subject to be approved:
Modular Scaffolding System "ALFIX MODUL MULTI"

This notification shall extend the period of validity of national technical approval no. Z-8.22-906 of 13 October 2011, amended by notification as of 4 March 2016. This notification consists of one page. It shall only be valid in connection with the above mentioned national technical approval and shall only be used in conjunction with it.

Andreas Schult
Head of division

Certified: [signed]
[Seal: Deutsches Institut für Bautechnik]

DIBt

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and of the European Union of Agrément (UEAtc) and the World Federation of
Technical Assessment Organisations

National Technical Approval

Date:	Reference number:
13 October 2011	33-1.8.22-24/11

Approval number:

Z-8.22-906

Period of validity

from: 13 October 2011
to: 13 October 2016

Applicant:

ASB Produktions GmbH
Langhennersdorfer Straße 15
D-09603 Großschirma
Germany

Subject to be approved:
"ALFIX MODUL plus II" Modular System

Translation of German Original not reviewed by Deutsches Institut für Bautechnik

The above mentioned subject is hereby granted national technical approval. This national technical approval includes 24 pages as well as Annex A (pages 1 to 2), Annex B (pages 1 to 115), Annex C (pages 1 to 7) and Annex D (pages 1 to 7).
This national technical approval replaces national technical approval no. Z-8.22-906 of 6 November 2008. On 21 January 2006, the above mentioned subject was granted national technical approval for the first time.

I GENERAL PROVISIONS

1 The national technical approval shall serve as the verification of the usability or applicability of the subject to be approved as defined by the Buildings Regulations of the Land[1].

2 Provided that within the national technical approval particular demands are placed on the expertise and experience of people involved in the manufacturing of construction products and system according to the respective regulations of the Land pursuant to Section 17 sub-section 5 Model Building Code[2], it must be observed that said expertise and experience can also be verified through equal evidences of other Member States of the European Union. This shall also apply to equal evidences provided within the framework of the Agreement on the European Economic Area (EEA)[3] or other bilateral agreements, if applicable.

3 The national technical approval shall not replace the statutory approvals, permits and certificates required for executing building projects.

4 The national technical approval shall be granted without prejudice to any third party rights, in particular private protective property rights.

5 Manufacturer and distributor of the approval subject shall provide the users of the approval subject, without prejudice of any further extensive regulations outlined in the "Special Provisions", with copies of the national technical approval and indicate that this approval must be available at the site of use. On request, copies of the national technical approval shall be made available to the authorities involved.

6 Only complete sets of the national technical approval may be reproduced. A publication in extracts shall be subject to the consent by Deutsches Institut für Bautechnik. Any wording and drawings of advertising material shall not be contradictory to the national technical approval. Translations of such approval must be marked by "Translation of German original not reviewed by Deutsches Institut für Bautechnik".

7 The national technical approval will be granted revocably. The provisions of this approval may be amended or changed subsequently, especially if new technological findings require this.

[1] Landesbauordnungen
[2] Musterbauordnung
[3] Abkommen über den Europäischen Wirtschaftsraum (EWR)

II SPECIAL PROVISIONS

1 Subject and Scope of Application

The subject of this national technical approval is the modular system "ALFIX MODUL plus II" for the erection of work and safety scaffoldings, supporting scaffolds as well as other temporary constructions.

The modular system consists of uprights (standards), ledgers, diagonal braces and decks as basic components and of modular components for side protection, access components and supplementary components. The uprights, ledgers and diagonal braces are interconnected by special scaffold connectors "ALFIX MODUL plus II".

This approval also governs the manufacturing of the scaffold components, provided their fabrication is not regulated by national technical approval Z-8.1-862 or the manufacturing of the components has been discontinued, i.e. approval was solely granted as to their continued use.

The scaffold connectors consist of a connecting disc welded to an upright tube and connecting heads welded to U-ledgers or tubular ledgers or flexibly attached to vertical diagonal braces. The connecting heads embrace the connecting disc and are pressed to the connecting disc by driving in a captive wedge so that the connecting heads are pressed against the upright tube. The horizontal diagonal braces are connected with the connecting disc by suspending a bolt into the same.

A maximum of eight members may be connected to each connecting disc.

For stability proof of work and safety scaffolds the DIN 12811-1:2004-03 requirements shall apply in connection with the “Application guideline for work scaffoldings according to DIN EN 12811-1"[1], and for stability proof of supporting scaffolds the DIN 12812:2008-12 requirements shall apply in connection with the “Application guideline for supporting scaffolds according to DIN EN 12812”[2]. The connector load and stiffness to be used for the stability proof are given in this general national technical approval.

For applications of scaffold components in façade scaffoldings, standard designs are described for which stability proof has been provided. Deviating designs require separate proof. The standard designs are applicable for façade scaffoldings with erection heights of up to 24 m above ground plus base jack extension length. The scaffolding system can be utilized in the standard designs with a system width of b = 0.73 m and with bay widths of $\ell \leq 3.07$ m for work scaffoldings belonging to the load classes ≤ 3, with a system width of b = 1.09 m and with bay widths of $\ell \leq 2.57$ m for work scaffoldings belonging to the load classes ≤ 4 in accordance with DIN EN 12811-1:2004-03, and as safety and roof safety scaffolding in accordance with DIN 4420-1:2004-03.

2 Scaffold Component Requirements

2.1 Features

2.1.1 General

The components as per Tables 1 and 2 shall comply with the specifications given in Annex B and with the regulations detailed in the following sections. The parts of the "ALFIX-MODUL plus II" scaffold connector as per Table 1, furthermore, shall conform to the documents lodged with the *Deutsches Institut für Bautechnik*.

[1] see DIBt-Mitteilungen, Issue 2/2006, p. 66 cf.

[2] see "Application Guideline for Supporting Scaffolds according to DIN EN 12812:2009-08", published in DIBt-Mitteilungen, Issue 6/2009, pages 227-230

Table 1: Individual parts of the "ALFIX-MODUL plus II" scaffold connector

Part	Annex B, page	Regulations for manufacture and the proof of conformity
Connecting disc	2	Sections 2.1 to 2.3
Wedge	3	
Connecting head for tube ledgers	4	
Connecting head for U-ledgers	5	
Connecting head for vertical diagonal brace	6	
Connecting head for horizontal diagonal brace	7	

Table 2: Scaffold components for the utilization in the "ALFIX-MODUL plus II" modular system

Designation	Annex B, page	Regulations for manufacture and the proof of conformity
Vertical diagonal braces	8	Sections 2.1 to 2.3
Horizontal diagonal braces	9	
Vertical starter piece	10	
Vertical upright with spigot fitting 200	11	
Vertical upright with detachable spigot fitting 520	12	
Tube ledger	13	
Tube ledger, reinforced	14	
U-transom 0.73 m	15	
U-transom reinforced 1.09 m, 1.40 m	16	
Aluminium frame platform RE 1.57 m, 2.07 m	17	
Aluminium frame platform RE 2.57 m, 3.07 m	18	
Aluminium frame platform with access hatch RE 2.57 m	20	
Aluminium frame platform with access hatch RE 3.07 m	21	
Steel plank AF RE 0.32 m	23	
Steel plank AF RE 0.30 m; 0.34 m	24	
Intermediate deck AF RE 0.16 m; 0.19 m	25	
Steel plank RE	26	for use only
Intermediate deck RE	27	Sections 2.1 to 2.3
Modular safety net	28	
Wedge head coupler, turnable	29	
Modular deck retainer	30	
Modular gap cover	31	
Modular gap cover RE	32	
Modular lattice girder 6.14 m	33	
Modular lattice girder 4.14 m / 5.14 m	34	
Modular lattice girder with spigot fitting 6.14 m	35	
Modular lattice girder with spigot fitting 4.14 m / 5.14 m	36	
Modular spigot fitting U	37	

Table 2: (continued)

Designation	Annex B, page	Regulations for manufacture and the proof of conformity
U-transom GT 0.73 m / 1.09 m V	38	
Tube transom GT 0.73 m / 1.09 m V	39	
Modular spigot fitting	40	
Base jack, swivelling	41	
Head spindle U	42	
Locking device for base jack	43	
Intermediate deck ledger RE – M	44	
Intermediate deck ledger RE – R	45	
Decking and planking ledger RE	46	
Intermediate deck ledger – M	47	
Intermediate deck ledger – R	48	
Decking and planking ledger	49	
Wedge head coupler, fixed	50	
Modular safety door	51	
U-bridging ledger 1.57 m	52	
U-bridging ledger 2.07 m	53	
U-bridging ledger 2.57 m	54	
U-bridging ledger 3.07 m	55	
Double tube ledger 1.57 m	56	Sections 2.1 to 2.3
Double tube ledger 2.07 m	57	
Double tube ledger 2.57 m	58	
Double tube ledger 3.07 m	59	
Aluminium frame platform with plywood 1.57 m; 2.07m	60	
Aluminium frame platform with plywood 2.57 m; 3.07m	61	
Aluminium frame platform with access hatch 2.57 m	63	
Aluminium frame platform with access hatch 3.07 m	64	
Modular toeboard 4.14 m	66	
Modular toeboard	67	
Bracket 0.39 m RE	68	
Modular bracket 0.39 m	69	
Modular bracket 0.73 m	70	
Spindle coupler	71	
Horizontal ledger	72	
Bracket ledger	73	
Bracket RE 0.50 m	74	
Suspended scaffold connector	75	

Table 2: (continued)

Designation	Annex B, page	Regulations for manufacture and the proof of conformity
Modular aluminium toeboard	76	Sections 2.1 to 2.3
Starting vertical upright	77	
Surface scaffolding upright	78	
Vertical upright 0.50 m with detachable spigot fitting 500	79	
Modular double-end guardrail	80	
Scaffold retainer	81	according to Z-8.1-862
Quick release anchor	82	
Base jack	83	
Steel plank AF 0.32 m	84	
Steel deck	85	for use only
Steel plank AF 0.30 m; 0.34 m	86	according to Z-8.1-862
Intermediate deck AF 0.16 m; 0.19 m	87	
Intermediate deck	88	
Aluminium deck with plywood 2.57 m; 3.07 m	89	for use only
Aluminium deck with plywood 1.57 m; 2.07 m	90	
Aluminium hatch-type access deck 3.07 m with ladder	92	
Aluminium hatch-type access deck 2.57 m with ladder	93	
Integrated ladder	95	according to Z-8.1-862
Aluminium deck with plywood 3.07 m	96	for use only
Aluminium deck with plywood 1.57 m, 2.07 m, 2.57 m	97	
Aluminium hatch-type access deck 3.07 m with ladder	99	
Aluminium hatch-type access deck 2.57 m with ladder	100	
Toeboard, end toeboard	102	according to Z-8.1-862
Aluminium toeboard, aluminium end toeboard	103	
Wooden toeboard 4.14 m	104	
Gap cover	105	
Transom	106	
Guardrail coupler AF	107	
Toeboard coupler, halfcoupler with hook	108	
Coupler for square-shaped timber	109	
Toeboard holder	110	
Locking clip	111	
Claw coupler, tilting pin lock coupler	112	
Diagonal cross brace	113	
Advancing guardrail post 2.00 m	114	
Telescopic guardrail 2.0 – 3.0 m	115	

2.1.2 Materials

2.1.2.1 Metals

Materials shall comply with the technical rules as per Table 3; their characteristics are to be confirmed by inspection and test certificates complying with the data specified in Table 3.

2.1.2.2 Solid wood

Solid wood shall correspond at least to sorting class S 10 according to DIN 4074-1:2003-06.

2.1.2.3 Structural veneer plywood

Structural veneer plywood BFU 100 G in accordance with national technical approval Z-9.1-430 shall be used.

2.1.3 Corrosion protection

The regulations according to DIN 18800-7:2009-11 shall apply.

Table 3: Technical regulations and inspection and test certificates for metallic materials of parts and scaffold components

Material	Material number/ Numeric designation	ID number	Technical regulation	Inspection certificate according to DIN EN 10204: 2005-01
Structural steel	1.0038	S235JR	DIN EN 10025-2: 2005-04	2.2
	1.0577	S355J2		3.1
	1.0039	S235JRH*)	DIN EN 10219-1: 2006-07	2.2*)
	1.0576	S355J2H		3.1
	1.0976	S355MC	DIN EN 10149-2: 1995-11	
	1.0986	S550MC		
Hot-rolled strip and sheet metal	1.0332	DD11**)	DIN EN 10111	3.1
Cast steel	1.6220	G20Mn5	DIN EN 10293: 2005-06	3.1
Aluminium alloys	EN AW-6060 T66	EN AW-AlMgSi	DIN EN 755-2: 2008-06	
	EN AW-6063 T66	EN AW-AlMg0,7Si		
	EN AW-5083 H224	EN AW-AlMg4,5Mn0,7	DIN EN 1386: 2008-05	

*) The extended yield point of $R_{eH} \geq 320$ N/mm² required for some scaffold components – relevant components are marked correspondingly in the drawings in Annex B – is to be achieved by strain hardening in the production process, in which the elongation after fracture shall not fall below the minimum requirements for steel S355JOH according to DIN EN 10019-2: 2006-11. The values of the yield point and the elongation after fracture are to be certified by an approval inspection certificate 3.1 according to DIN EN 10204:2005-01.

**) R_{eH} and R_m according to the drawings in Annex B

2.2 Manufacturing and Marking

2.2.1 Manufacturing

Manufacturers of welded scaffold-connector components based on this approval must have verified that they are qualified for that job.

This proof shall be considered furnished if the welder is in possession of a Class C certificate as a minimum (basic aptitude certification with extension for the fabrication of welded connections with steel castings and components of elevated yield point) as per DIN 18800–7:2008-11 in accordance with the requirements for the fabrication of welded connections as set out by this approval.

For aluminium components, this proof shall be considered furnished if the welder is in possession of a Class B Certificate as per DIN V 4113-3:2003-11 in accordance with the requirements for the fabrication of welded connections as set out by this approval.

2.2.2 Marking

The delivery notes for the scaffold components whose fabrication is regulated by this national technical approval shall be marked in accordance with the regulations for conformity marking in the Länder.

Moreover, scaffold components shall be marked noticeably and permanently with

- the capital letter "Ü",
- the shortened approval number "906", as a minimum
- the symbol of the manufacturer concerned, and
- the last two digits of the year of manufacture.

For such marking the prerequisites according to Paragraph 2.3 must be fulfilled.

2.3 Proof of Conformity

2.3.1 General

The proof of conformity of the scaffold-connector parts as per Table 1 and of the scaffold components as per Table 2, the fabrication of which is governed by this national technical approval with the regulations set out in this national technical approval, is to be furnished for each production site by means of a conformity certificate. This shall be based on intra-plant production inspections and regular third-party monitoring including a product test of parts and scaffold components in conformity with the following provisions.

For the granting of a conformity certificate and third-party monitoring including the associated product test, the manufacturer of the scaffold connectors has to involve a recognized certification body as well as an inspection agency recognized for this purpose.

The declaration that a conformity certificate has been granted must be made by the manufacturer by marking the construction products with the mark of conformity (Ü mark) referring to the intended use.

Deutsches Institut für Bautechnik shall be provided by the certification body with a copy of the certificate of conformity granted by the latter.

2.3.2 Intra-plant production inspection

At each production site a production inspection system shall be established and implemented. Intra-plant production inspection is to be understood as a constant monitoring of production by the manufacturer through which he must ensure that the individual parts and scaffolding components manufactured by him are in conformity with the provisions of this national technical approval.

The intra-plant production inspection shall include the following measures as a minimum:

Scaffolding connector:

- Checking and inspection of the elements as per Table 1:
  - It has to be checked whether test certificates as per Section 2.1.2.1 are available for the materials and the certified test results meet the requirements.
  - 10 elements of each lot, but a minimum of 1 part out of each 10,000 connector parts, shall be checked for observance of major dimensions and angles as specified in the documents lodged with the *Deutsches Institut für Bautechnik*. The actual sizes shall be documented.
  - The connecting heads of cast steel shall be checked to be free of cracks.
- Inspections to be executed at the scaffold connector:
  - At least 0.025 ‰ of the manufactured connecting discs shall be subjected, after connection to an upright tube, to a tensile normal force test where on one side a U-ledger and on the other side a tube ledger are provided in the big hole, until breakage takes place; the failure loads must not fall below a value of 39.6 kN. The test must be executed in conformity with the regulations set out in the "Zulassungsgrundsätze für Arbeits- und Schutzgerüste, Anforderungen, Berechnungsannahmen, Versuche, Übereinstimmungsnachweis"[1] (Policy on the approval of work and safety scaffoldings, requirements, tests, calculation conditions, proof of conformity).

Scaffold components as per Table 2:

- Checking and inspections of the basic material:
  - There shall be checks as to whether inspection certifications according to Section 2.1.2.1 are available for the materials and whether the certified inspection results comply with the requirements.
    - The conformity of dimensions and tolerances with the specifications in the drawing shall be checked for a minimum of 1‰ of the respective components.
- Checking and inspections to be executed at the scaffold components:
  - The conformity of dimensions and tolerances and, if applicable, welding seams as well as corrosion protection with the specifications in the drawings for a minimum of 1‰ of the scaffold components.
  - For scaffold components manufactured in template or automated production, the respective templates or machine settings shall be checked and documented prior to the initial operation.

The results of intra-plant inspection shall be recorded and evaluated. The documents shall contain the following information as a minimum:

- the designation of the parts and scaffold components
- the type of the check executed
- the production and inspection date of the parts and scaffold components
- the checking and inspection results and a comparison with the requirements; and
- the signature of the person responsible for the intra-plant production inspection.

The documentation must be retained for a minimum of five years and, on request, shall be made available to the *Deutsches Institut für Bautechnik* and the competent highest construction supervision authority.

[1] To be obtained from *Deutsche Institut für Bautechnik*.

In case the inspection results fail to meet the requirements, the manufacturer shall immediately take the necessary containment actions in order to remedy the defects. Non-conforming parts and scaffold components shall be handled in such a manner that confusions with conforming products are eliminated. Following the containment action, the inspection shall be repeated without delay, provided it is technically feasible and required to prove the elimination of the defects

2.3.3 Third-party monitoring

At each production site the intra-plant production inspection shall be audited by third-party monitoring at regular intervals, at least twice a year for parts as per Table 1 and every five years for scaffold components as per Table 2. The third-party monitoring shall include an inspection of both the manufacturing site and the intra-plant production control, including a product inspection of individual parts as per Table 1 and of scaffold components as per Table 2. Sample taking and tests are incumbent on the certification body concerned.

As a minimum the following inspections shall be executed:

- Inspection of the personnel and facility-related requirements for the orderly fabrication of the individual parts of the scaffold connector and scaffold components
- Inspection of the intra-plant production inspections
- Random tests regarding the conformity of the individual scaffold-connector parts and the scaffold components with the provisions of the approval concerning
  - Type of construction, design, dimensions
  - Corrosion protection
  - Marking
- Inspection of the required proof of weldability
- A minimum of 5 components of the scaffold connector shall be checked for conformity with critical dimensions as given in the drawings of the annexes and the records lodged with *Deutsches Institut für Bautechnik*, and compared with the admissible tolerances.
- With scaffold connectors, minimum 5 tensile normal force tests with U-ledgers and tube ledgers shall be executed according to the regulations in Section 2.3.2.

The individual parts, scaffold connectors and scaffold components shall be taken from running production.

The results of certification and third-party inspection shall be kept for a minimum of five years. On request, they shall be made available by the certification body and the inspection agency respectively to *Deutsches Institut für Bautechnik* or the competent higher building authority.

3 Provisions for Design and Dimensioning

3.1 General

If not otherwise determined in this notification, the layout and dimensioning of the scaffold using the modular system shall be done based on the Technical Construction Regulations *(Technische Baubestimmungen)*, especially those for work and safety scaffolds according to DIN EN 12811-1:2004-03 in connection with the "Application guideline for work scaffoldings according to DIN EN 12811-1" and the "Zulassungsgrundsätze für Arbeits- und Schutzgerüste, Anforderungen, Berechnungsannahmen, Versuche, Übereinstimmungsnachweis" (Policy on the approval of work and safety scaffoldings, requirements, calculation conditions, proof of conformity), and for supporting scaffolds the regulations according to DIN EN 12812:2008-12" in connection with the "Application guideline for supporting scaffolds according to DIN EN 12812".

The stability of scaffolds shall be evidenced for each individual case or by a static type calculation if they are not of standard design by a general technical approval according to Annex C or Annex D.

3.2 Proof of scaffold connectors

3.2.1 System assumptions

The provisions of the following sections shall be applicable for the connector connections including the connections between connecting heads and the members (ledgers and diagonal braces) listed in the Annexes.

The static systems for the calculation shall be modelled according to Annex A, page 2. The listed short members from the upright tube axis to the joints can be considered as stiff. The indexes listed in the following sections refer to a local coordinate system in which the x-axis describes the ledger axis and the z-axis describes the upright tube axis (cf. Annex A, page 2).

In the connection of a ledger, normal forces as well as bending moments and lateral forces may be transferred on the level of the upright tube/ledger and the level at a right angle to it. For the check calculation of the scaffold system it is important that the bending moment of the connection of ledger and upright tube refers to the outer edge of the upright tube.

Normally only normal forces may be transferred in the connection of a vertical diagonal brace. The vertical component in the vertical diagonal brace connection has to be taken into account with the connection eccentricities as given in Annex A, page 2. The moments resulting from the diagonal force must be absorbed by the standard and ledgers.

Normally only normal forces may be transferred in the connection of a horizontal diagonal brace.

The specifications for stiffness and stresses of the connections are applicable for the connection using the “small” and “big” hole of the connecting disc.

In all formulas of the following sections, the cutting forces N and V in kN and the bending and torsional moments M in kNcm shall be inserted.

3.2.2 Connection of ledger

3.2.2.1 Load/deformation behaviour

3.2.2.1.1 Bending at the upright tube/ledger level (vertical level)

If no jointed connection is assumed, it is necessary for the check calculation of scaffolding to take into account the ledger connections at the level formed of upright tube and ledger (vertical level) with a torsion spring clamp according to the moment/angle of rotation (M_y/φ)- relation as given in Figure 1 of Annex A, page 1.

3.2.2.1.2 Bending at the level rectangular to the upright tube/ledger level (horizontal level)

For the check calculation of scaffolding, the ledger connection must be considered, if subject to bending stress at a level rectangular to the upright tube/ledger level (horizontal level), using a torsion spring clamp in accordance with Figure 2 of Annex A, page 1.

3.2.2.1.3 Vertical lateral force rectangular to the ledger axis

For ledger lengths > 0.7 m in connection with vertical lateral forces $V_d \leq$ 10 kN, the formulation of an additional clearance in the direction of lateral force can be neglected. Otherwise, an additional clearance in the direction of lateral force of f_0 = 0.175 cm must be taken into account.

3.2.2.2 Proof of load-bearing capacity

3.2.2.2.1 General proofs

It must be proved for the ledger connection that the stresses are not higher than the resistance values as per Table 4.

Table 4: Resistance values in ledger connection

Connection stress resultant	Resistance
Bending moment $M_{y,R,d}$ [kNcm]	± 104.0
Vertical lateral force $V_{z,R,d}$ [kN]	± 35.0
Bending moment $M_{z,R,d}$ [kNcm]	± 50.0
Horizontal lateral force $V_{y,R,d}$ [kN]	± 16.0
Normal force $N_{R,d}$ [kN]	± 36.0

3.2.2.2.2 Interaction upright tube/ledger connection

In the area of loaded connecting discs the following conditions have to be fulfilled

$$0.326 \cdot I_A + I_S \leq 1$$

Where:

I_A Coefficient of utilization in ledger connection

$$I_A = \frac{M_y}{M_{y,R,d}}$$

with: M_y bending moment in ledger connection

$M_{y,R,d}$ resistance against bending moments in the ledger connection as per Table 4

I_S Vector coefficient of utilization in upright tube in the area of loaded connecting disc

- for $v_{act} \leq 1/3$ it holds:

$I_S = \frac{a}{b}$ (a, b see Fig. 1, where b is to be determined from the interaction relationship according to Fig. 1)

- For $1/3 < v_{act} \leq 0.9$ the vector coefficient of utilization must be determined considering the interaction relationship as shown by the left part of the equation, Column 4 of Table 7, DIN 4420-1:1990-12.

with:

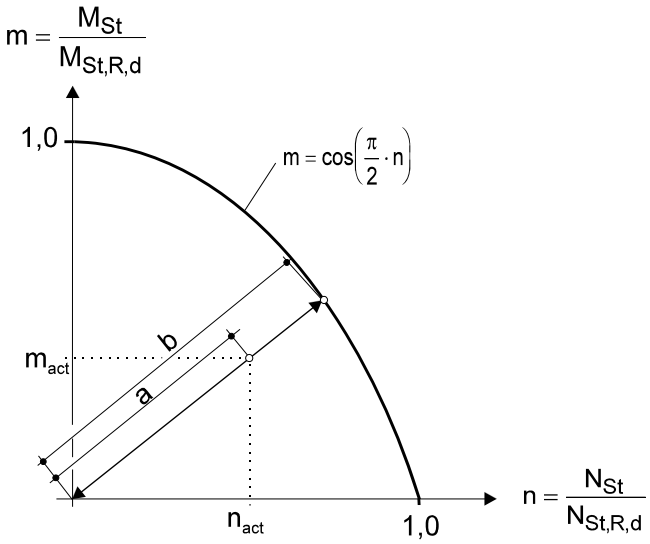
v_{act} the coefficient of utilization to lateral force in upright tube

$$v_{act} = \frac{V_{St}}{V_{St,R,d}}$$

V_{St} lateral force in upright tube

$V_{St,R,d}$ resistance against lateral force in upright tube

$V_{St,R,d} = V_{pl,d} = 48.5$ kN



where:

m_{act} Coefficient of utilization to bending moments and upright tube

M_{St} Bending moment in upright tube

$M_{St,R,d}$ Resistance against bending moments in upright tube

$M_{St,R,d} = M_{pl,d} = f_{y,d} \cdot \alpha_{pl} \cdot W_{el} = 175$ kNcm

n_{act} Coefficient of utilization to normal force in upright tube

N_{St} Normal force in upright tube

$N_{St,R,d}$ Stressability to normal force in upright tube

$N_{St,R,d} = N_{pl,d} = f_{y,d} \cdot A = 132$ kN

Fig. 1: Vector coefficient of utilization in upright tube

3.2.2.2.3 Combination of internal forces and moments

For combined internal forces and moments in a ledger connection, the following conditions must be fulfilled:

$$\frac{N^{(+)}}{N_{R,d}^{(+)}} + \frac{M_y}{M_{y,R,d}} + \frac{M_z}{M_{z,R,d}} + \frac{V_y}{V_{y,R,d}} \leq 1$$

$$\frac{N^{(+)}}{N_{R,d}^{(+)}} + \frac{V_z}{V_{z,R,d}} + \frac{M_z}{M_{z,R,d}} + \frac{V_y}{V_{y,R,d}} \leq 1$$

where:

$N^{(+)}$	tensile normal force in ledger connection
M_y, V_z, M_z, V_y	stresses in ledger connection
$N_{R,d}^{(+)}$	resistance against normal tensile force according to Table 4
$M_{y,R,d}$, $V_{z,R,d}$, $M_{z,R,d}$, $V_{y,R,d}$	resistance according to Table 4

3.2.3 Connection of vertical diagonal brace

3.2.3.1 Load/deformation behaviour

In the entire system the vertical diagonal braces including their connections have to be calculated as a function of the stress direction (tensile force or thrust) and the diagonal brace length with the equivalent stiffness ($E_d \cdot A_{eff}$) according to Table 5 and a clearance of f_0 = 0.25 cm (see Annex A, page 2).

3.2.3.2 Proof of load-bearing capacity

The following has to be proved for the vertical diagonal braces as a function of stress direction:

$$\frac{N_V}{N_{V,R,d}} \leq 1$$

Where:

N_V	tensile force or thrust in vertical diagonal braces
$N_{V,R,d}$	resistance of vertical diagonal braces to tensile force or thrust according to Table 5

3.2.4 Connection of horizontal diagonal brace

3.2.4.1 Load/deformation behaviour

In the entire system the horizontal diagonal braces including their connections have to be calculated as a function of the diagonal brace length and independent of the stress direction (tensile or thrust) with the equivalent stiffness ($E_d \cdot A_{eff}$) according to Table 6 and a clearance of f_0 = 0.12 cm.

3.2.4.2 Proof of load-bearing capacity

The following shall be proved for the horizontal diagonal braces:

$$\frac{N_H}{N_{H,R,d}} \leq 1$$

Where:

N_H	tensile force or thrust in horizontal diagonal brace
$N_{H,R,d}$	resistance of horizontal diagonal brace according to Table 6

Table 5: Characteristics of vertical diagonal braces

Bay length L [m]	Bay height H [m]	Stress by thrust		Stress by tensile force	
		$E_d \cdot A_{eff}$ [kN]	$N^{(-)}_{V,R,d}$ [kN]	$E_d \cdot A_{eff}$ [kN]	$N^{(+)}_{V,R,d}$ [kN]
3.07	2.0	1980	10.4	4630	22.8
2.57		1910	12.8	3600	
2.07		1870	15.5	2930	
1.57		1910	18.5	2300	
1.40		1950	19.6	2170	
1.29		1990	20.3	2030	
1.09		2110	21.4	1850	
0.73		1990	21.5	1670	21.5
3.07	1.5	1690	11.9	4100	21.1
2.57		1720	14.9	3700	22.1
2.07		1600	18.7	3020	22.8
1.57		1510	22.8	2210	
1.09		1630	22.8	1640	
0.73		1710	22.1	1250	22.1
3.07	1.0	1680	13.1	3590	19.9
2.57		1500	16.8	3160	20.3
2.07		1360	21.2	2730	21.2
1.57		1220	22.8	2370	22.8
1.29		1130		1800	
1.09		1090		1490	
0.73		1170		1040	
3.07	0.5	1520	14.0	3300	19.1
2.57		1350	18.4	2790	19.2
2.07		1200	19.4	2320	19.4
1.57		960	19.9	1820	19.9
1.29		810	20.5	1570	20.5
1.09		730	21.3	1380	21.3
0.73		590	22.8	930	22.8

Table 6: Characteristics of horizontal diagonal braces

Bay length L [m]	Bay width B [m]	$N_{H,R,d}$ [kN]	$E_d \cdot A_{eff}$ [kN]
0.73	0.73	3.10	2760
1.09	1.09	3.07	2970
1.57	1.57	3.03	2780
2.07	2.07	2.98	2240
2.57	2.57	2.91	1530
3.07	3.07	2.81	830
1.09	0.73	3.08	3160
1.40		3.07	3210
1.57		3.06	3200
2.07		3.03	3070
2.57		3.00	2850
3.07		2.96	2530
1.40	1.09	3.06	3210
1.57		3.05	3190
2.07		3.03	3040
2.57		2.99	2790
3.07		2.95	2460
1.40	1.57	3.04	3140
2.07		3.01	2910
2.57		2.98	2650
3.07		2.93	2330
1.40	2.07	3.02	2970
2.57		2.95	2450
3.07		2.90	2130
1.40	2.57	2.99	2900
3.07		2.86	1880
1.40	3.07	2.94	2380

3.2.5 Connecting disc

3.2.5.1 Connection in directly neighbouring holes of connecting disk

If two ledgers or one ledger and one vertical diagonal brace or one ledger and a horizontal diagonal brace are connected in directly neighbouring holes, the following must be proved:

$$\left(n^A + n^a\right)^2 + \left(v^A + v^a\right)^2 \leq 1$$

with:

n, v	interaction portions as per Table 7
A	ledger A
a	ledger a or vertical or horizontal diagonal brace

If three ledgers or vertical diagonal braces are connected in directly neighbouring holes, or two ledgers at an angle of 90°, the following must be additionally proved provided:

$v^A > 0.814$; or
$v^B > 0.814$

$$0.55\left(v^A + v^a + v^B\right) \leq 1$$

with:

v	interaction portions as per Table 8
A	ledger A
B	ledger B at an angle of 90° to A
a	ledger or vertical diagonal brace between A and B according to Figure 2

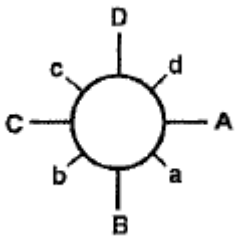


Figure 2: Occupancy of connecting disc

Table 7: Interaction portions

Interaction portion	Connection: ledger A / ledger a	Connection: ledger A / ledger B / vertical diagonal brace a	Connection: ledger A / horizontal diagonal brace a
n^A	$\frac{N^{A(+)} + \lvert M_y^A \rvert / e}{N_{R,d}}$		
n^a	$\frac{N^{a(+)} + \lvert M_y^a \rvert / e}{N_{R,d}}$	$\frac{0.707\ N_V^{(+)} \sin \alpha\ + 1.883 \cdot \lvert N_V \rvert \cos \alpha}{1.29 \cdot N_{R,d}}$	$\frac{N_H^{(+)}}{N_{R,d}}$
v^A	$\frac{V_z^A}{V_{z,R,d}}$		
v^B	$\frac{V_z^B}{V_{z,R,d}}$		
v^a	$\frac{V_z^a}{V_{z,R,d}}$	$\frac{\lvert N_V \rvert \cos \alpha}{V_{z,R,d}}$	---

Where:

$N^{A(+)}$; $N^{a(+)}$	Normal force (tensile forces to be calculated only) in ledger connection (ledger A and ledger a respectively)
M_y^A; M_y^a	Bending in ledger connection (ledger A and ledger a respectively)
V_z^A;V_z^a V_z^B	Vertical lateral force in ledger connection (ledger A, ledger B, vertical diagonal brace a)
N_V	Normal force in vertical diagonal brace
$N_V^{(+)}$	Tensile force in vertical diagonal brace
$N_H^{(+)}$	Tensile force in horizontal diagonal brace
e	Moment arm ledger connection e = 3.3 cm
$N_{R,d}$, $V_{z,R,d}$	Resistances as per Table 4

The proof shall always be furnished in pairs around the connector (node).

3.2.5.2 Connection of ledgers and/or diagonal braces at any hole of the connecting discs

$$\frac{\sum V_z}{\sum V_{z,R,d}} \leq 1$$

Where:

$\sum V_z$ the total of all vertical lateral forces acting on the connecting disc (incl. vertical components of vertical diagonal braces)

$\sum V_{z,R,d}$ the resistance of the connecting discs against vertical lateral forces $\sum V_{z,R,d} = 127.0\ kN$

3.2.6 Wedge head coupler

The wedge head coupler can only be used for the connection of "free" scaffold tubes Ø 48.3 x 3.2 mm at the upright tubes of the scaffolding system in connection with the roof edge protection wall (see e.g. Annex C, page 4)

3.3 Proof of the complete system

3.3.1 Vertical stress of decks

Proof has been furnished for the decks of the modular system "ALFIX MODUL plus II" as per Table 8 for the working loads of the load classes according to DIN EN 12811-1:2004-03, Table 3 and for the use of safety and roof safety scaffoldings with fall heights of up to 2 m according to DIN 4420-1:2004-03 (Class D according to DIN EN 12810-1:2004-03).

Table 8: Classification of decks to the load classes

Designation	Annex B, page	Bay width ℓ [m]	Use in load class
Aluminium frame platform RE	17 and 18	≤ 3.07	≤ 3
Aluminium frame platform with access hatch RE	20 and 21	≤ 3.07	≤ 3
Steel plank AF RE	23 and 24	4.14	≤ 3
		3.07	≤ 4
		2.57	≤ 5
		≤ 2.07	≤ 6
Intermediate deck AF RE 0.19 m	25	4.14	≤ 3
		3.07	≤ 4
		2.57	≤ 5
		≤ 2.07	≤ 6
Intermediate deck AF RE 0.16 m	25	3.07	≤ 4
		2.57	≤ 5
		≤ 2.07	≤ 6
Steel plank RE	26	3.07	≤ 4
		2.57	≤ 5
		≤ 2.07	≤ 6
Intermediate deck RE	27	3.07	≤ 4
		2.57	≤ 5
		≤ 2.07	≤ 6
Aluminium frame platform	60 and 61	≤ 3.07	≤ 3
Aluminium frame platform with access hatch	63 and 64	≤ 3.07	≤ 3

Table 8: (continued)

Designation	Annex B, page	Bay width ℓ [m]	Use in load class
Steel deck	85	3.07	≤ 4
		2.57	≤ 5
		≤ 2.07	≤ 6
Steel plank AF	84 and 86	4.14	≤ 3
		3.07	≤ 4
		2.57	≤ 5
		≤ 2.07	≤ 6
Intermediate deck AF 0.19 m	87	4.14	≤ 3
		3.07	≤ 4
		2.57	≤ 5
		≤ 2.07	≤ 6

3.3.2 Elastic support of vertical frame series

Due to the horizontal levels (decking elements), non-fixed connectors of frame series shall be considered elastically supported on a level rectangular to the tensioning direction of the decks (with façade scaffoldings rectangular to the façade), provided that the horizontally adjacent connectors are fixed. This elastic support can be allowed for in the calculation due to the assumption of a travel limiting spring with the rated values specified in Table 9.

Table 9: Rated values of the horizontal travel limiting springs

Deck	as per Annex B, page	Scaffold width b [m]	Bay width ℓ [m]	f_o [cm]	Stiffness $c_{\perp,d}$ [kN/cm]		Stress of spring load $F_{R\perp,d}$ [kN]
					$0 < F_\perp \leq 1.50$ [kN]	$1.50 < F_\perp \leq F_{R\perp,d}$ [kN]	
Aluminium frame platform RE	17, 18	0.73	≤ 3.07	3.40	0.78	0.78	1.71
Aluminium frame platform	60, 61						
Aluminium deck with plywood	89, 90, 96 ,97						
Steel plank AF RE 0.32 m	23			3.96	0.58	0.46	3.0
Steel plank RE	26						
Steel plank AF 0.32 m	84						
Steel deck	85						

Table 9: (continued)

Deck	as per Annex B, page	Scaffold width b [m]	Bay width ℓ [m]	f_o [cm]	Stiffness $c_{\perp,d}$ [kN/cm]		Stress of the spring load $F_{R\perp,d}$ [kN]
					$0 < F_{\perp} \leq 1.50$ [kN]	$1.50 < F_{\perp} \leq F_{R\perp,d}$ [kN]	
Steel plank RE	26	1.09	≤ 3.07	4.39	0.79	0.79	2.46
Steel plank AF RE 0.32 m	23						
Steel deck	85						
Steel plank AF 0.32 m	84						

3.3.3 Elastic coupling of the vertical levels

The inner and outer vertical level of a scaffold can be considered elastically coupled to each other in the direction of these levels (with façade scaffoldings parallel to the façade) due to the decks. Due to the assumption of coupling springs with the parameters specified in Table 10, this elastic coupling can be allowed for in the calculation, regardless of the bay width.

Table 10: Rated values of the horizontal coupling springs

Deck	as per Annex B, page	Scaffold width b [m]	Bay width ℓ [m]	f_o [cm]	Stiffness $c_{\|\|,d}$ [kN/cm]		Strength of spring load $F_{R\|\|,d}$ [kN]
					$0 < F_{\|\|} \leq 3.0$ [kN]	$3.0 < F_{\|\|} \leq F_{R\|\|,d}$ [kN]	
Aluminium frame platform RE	17, 18	0.73	≤ 3.07	0.50	2.65	2.22	3.86
Aluminium frame platform	60, 61						
Aluminium deck with plywood	89, 90, 96, 97						
Steel plank AF RE 0.32 m	23			1.40	2.58	3.46	4.50
Steel plank RE	26						
Steel plank AF 0.32 m	84						
Steel deck	85						

Table 10: (continued)

Deck	as per Annex B, page	Scaffold width b [m]	Bay width ℓ [m]	Lose f_o [cm]	Stiffness $c_{\|\|,d}$ [kN/cm]		Strength of spring load $F_{R\|\|,d}$ [kN]
					$0 < F_{\|\|} \leq 3.0$ [kN]	$3.0 < F_{\|\|} \leq F_{R\|\|,d}$ [kN]	
Steel plank AF RE 0.32 m	23	1.09	≤ 3.07	1.95	1.67	1.67	3.94
Steel plank RE	26						
Steel plank AF 0.32 m	84						
Steel deck	85						
Steel plank AF RE 0.32 m	23	1.09	≤ 2.57	1.95	1.39	1.39	3.28
Steel plank RE	26						
Steel plank AF 0.32 m	84						
Steel deck	85						

3.3.4 Material characteristics

For components made from steel S235JRH with an extended yield point of ($R_{eH} \geq 320$ N/mm²) – these components are marked correspondingly in the drawings in Annex B – it is permissible to take a rated value of $f_{y,d}$ = 291 N/mm² of the yield point as a calculation basis.

3.3.5 Welding seams

For the proof of the welding seams of components made from steel S235JRH with an extended yield point of ($R_{eH} \geq 320$ N/mm²) - these components are marked correspondingly in the drawings in Annex B – the utilization of the extended yield points of $f_{y,d}$ = 291 N/mm² is permissible for butt welds (welding seams) that are subject to pressure/bending pressure. For all other welding seams proof shall be furnished taking into account the yield point of the base materials of the components.

3.3.6 Cross-section values of the scaffold spindles

The equivalent cross-section values for the stress analyses and calculation of distortion according to DIN 4425:1990-11 (Annex B of DIN EN 12811-1:2004-03) for scaffold base jacks according to Annex B, page 83 shall be assumed as follows:

$A = A_S$ = 3.52 cm²
I = 4.00 cm⁴
W_{el} = 2.68 cm³
W_{pl} = 1.25 · 2.68 = 3.35 cm³

3.3.7 Couplers

For the proof of the half couplers attached to the various components, the load-bearing capacities and stiffness for class A half couplers shall be applied according to the specifications in the "Zulassungsgrundsätze für den Verwendbarkeitsnachweis von Halbkupplungen an Stahl- and Aluminiumrohren"[1] (Approval principles for the proof of applicability of half couplers on steel and aluminium tubes).

4 Design Provisions

4.1 General

The execution and inspection of the scaffolds is not the subject matter of this National Technical Approval.

4.2 Condition of components

Before installation, all components shall be inspected for their proper condition; damaged components must not be used.

4.3 Design and structure

4.3.1 Components

Scaffolds governed by this approval shall be constructed using only the scaffold components listed in Table 2. Only components marked according to Paragraph 2.2.2 or according to the provisions of the national technical approval Z-8.1-862 shall be used.

In individual cases, steel tubes and couplers according to DIN EN 12811-1:2004-03 as well as scaffold decks and planks according to DIN 4420-1:2004-03 may also be used.

In derogation of the scaffolding base jack specified in Annex B, page 83, also other light scaffolding spindles complying with DIN 4425:1990-11 or base jacks in line with Annex B of DIN EN 12811-1:2004-03 can be used in conformity with the required load-bearing capacities.

In terms of the use of the scaffolding connector the following shall apply:

A maximum of eight members may be connected to each connecting disc.

To fix the captive wedges of the connecting heads, they must be hammered tight with a 500 g-hammer in top-to-bottom direction until the blow bounces off.

4.3.2 Base area

On top of the scaffolding base jacks, the lower assembly frames or vertical starter pieces are to be mounted and adjusted so that the scaffold layers are positioned horizontally. Measures have to be taken to the effect that the plates of the scaffolding spindles rest horizontally and solidly on the ground to absorb and transmit the forces generated by the scaffolding.

4.3.3 Decks and planks

The decks and planks are to be secured from accidental lift-off.

4.3.4 Side protection

The DIN EN 12811-1:2004-03 provisions are applicable for side protection. The components designed for side protection shall be given priority over components such as steel tubes and couplers according to DIN EN 12811-1:2004-03 as well as wooden decks and planks according to DIN 4420-1:2004-03, which shall only be used in exceptional cases.

4.3.5 Bracing

Scaffolds must be braced.

Vertical levels must be braced using longitudinal ledgers or longitudinal ledgers in combination with vertical diagonal braces. System decks in combination with transoms can be considered as longitudinal ledgers for the proof of stability.

The stiffness of the horizontal levels must be ensured by ledgers and horizontal diagonals or by system decks in combination with transoms.

Design and positioning of the individual bracing levels follow from the particulars of proof of stability.

4.3.6 Anchoring

The anchoring pattern and the anchoring forces shall be based on the specifications in the proof of stability.

The anchoring of the scaffold retainer to the façade or to any other part of the building is not the subject-matter of this approval. The user shall ensure that they are capable of absorbing and transmitting the forces emanating from the scaffold retainer safely. Vertical forces must not be transferred in this process.

4.3.7 Couplers

Threaded joint couplers must be fixed to the uprights with a tightening torque of 50 Nm; deviations of ± 10 % are admissible. The screws must be maintained so that they can be easily moved, e.g. by applying an oil-grease-mixture.

5 Provisions for use and maintenance

5.1 General

The use of the scaffolds is not the subject-matter of this National Technical Approval.

5.2 Wooden scaffold components

In order to avoid damages to the wooden scaffold components due to dampness, they are to be stored in a dry and adequately aerated place with no ground contact.

Georg Feistel
Head of Department

Authorized

>*signed*<

>Seal: Deutsches Institut für Bautechnik<

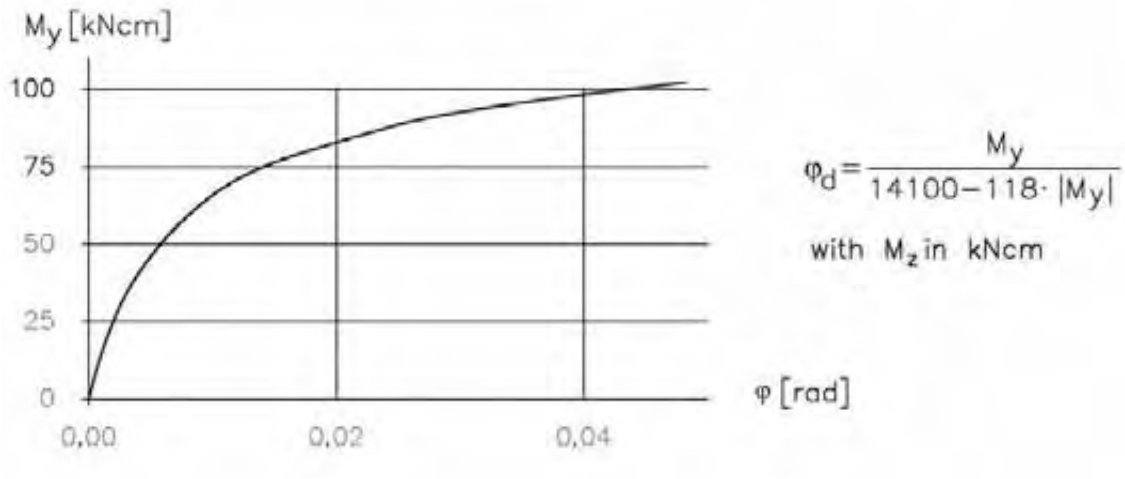


Figure 1: Torsion spring rigidity in the ledger connection at the upright tube/ ledger level

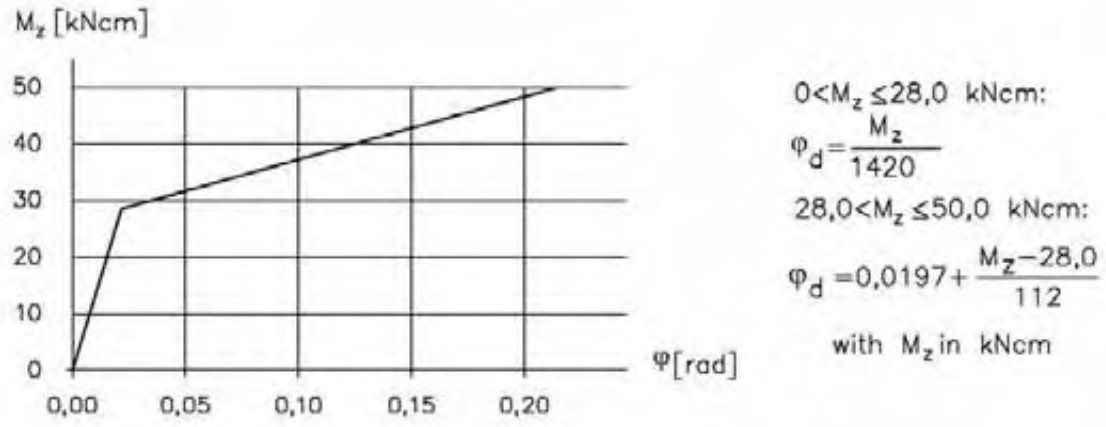
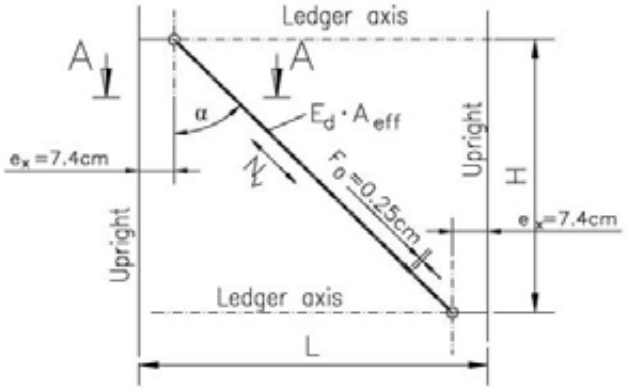
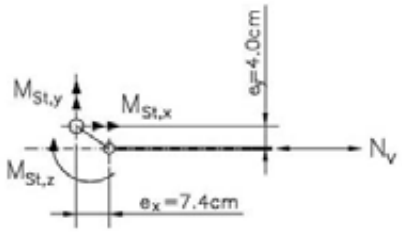


Figure 2: Torsion spring rigidity in the ledger connection at the level rectangular to the upright tube/ ledger level

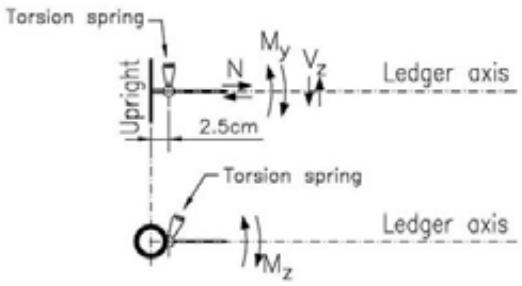
Statically determined system
Vertical diagonal brace



Section A-A



Statically determined system
Ledger connection



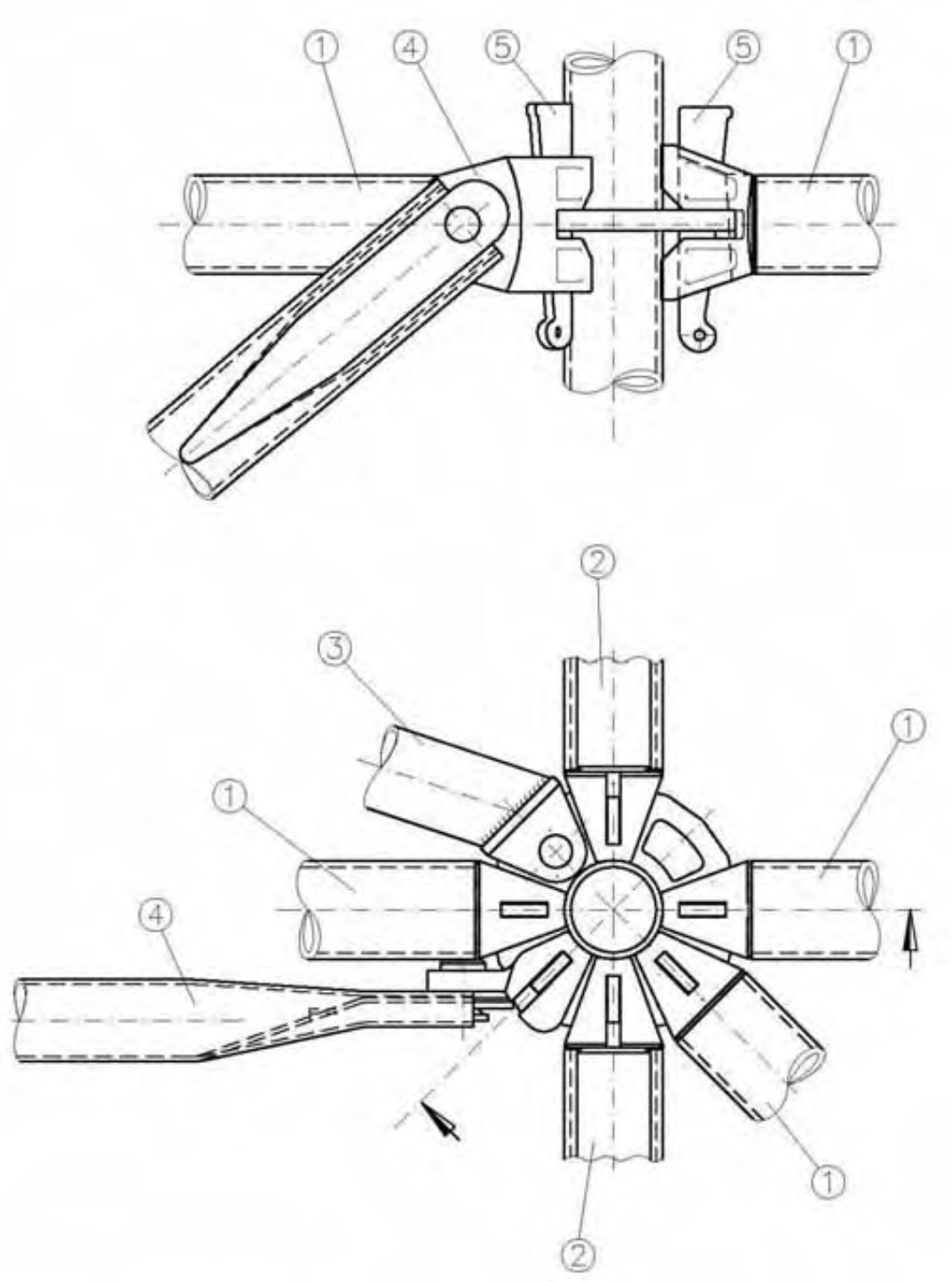
Connector torques due to diagonal force N_v

$M_{St,x} = N \cdot \cos \alpha \cdot 4{,}0\text{cm}$

$M_{St,y} = N \cdot \cos \alpha \cdot 7{,}4\text{cm}$

$M_{St,z} = N \cdot \sin \alpha \cdot 4{,}0\text{cm}$

The connector torques must be absorbed by the vertical upright and ledgers.



(1) Tube ledger
(2) U-ledger
(3) Horizontal diagonal brace
(4) Vertical diagonal brace
(5) Wedge 6mm

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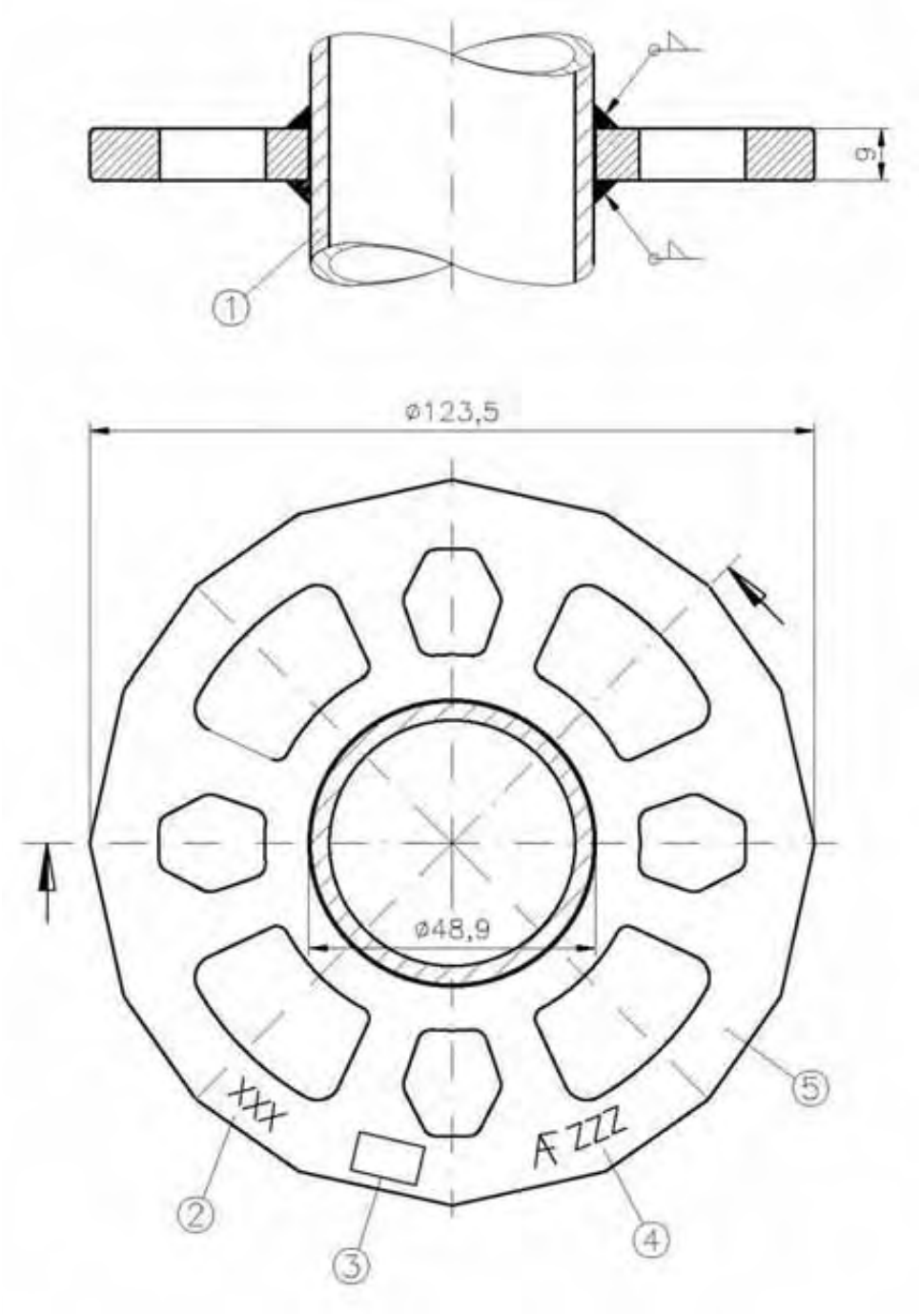
ALFIX MODUL plus II

Scaffolding connector

Overview



(1)	R48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	Batch number / week, year		embossed 0,4
(3)	Foundry logo		embossed 0,4
(4)	Æ short approval number		embossed 0,4
(5)	G20Mn5	DIN EN 10293	ReH≥360N/mm^2, Rm≥500N/mm^2
	alternatively: S355J2	DIN EN 10025-2	

Material thickness = 9mm

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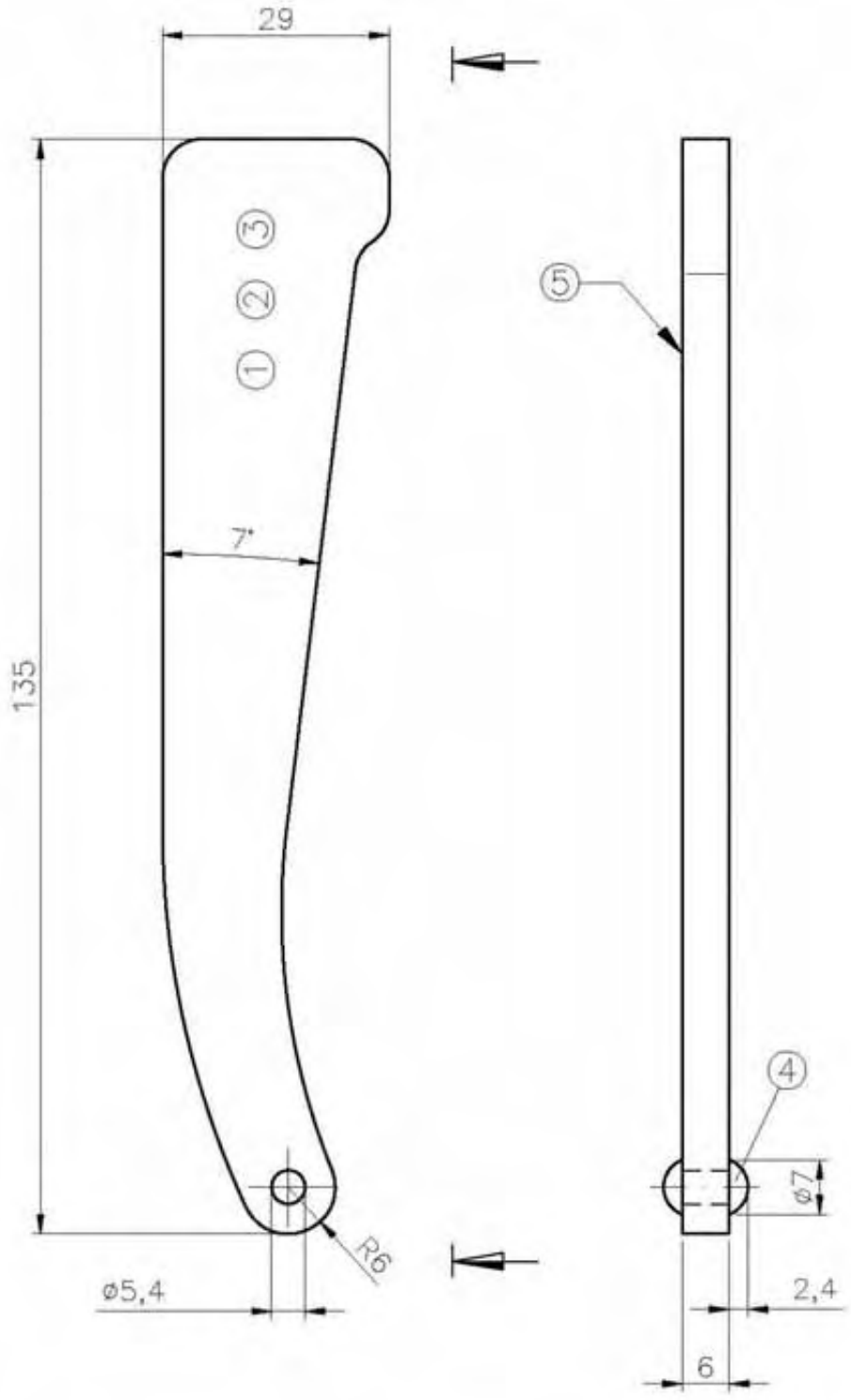
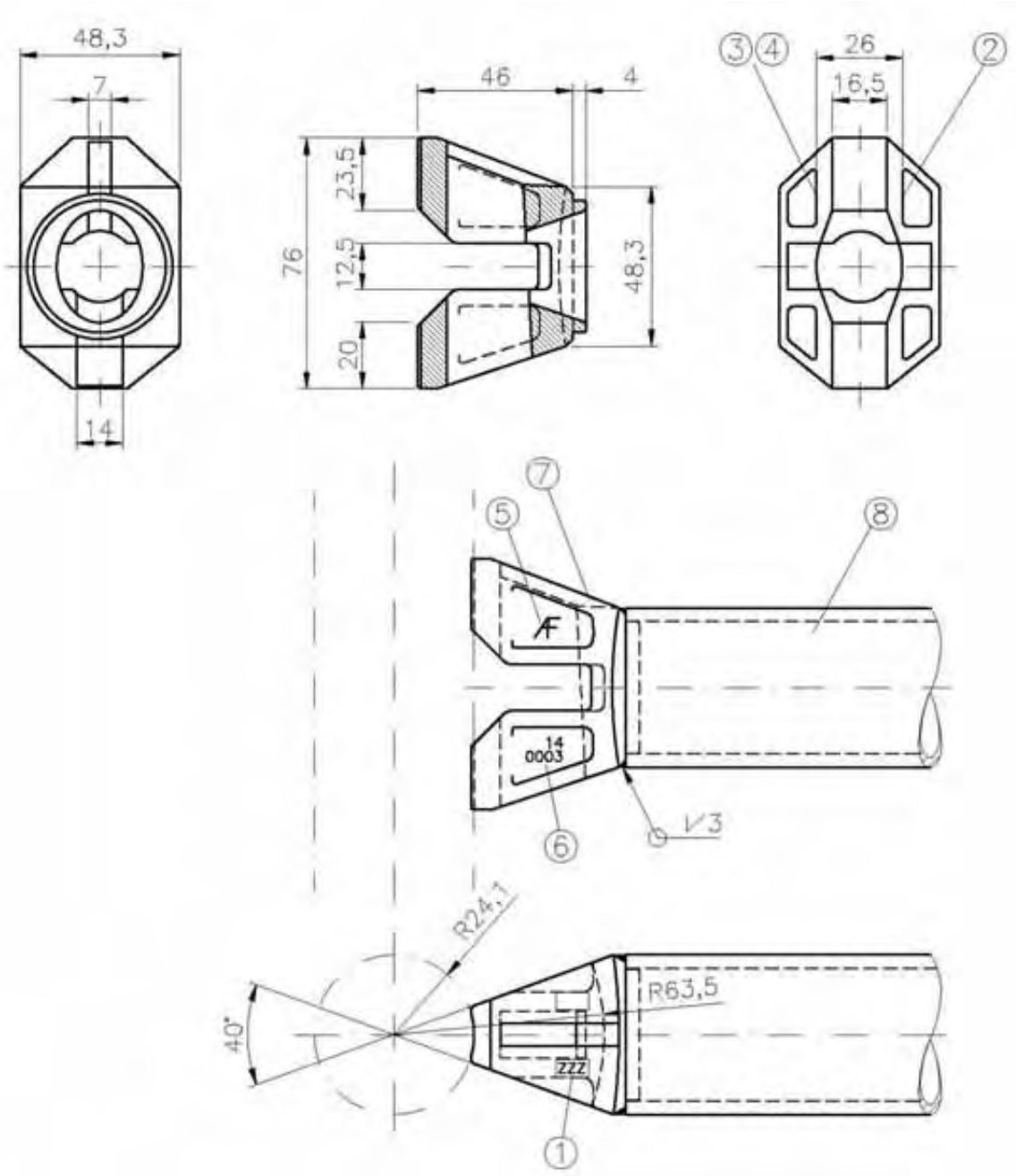
ALFIX MODUL plus II

Perforated connecting disc



(1) ZZZ = Short approval number
(2) AF = Manufacturer's mark ALFIX
(3) YY = Year of manufacture (e.g. 08 = 2008)
(4) Button-head rivet Ø 5x10 with rivet head of rivet Ø 4 DIN 660 QSt 32-2, zinc-plated
(5) Marking

galvanized; S550MC



(1) ZZZ = Short approval number
(2) ▭ = Foundry marking
(3) XX = Calendar week and
(4) YY = Year of manufacture (e.g. 4005 = CW 40/2005)
(5) AF = Manufacturer's mark ALFIX
(6) $^{14}_{0003}$ = Drawing number
(7) G20Mn5 DIN EN 10293
(8) R 48.3x3.2 S235JRH ReH≥320N/mm²

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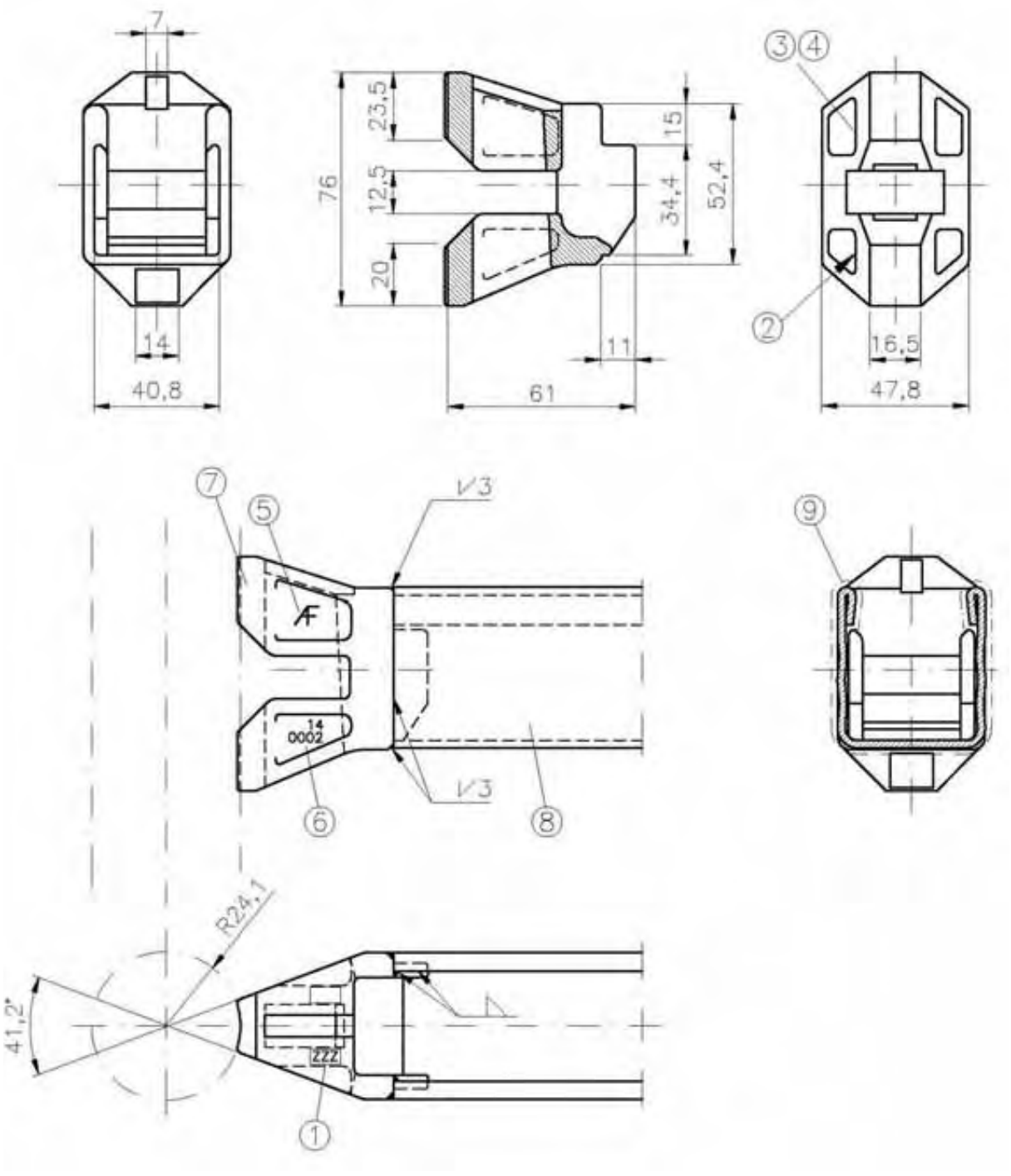
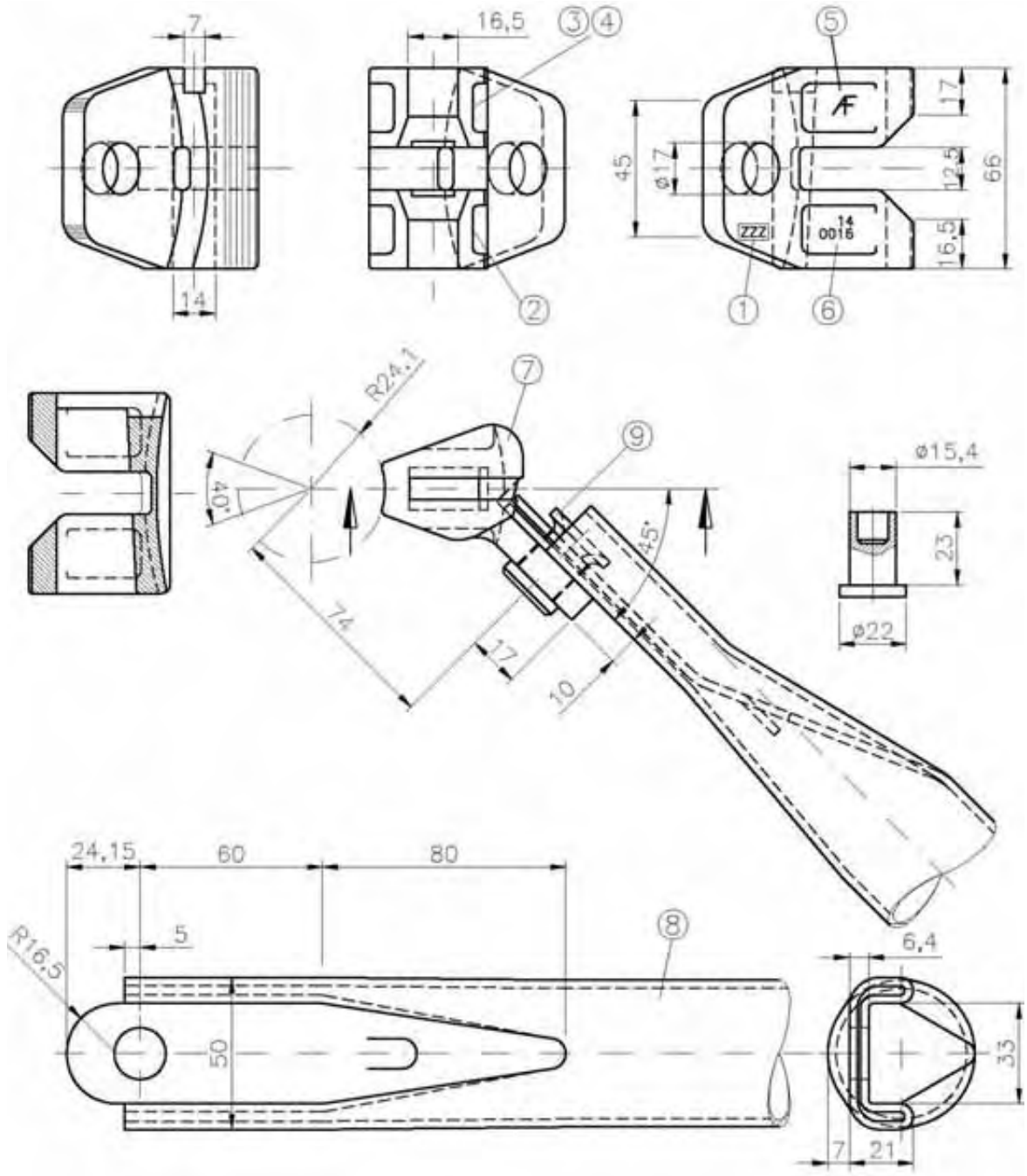
Tube ledger connection



(1) ZZZ = Short approval number
(2) ☐ = Foundry marking
(3) XX = Calendar week and
(4) YY = Year of manufacture (e.g. 4005 = CW 40/2005)
(5) AF = Manufacturer's mark ALFIX
(6) 14 0002 = Drawing number
(7) G20Mn5 DIN EN 10293
(8) U-profile 48x52x2.5 S235JRH
(9) Welded area



(1) ZZZ = Short approval number
(2) ☐ = Foundry marking
(3) XX = Calendar week and
(4) YY = Year of manufacture (e.g. 4005 = CW 40/2005)
(5) AF = Manufacturer's mark ALFIX
(6) 0016^{14} = Drawing number

(7)	G20Mn5	DIN EN 10293	
(8)	R 48.3x2.7	S235JRH	ReH≥320N/mm²
(9)	Rivet modular diagonal braces	QSt 36-3	blank drawn, zinc-plated

Diagonal brace head – right hand
Diagonal brace head – left hand, inversely

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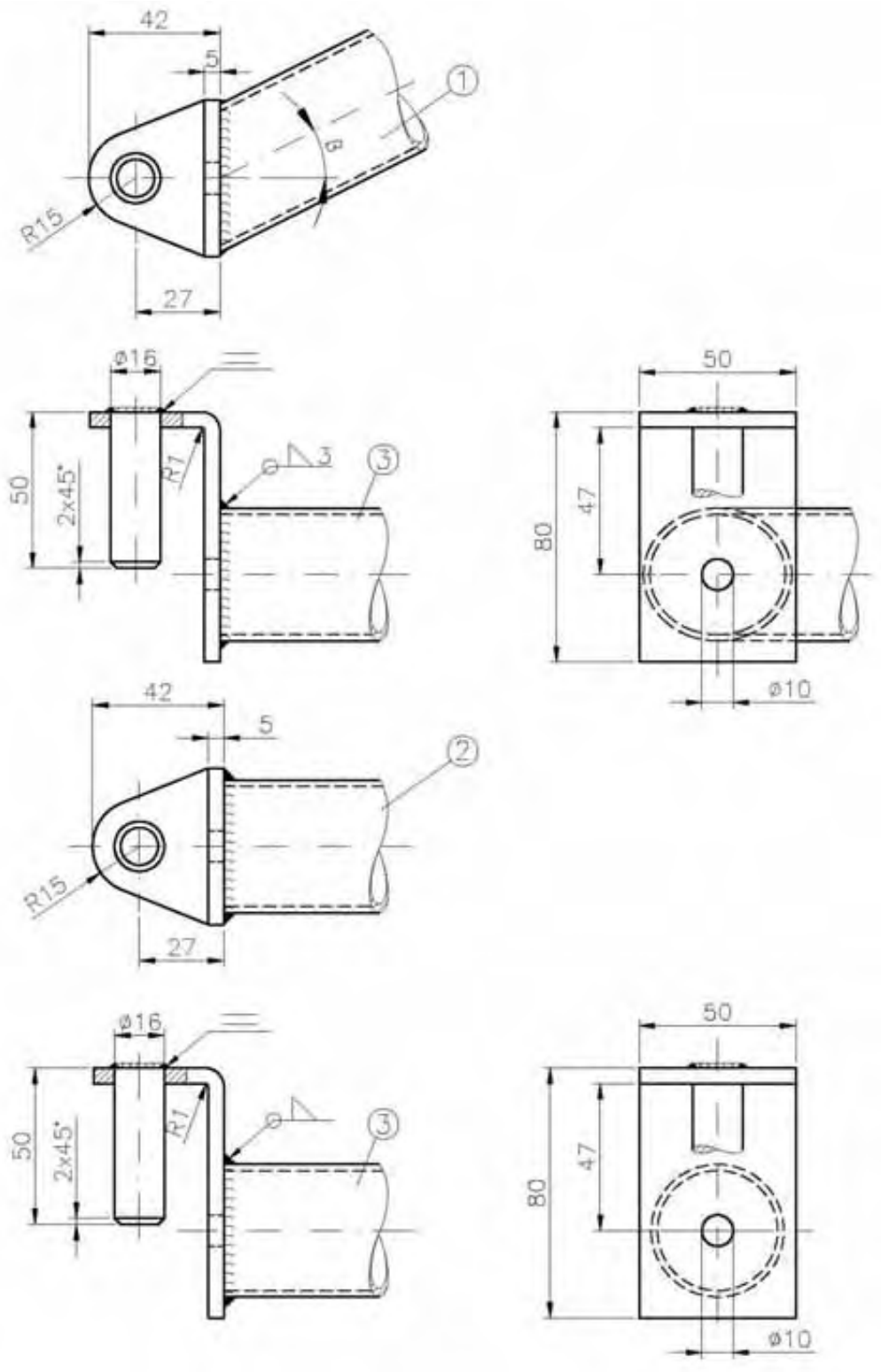
ALFIX MODUL plus II

V-diagonal brace connection



(1) Form “A” S235JR
(2) Form “B“ S235JR
(3) R 42.4x2 S235JRH

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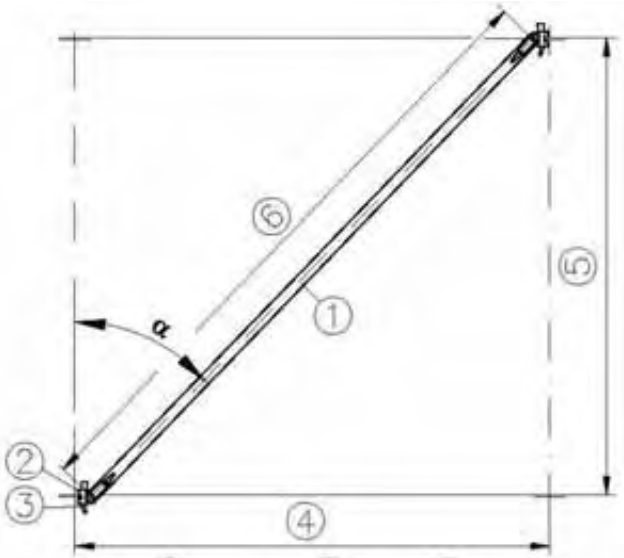
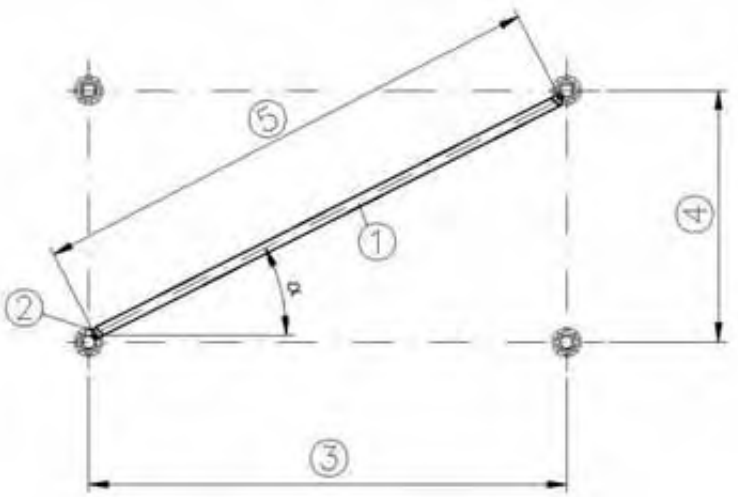
ALFIX MODUL plus II

H-diagonal brace connection



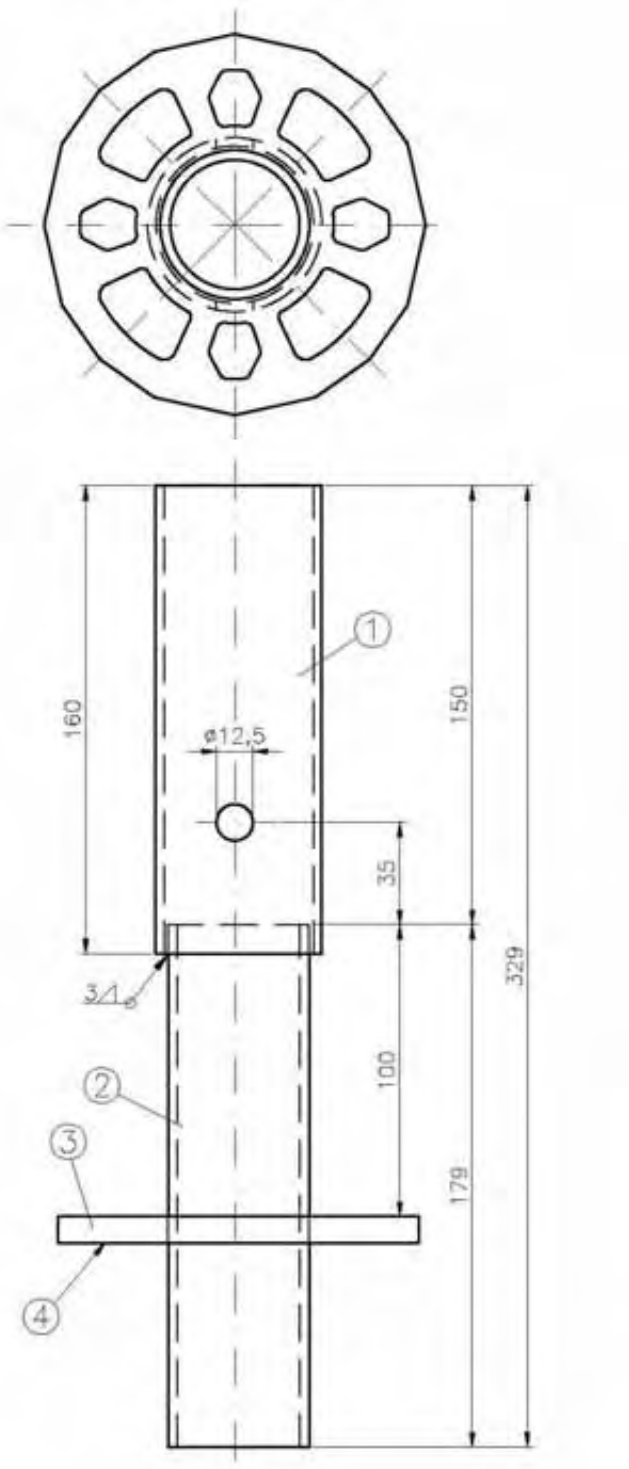
④	⑤	⑥	α
732	500	769	49,5
1088	500	1065	62,0
1286	500	1243	66,3
1400	500	1348	68,2
1572	500	1509	70,7
2072	500	1988	75,5
2572	500	2475	78,4
3072	500	2966	80,3
732	1000	1158	30,3
1088	1000	1372	43,3
1286	1000	1515	48,7
1400	1000	1602	51,4
1572	1000	1740	55,0
2072	1000	2168	62,6
2572	1000	2622	67,6
3072	1000	3090	71,2
732	1500	1610	21,3
1088	1500	1770	32,1
1286	1500	1883	37,2
1400	1500	1954	39,8
1572	1500	2068	43,5
2072	1500	2440	52,1
2572	1500	2851	58,3
3072	1500	3286	62,9
732	2000	2084	16,3
1088	2000	2210	25,2
1286	2000	2301	29,7
1400	2000	2360	32,1
1572	2000	2455	35,5
2072	2000	2775	43,9
2572	2000	3143	50,5
3072	2000	3543	55,7

(1) R 48.3x2.7 S235JRH ReH≥320N/mm²
(2) V-diagonal brace connection
(3) Wedge 6 mm S550MC
(4) Bay length L
(5) Bay height H
(6) Rivet distance I



⑥	③	④	⑤	α
B	732	732	953	45
A	1088	732	1231	33,9
A	1400	732	1502	27,6
A	1572	732	1657	25
A	2072	732	2124	19,5
A	2572	732	2603	15,9
A	3072	732	3088	13,4
B	1088	1088	1457	45
A	1400	1088	1692	37,8
A	1572	1088	1831	34,7
A	2072	1088	2262	27,7
A	2572	1088	2717	22,9
A	3072	1088	3185	19,5
B	1572	1572	2141	45
A	1400	1572	2023	48,3
A	2072	1572	2519	37,2
A	2572	1572	2935	31,4
A	3072	1572	3373	27,1
B	2072	2072	2848	45
A	1400	2072	2420	55,9
A	2572	2072	3221	38,8
A	3072	2072	3625	34
B	2572	2572	3555	45
A	1400	2572	2850	61,4
A	3072	2572	3925	39,9
B	3072	3072	4262	45
A	1400	3072	3299	65,5

(1) R 42.4x2 S235JRH
(2) H-diagonal brace connection
(3) Bay length L
(4) Bay width B
(5) Bolt distance l
(6) Form



(1) R 57x2.9 S235H
(2) R 48.3x3.2 S235JRH ReH≥320N/mm²
(3) Perforated connecting disc
(4) Marking

galvanized

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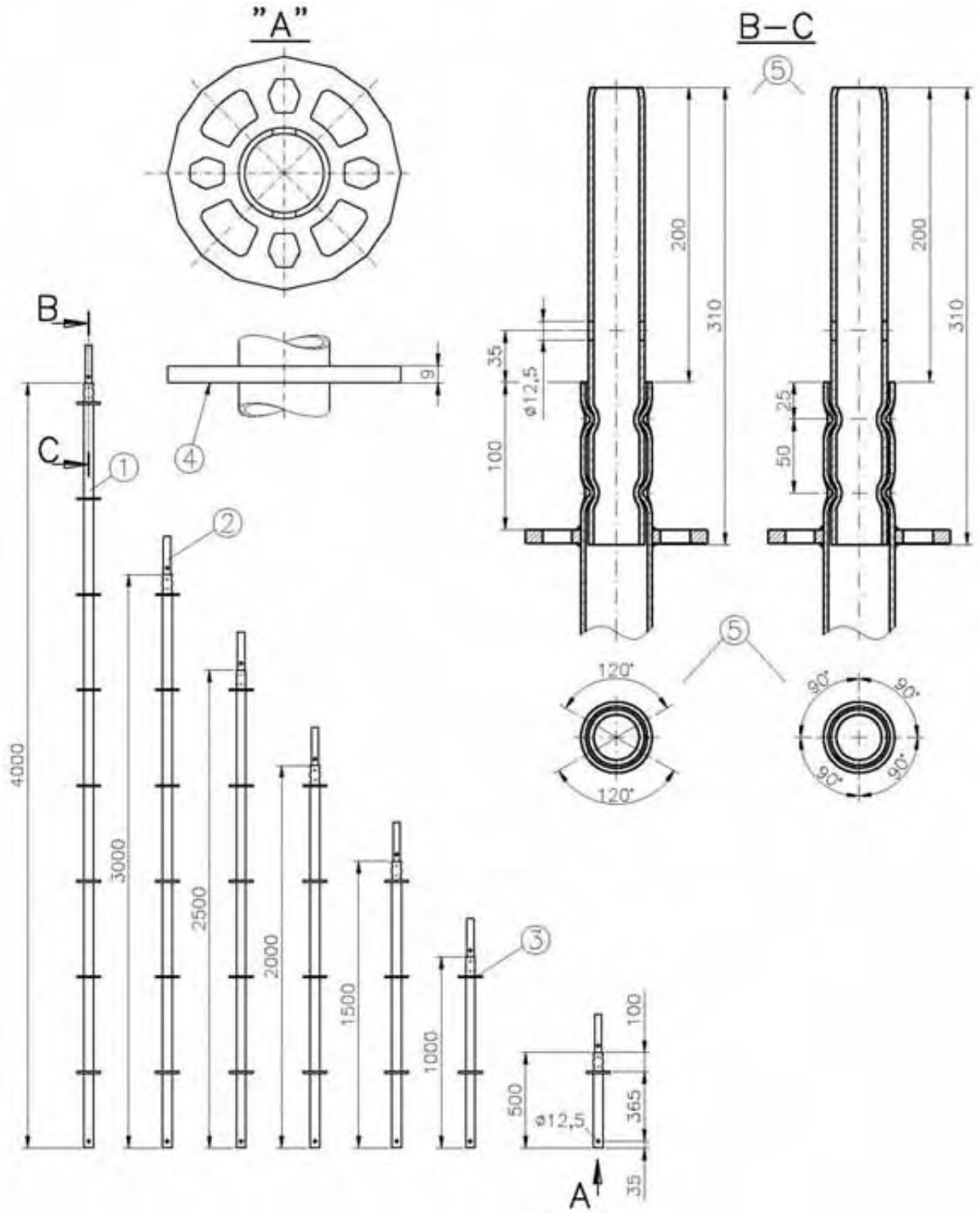
ALFLIX MODUL plus II

Vertical starter piece



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm²
(2)	R 38x3.6	S235JRH	ReH≥320N/mm²
(3)	Perforated connecting disc		
(4)	Marking		
(5)	Linear swaging	alternatively: 4x spot-swaging	

galvanized

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ALFIX MODUL plus II

Vertical upright with spigot fitting 200

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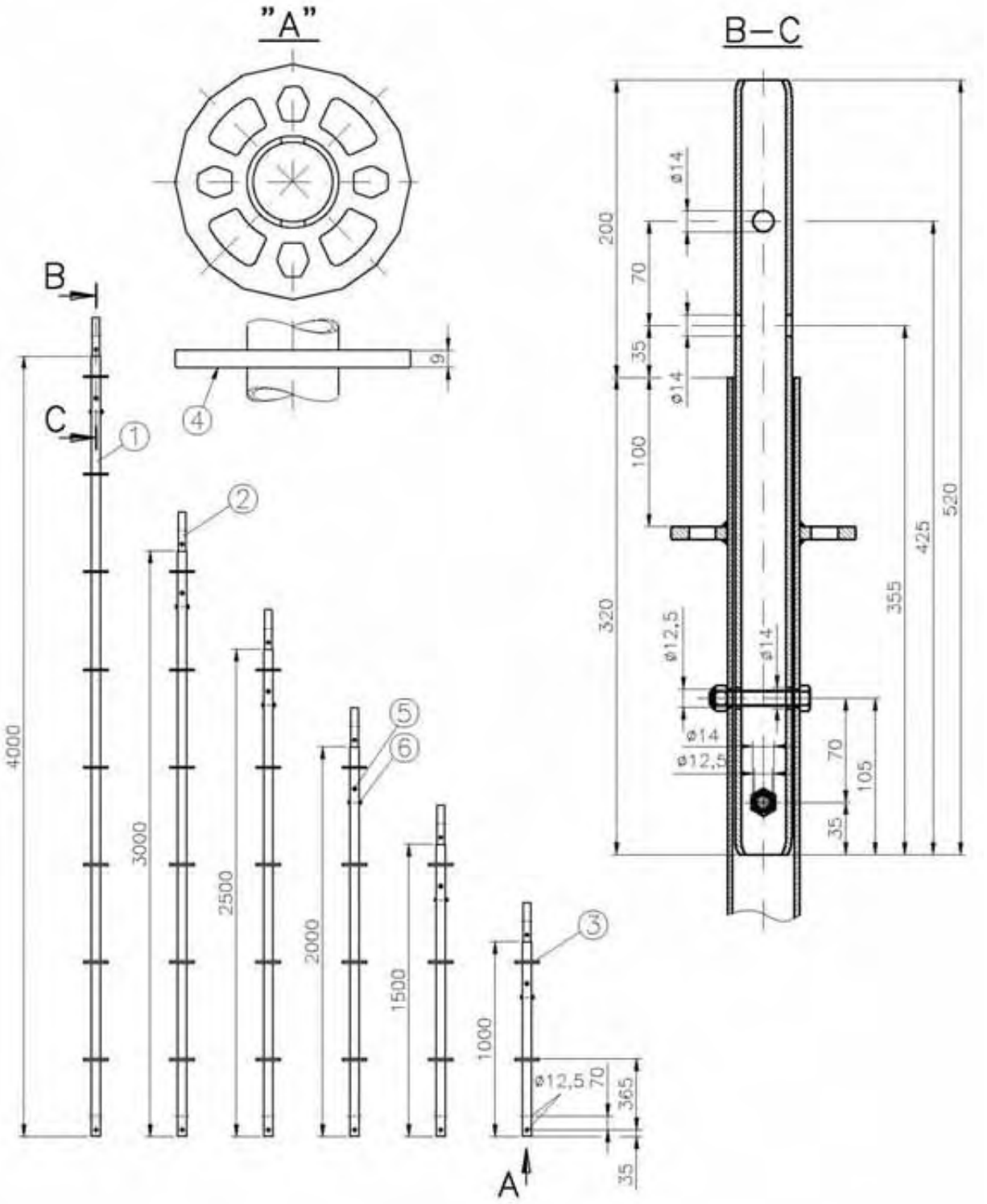

(1)	R 48.3x3.2	S235JRH	ReH≥320/mm²
(2)	R 38x4	S235JRH	ReH≥320N/mm²
(3)	Perforated connecting disc		
(4)	Marking		
(5)	Hexagon screw	DIN 931 – M10x60-8.8-galvanized	
(6)	Hex nut, self-locking	DIN 985 - M10-8-galvanized	

galvanized

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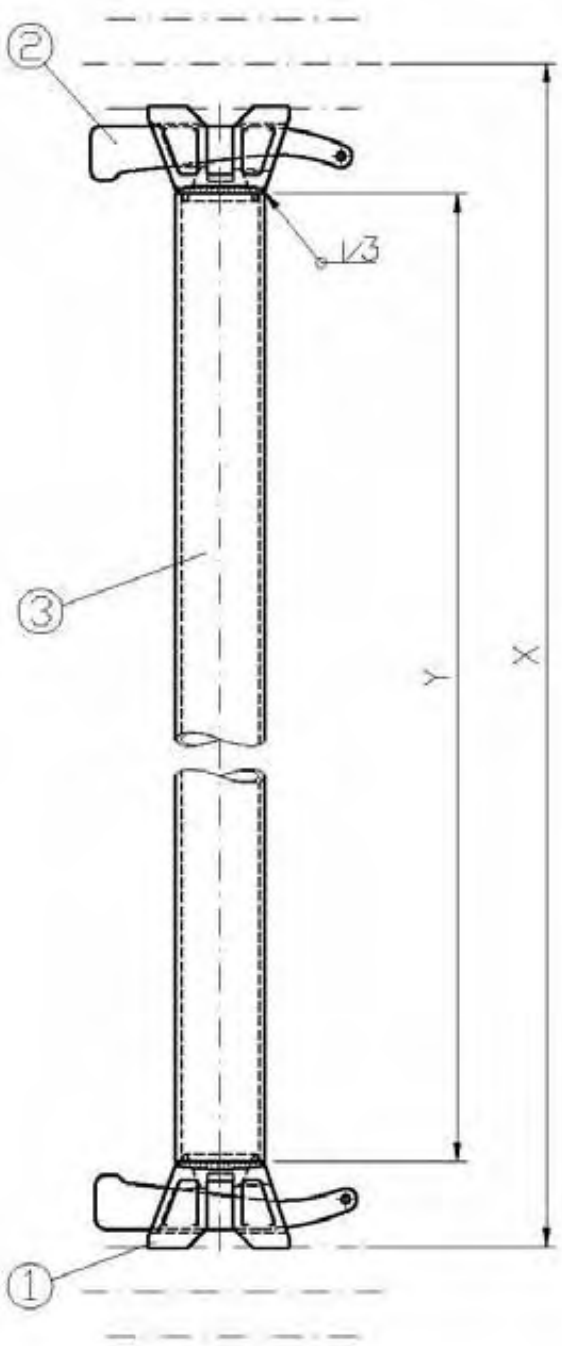
ALFLIX MODUL plus II

Vertical upright with detachable spigot fitting 520



X	Y
390	249
500	359
732	591
1088	947
1286	1145
1400	1259
1572	1431
2072	1931
2572	2431
3072	2931
4144	4003

(1) Tube ledger connection
(2) Wedge 6mm S550MC
(3) R 48.3x3.2 S235JRH ReH≥320N/mm²

galvanized

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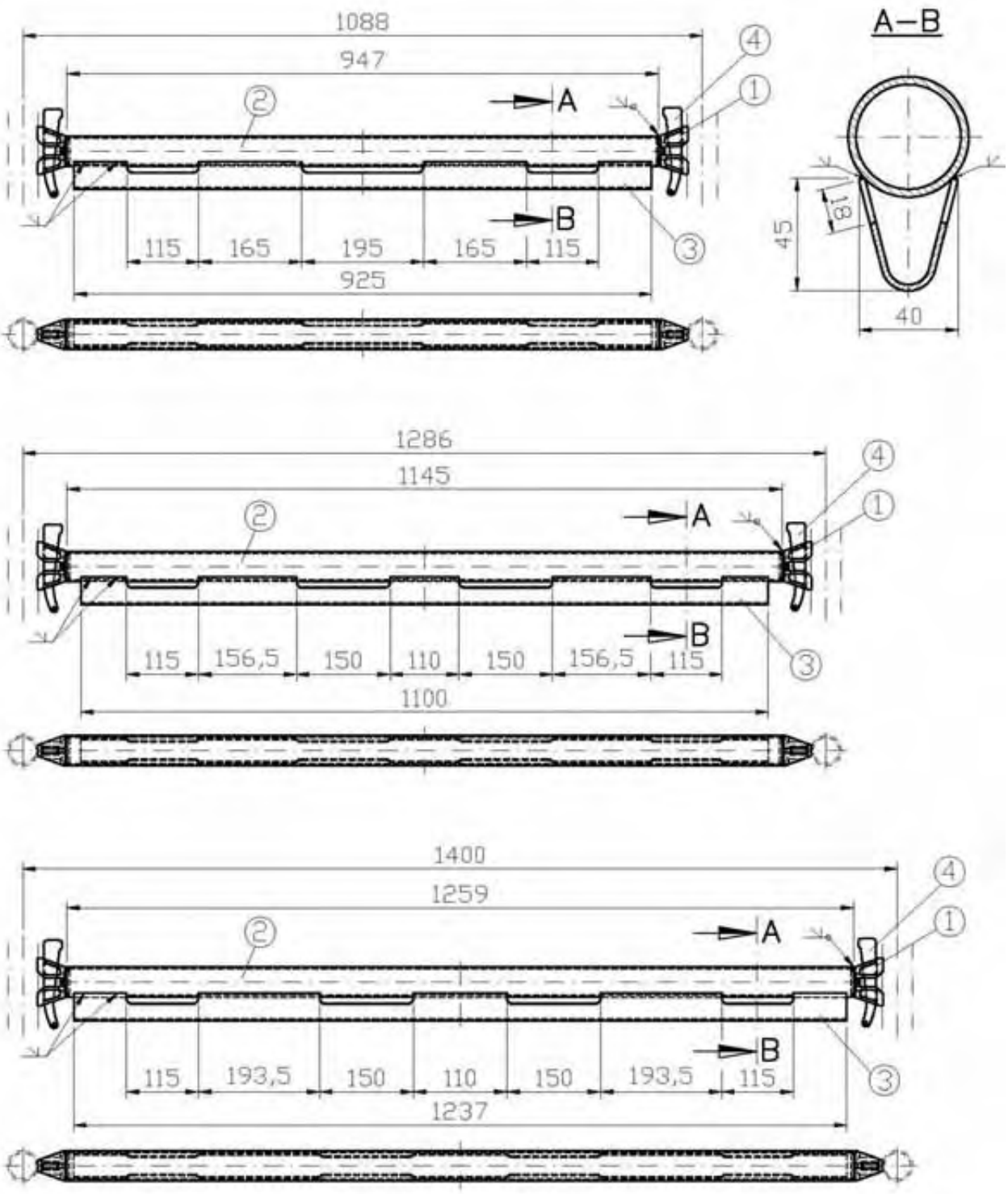
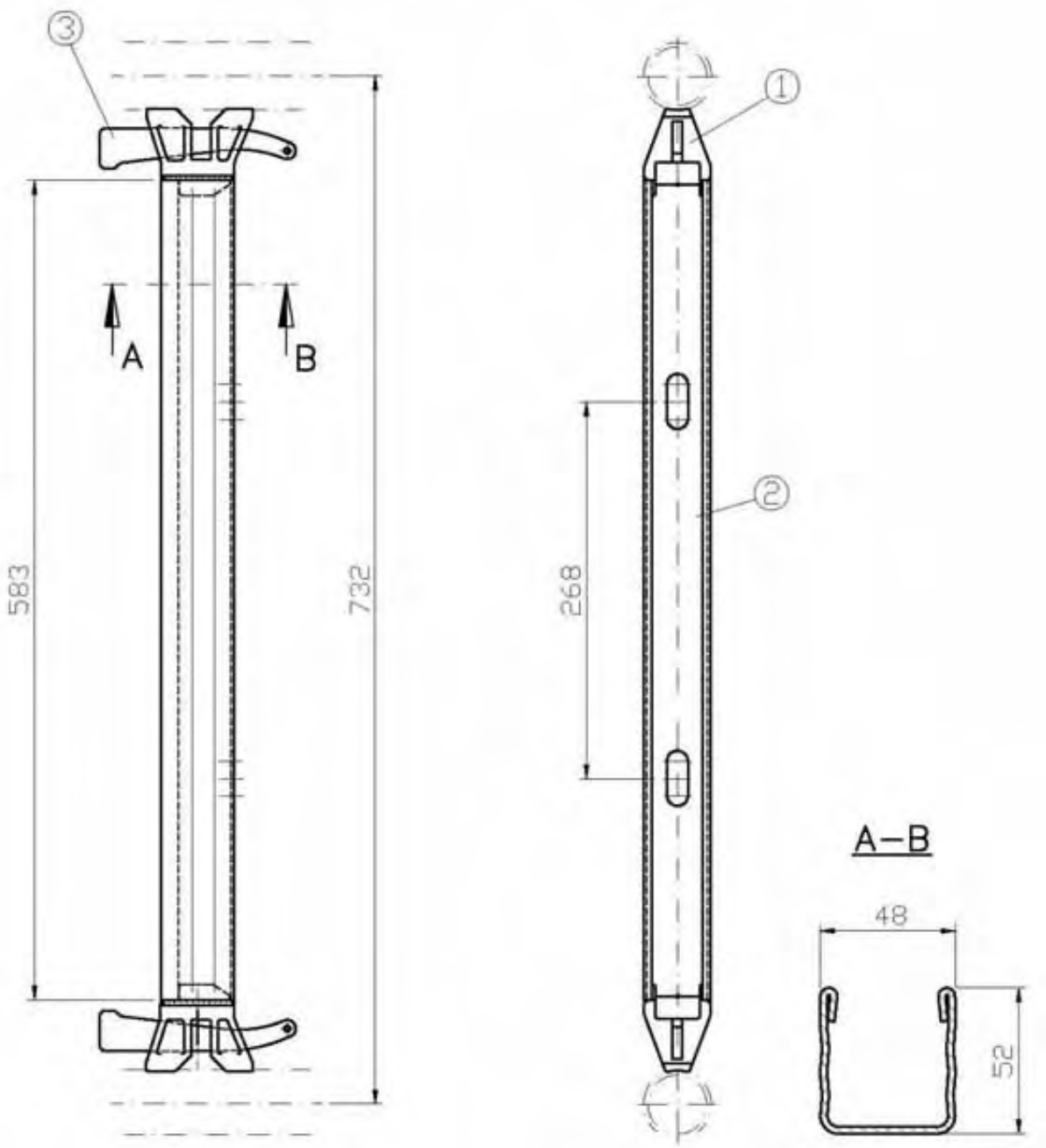
ALFIX MODUL plus II

Tube ledger



(1) Tube ledger connection
(2) R 48.3x3.2 S235JRH ReH≥320N/mm²
(3) BI 3 S235JR
(4) Wedge 6 mm S550MC

galvanized; all welds a=3mm



(1) U-ledger connection
(2) U-profile 48x52x2.5 S235JR
(3) Wedge 6mm S550MC

galvanized; all welds a=3mm

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ALFLIX MODUL plus II

U-transom 0.73m

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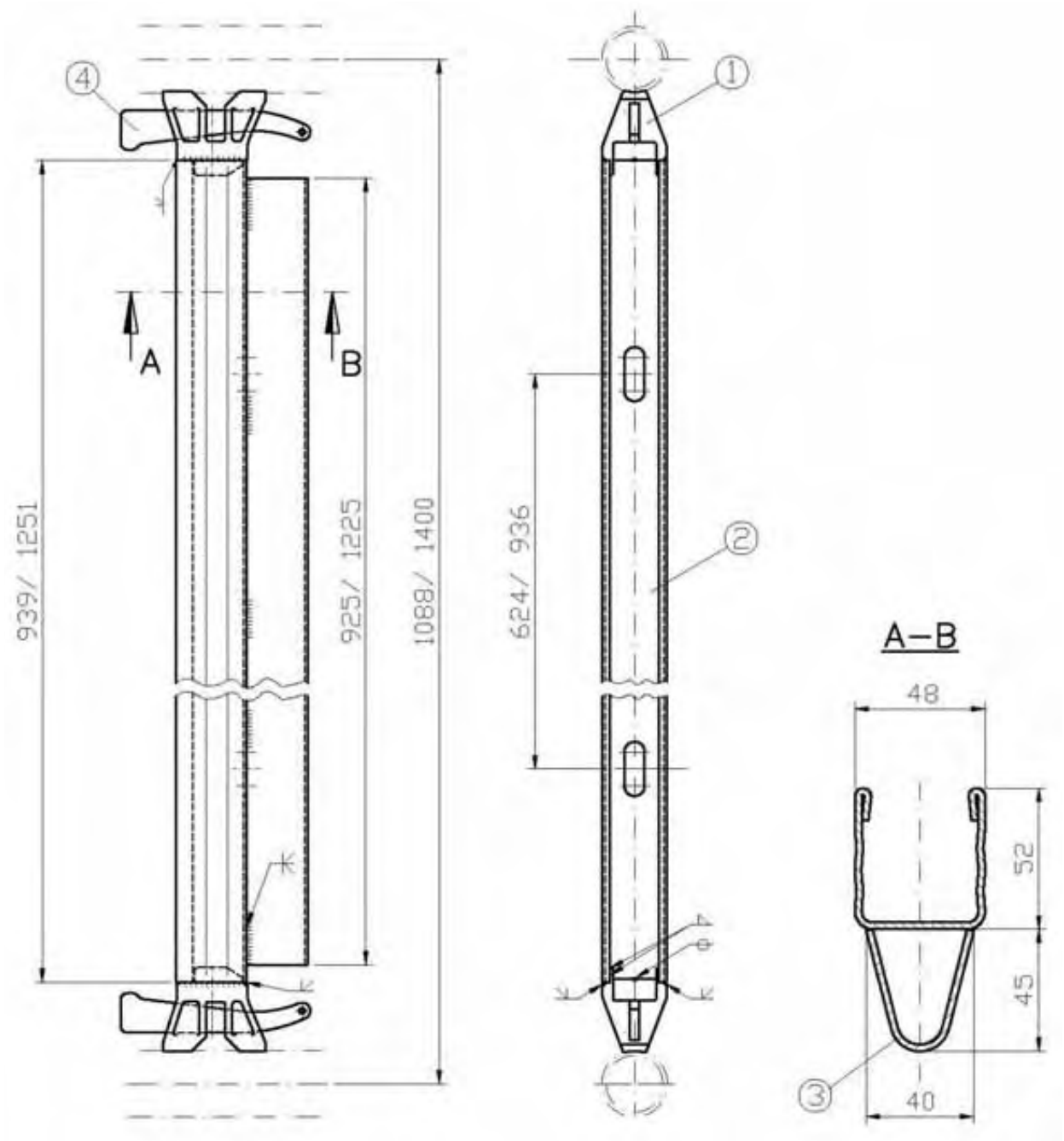

(1) U-ledger connection
(2) U-profile 48x52x2.5 S235JR
(3) Bl 3 S235JR
(4) Wedge 6mm S550MC

galvanized

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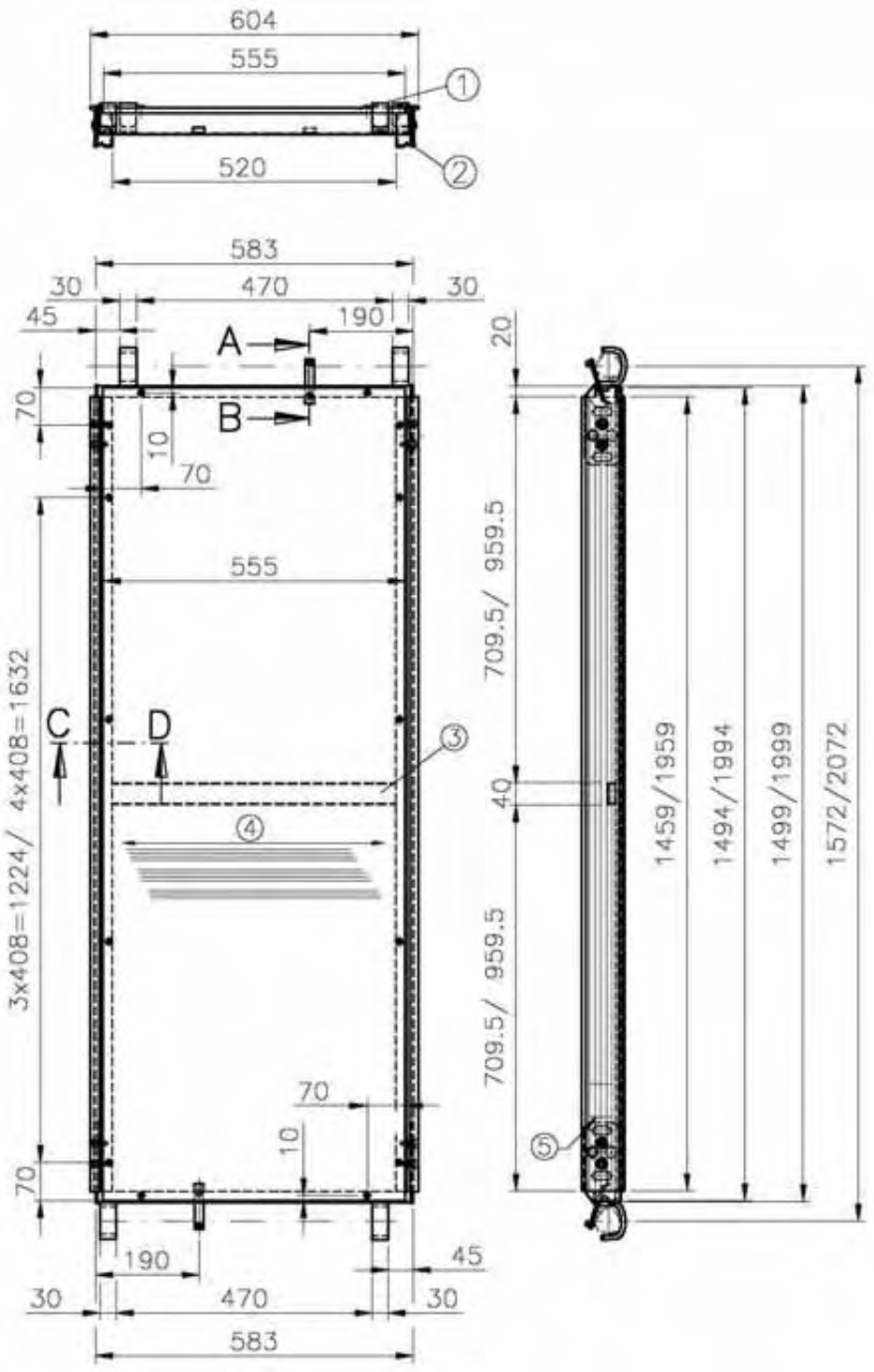
ALFIX MODUL plus II

U-transom reinforced
1.09m and 1.40m



(1) WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430 BFU (construction veneer plywood) 100-G
(2) Brace profile 78x42 EN AW-6063-T66
(3) RV 40x15x2 EN AW-6063-T66
(4) Fibre direction
(5) Marking

all welds a=2mm Sections and details, see Annex M710-B119 Load class 3

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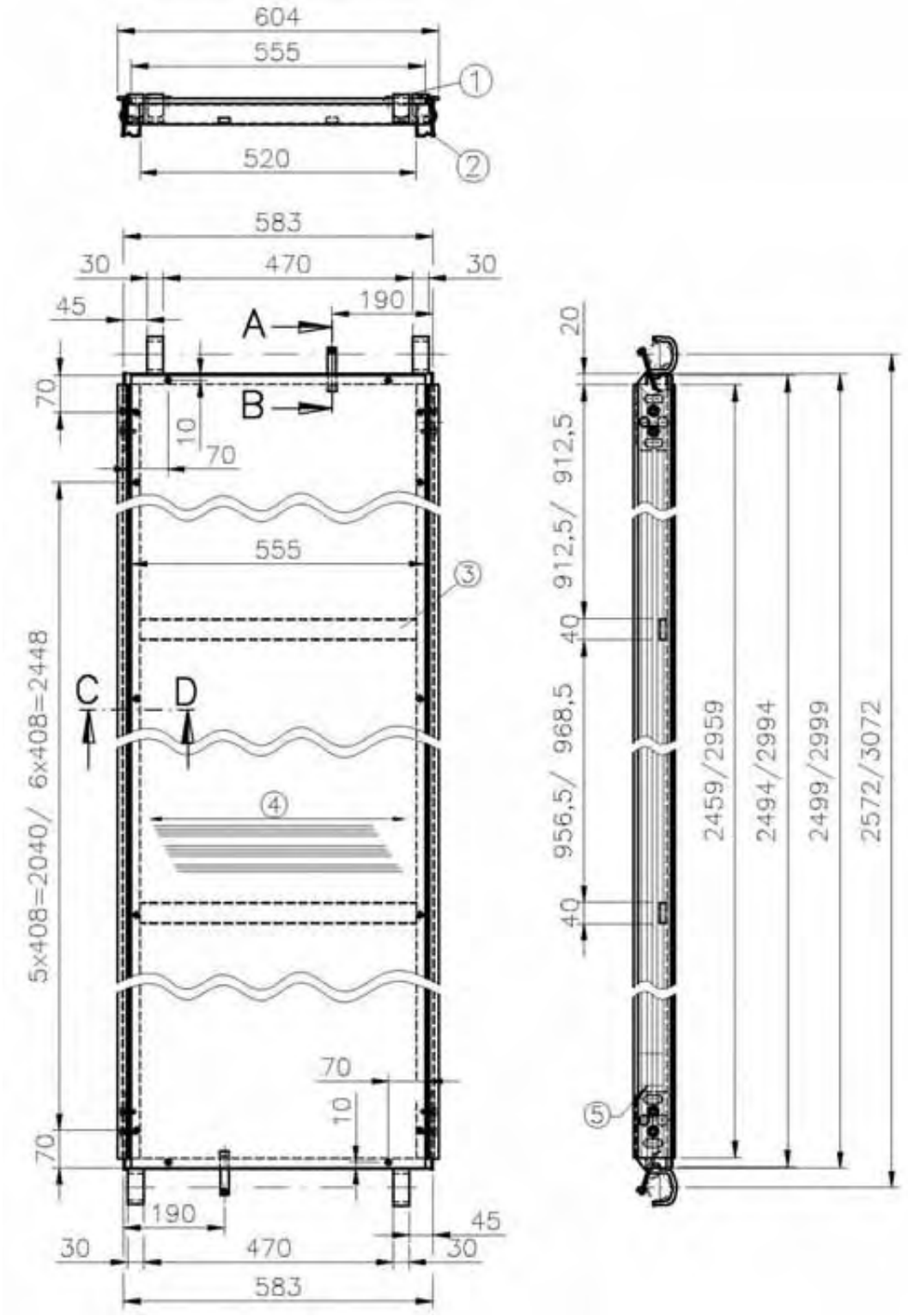
ALFIX MODUL plus II

Aluminium frame deck RE

1.57m and 2.07m



(1) WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430 BFU (construction veneer plywood) 100-G
(2) Brace profile 78x42 EN AW-6063-T66
(3) RV 40x15x2 EN AW-6063-T66
(4) Fibre direction
(5) Marking

all welds a=2mm Sections and details, see Annex M710-B119 Load class 3

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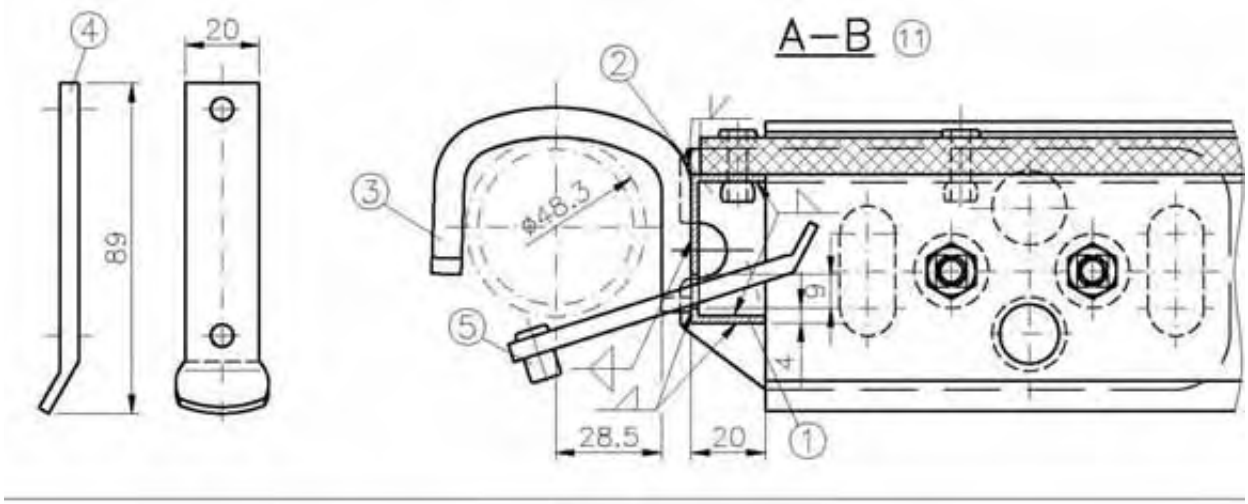
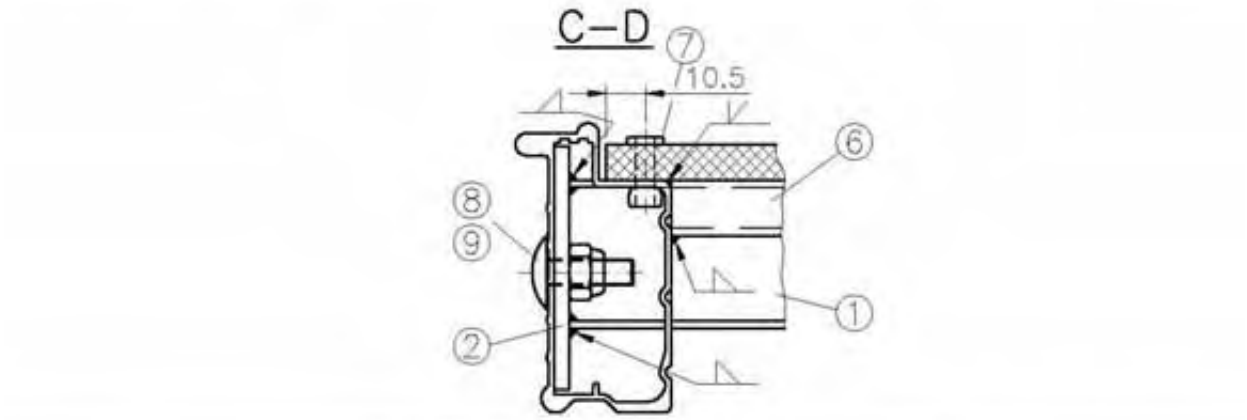
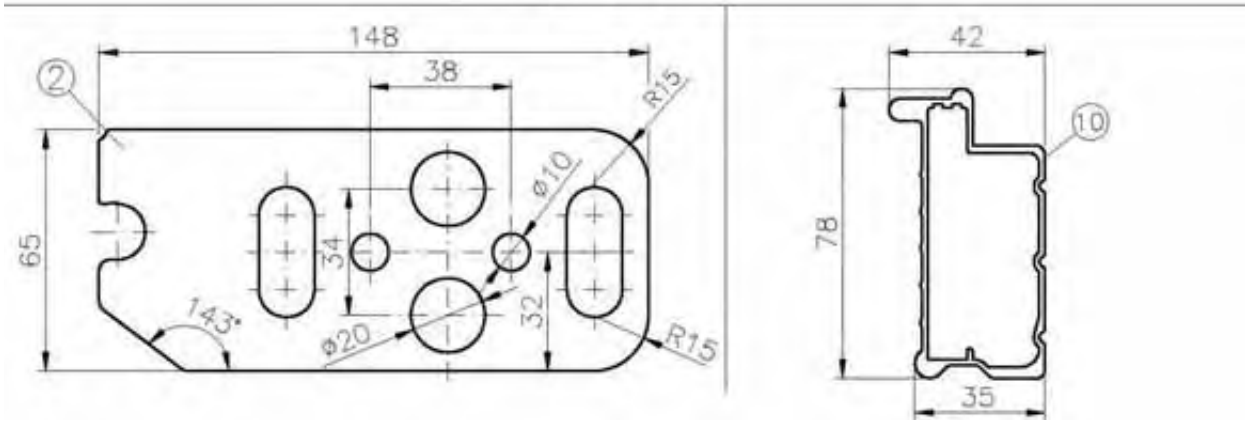
ALFIX MODUL plus II

Aluminium frame deck RE

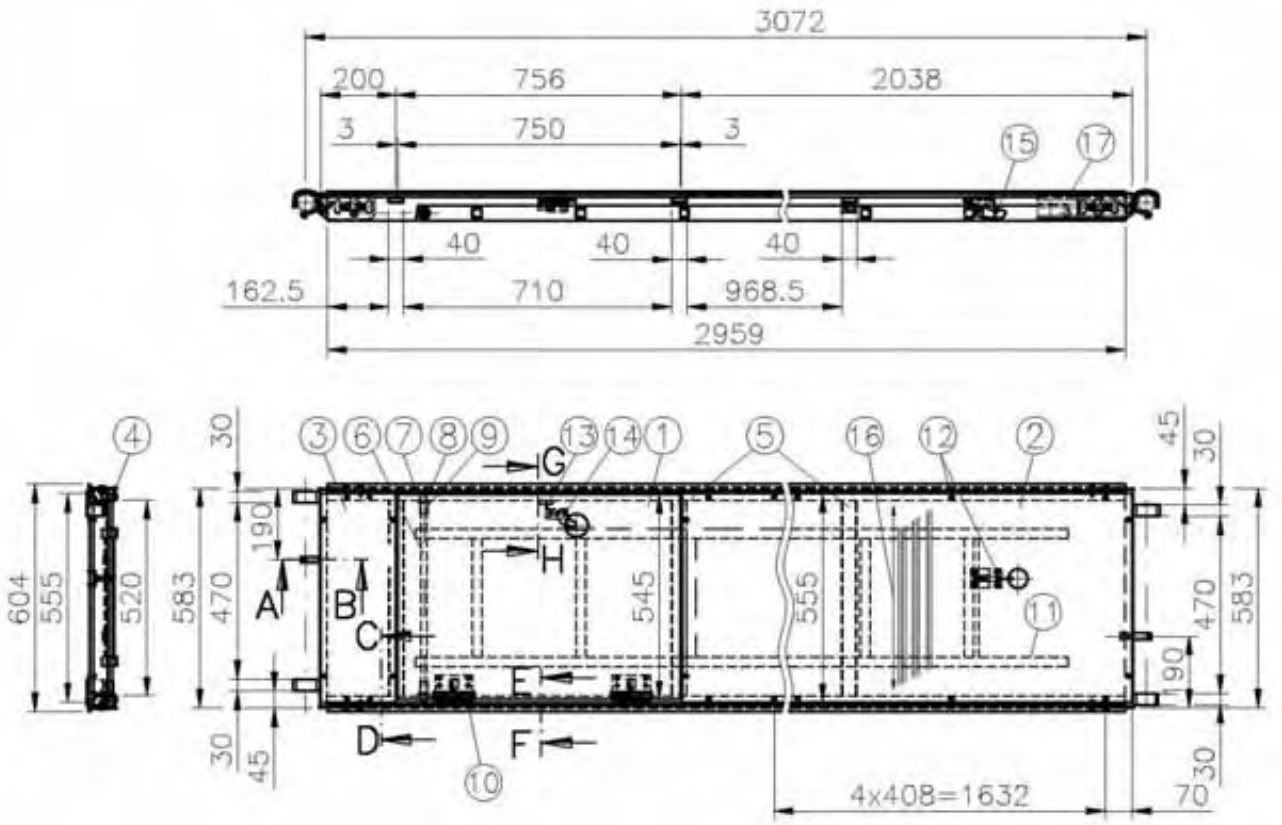
2.57m and 3.07m







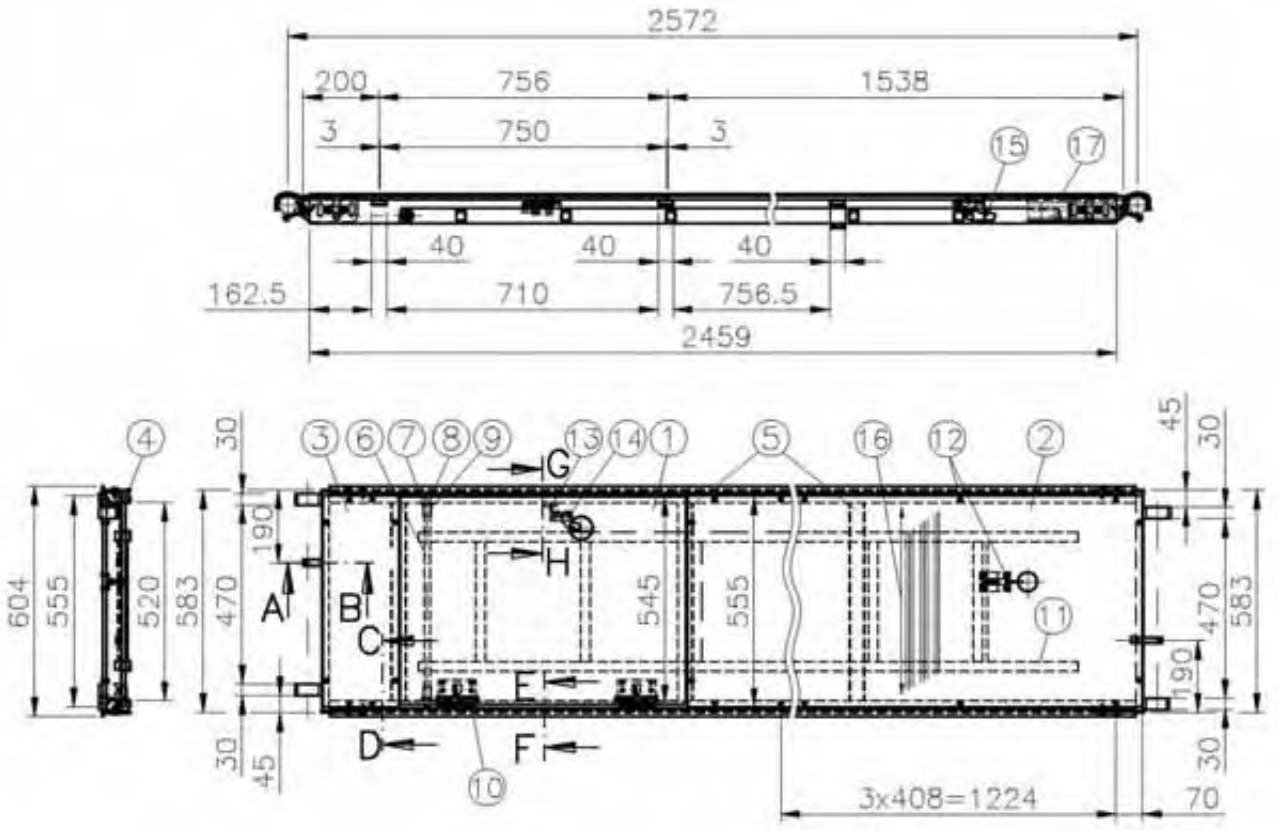
(1)	U 40x20x2	S235JR	
(2)	Mounting claw BI 4x65x148	S235JR	
(3)	Bd 30x8	S355J2;	alternatively: S355MC
(4)	Lock against lift-off FI 20x5	S235JR;	galvanized
(5)	Blind rivet 4.8x16	DIN 7337	
(6)	RV 40x15x2	EN AW-6063-T66	
(7)	Blind rivet 5x20	DIN 7337 EN AW-5754 H112	
(8)	Round-head bolt	DIN 603-M8x20	
(9)	Nut, self-locking	DIN 980-M8	
(10)	Aluminium brace profile	EN AW-6063-T66	
(11)	Head piece, galvanized	EN AW-6063-T66	



(1)	WISA Combi Mirror plywood 10x545 in acc. with Z-9.1-430	BFU (construction veneer plywood)100-G
(2)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU 100-G
(3)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU 100-G
(4)	Brace profile 78x42	EN AW-6063-T66
(5)	RV 40x15x2	EN AW-6063-T66
(6)	R 15x2	S235JRH
(7)	Disc ∅17	DIN 125
(8)	Cotter pin ∅4x25	DIN 94
(9)	Distance sleeve ∅20x2	PEHD
(10)	Scissor hinge 100x116x3	S235JR, galvanized
(11)	Ladder,	see Annex A709-A115
(12)	Blind rivet ∅5x20	EN AW-5754 H112
(13)	Blind rivet ∅4.8 x10	EN AW-5754 H112
(14)	Blind rivet ∅4.8x16	EN AW-5754 H112
(15)	Ladder holder	
(16)	Fibre direction	
(17)	Marking	

Sections and details, see Annex M710-B119 and M710-B122

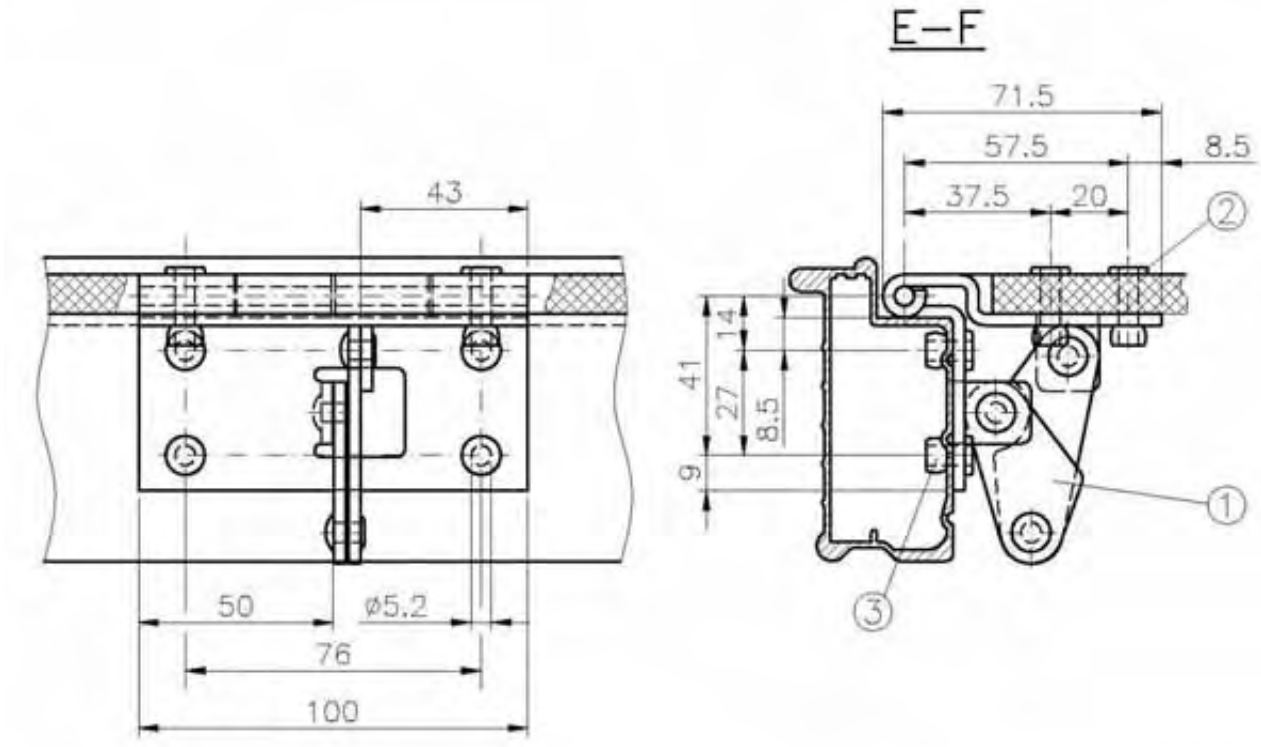
Load class 3

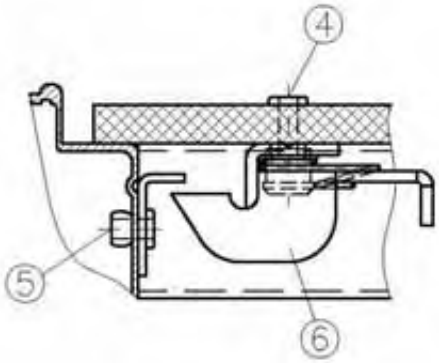


(1)	WISA Combi Mirror plywood 10x545 in acc. with Z-9.1-430	BFU (construction veneer plywood) 100-G
(2)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU 100-G
(3)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU 100-G
(4)	Brace profile 78x42	EN AW-6063-T66
(5)	RV 40x15x2	EN AW-6063-T66
(6)	R 15x2	S235JRH
(7)	Disc ∅17	DIN 125
(8)	Cotter pin ∅4x25	DIN 94
(9)	Distance sleeve ∅20x2	PEHD
(10)	Scissor hinge 100x116x3	S235JR, galvanized
(11)	Ladder,	see Annex A709-A115
(12)	Blind rivet ∅5x20	EN AW-5754 H112
(13)	Blind rivet ∅4.8 x10	EN AW-5754 H112
(14)	Blind rivet ∅4.8x16	EN AW-5754 H112
(15)	Ladder holder	
(16)	Fibre direction	
(17)	Marking	

Sections and details, see Annex M710-B119 and M710-B122

Load class 3





(1) Hinge 100x100x3
(2) Blind rivet 5x20 DIN 7337 EN AW-5754 H112
(3) Blind rivet 5x12 DIN 7337 EN AW-5754 H112
(4) Blind rivet 5x18 DIN 7337 EN AW-5754 H112
(5) Blind rivet 4.8x10 DIN 7337 EN AW-5754 H112
(6) Ledger

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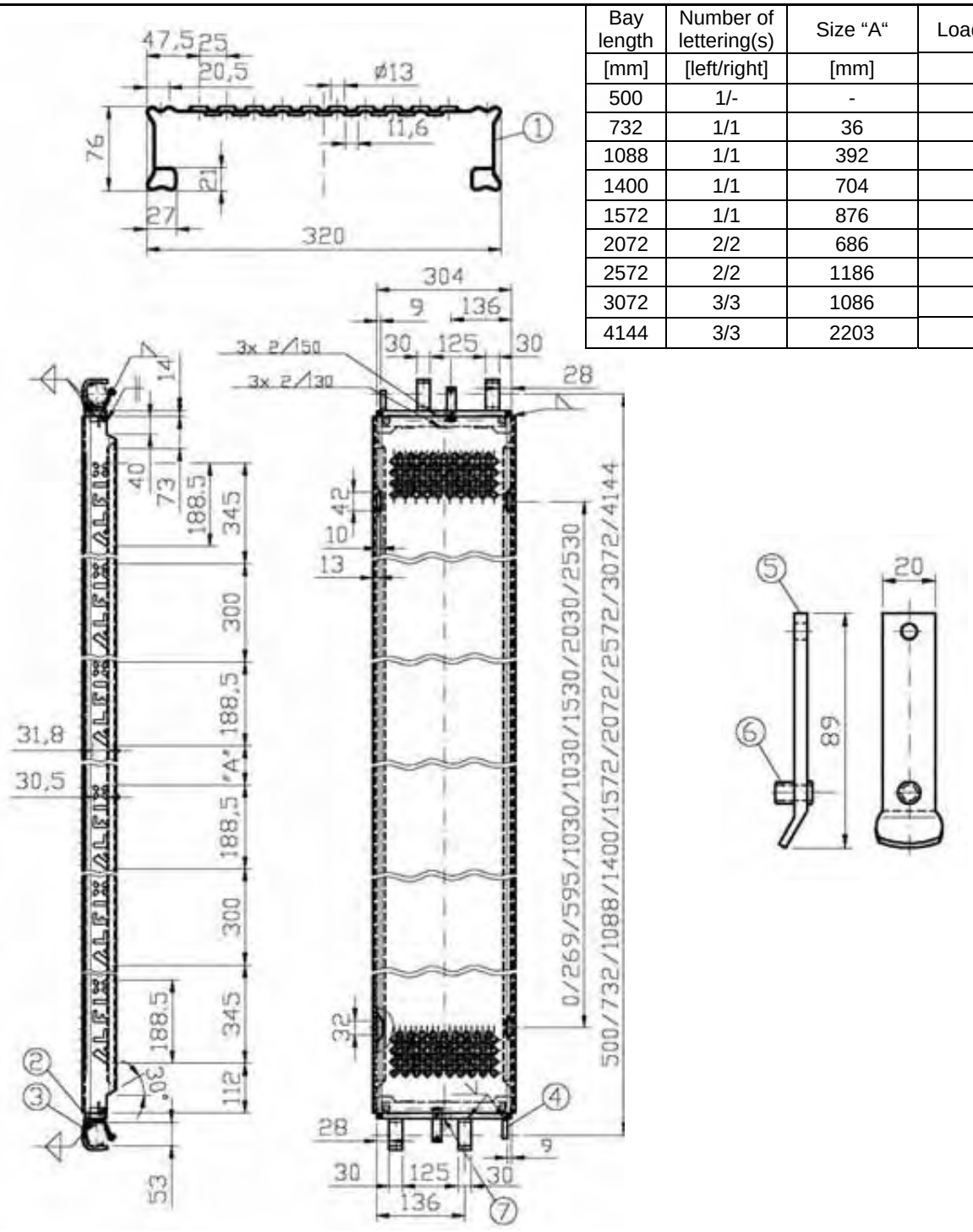
ALFIX MODUL plus II

Details

Aluminium frame deck

with access hatch RE

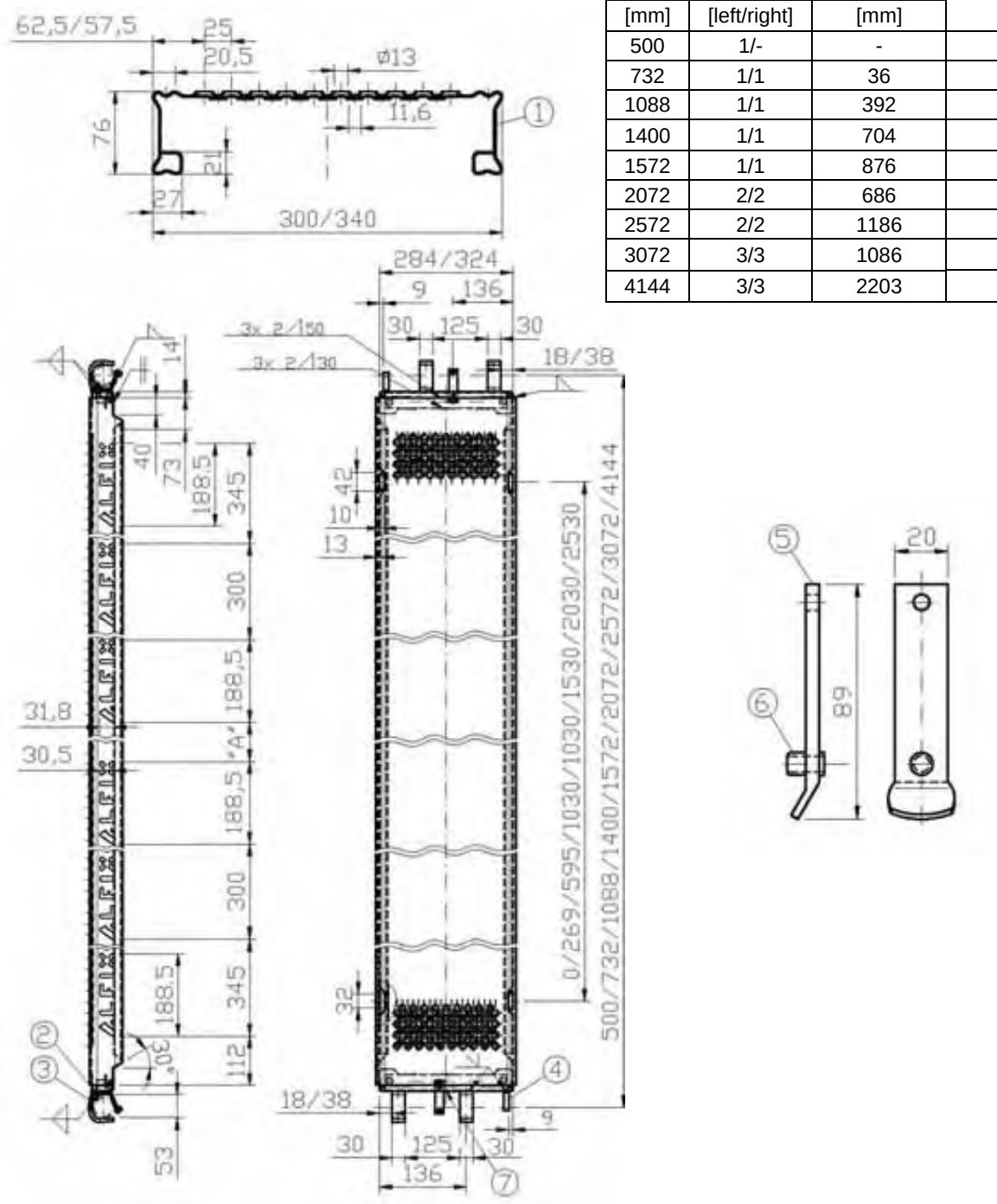
Bay length	Number of lettering(s)	Size “A“	Load class
[mm]	[left/right]	[mm]	
500	1/-	-	6
732	1/1	36	6
1088	1/1	392	6
1400	1/1	704	6
1572	1/1	876	6
2072	2/2	686	6
2572	2/2	1186	5
3072	3/3	1086	4
4144	3/3	2203	3



(1)	Bd 1.5mm	DIN EN 10111-DD11	ReH≥280N/mm²	Rm≥360N/mm²
	alternatively	DIN EN 10025-2 S235JR	ReH≥280N/mm²	Rm≥360N/mm²
(2)	Bd 2mm	DIN EN 10111-DD11	ReH≥240N/mm²	Rm≥360N/mm²
(3)	Bd 30x8	S355J2 alternatively: S355MC		
(4)	L 45x45x5	S235JR		
(5)	Fl 20x5	S235JR		
(6)	Blind rivet Ø4.8x16	DIN 7337		
(7)	Marking			

galvanized; all welds a=2mm

Bay length	Number of lettering(s)	Size “A“	Load class
[mm]	[left/right]	[mm]	
500	1/-	-	6
732	1/1	36	6
1088	1/1	392	6
1400	1/1	704	6
1572	1/1	876	6
2072	2/2	686	6
2572	2/2	1186	5
3072	3/3	1086	4
4144	3/3	2203	3



(1)	Bd 1.5mm	DIN EN 10111-DD11	ReH≥280N/mm²	Rm≥360N/mm²
	alternatively:	DIN EN 10025-2 S235JR	ReH≥280N/mm²	Rm≥360N/mm²
(2)	Bd 2mm	DIN EN 10111-DD11	ReH≥240N/mm²	Rm≥360N/mm²
(3)	Bd 30x8	S355J2 alternatively: S355MC		
(4)	L 45x45x5	S235JR		
(5)	Fl 20x5	S235JR		
(6)	Blind rivet Ø4.8x16	DIN 7337		
(7)	Marking			

galvanized; all welds a=2mm

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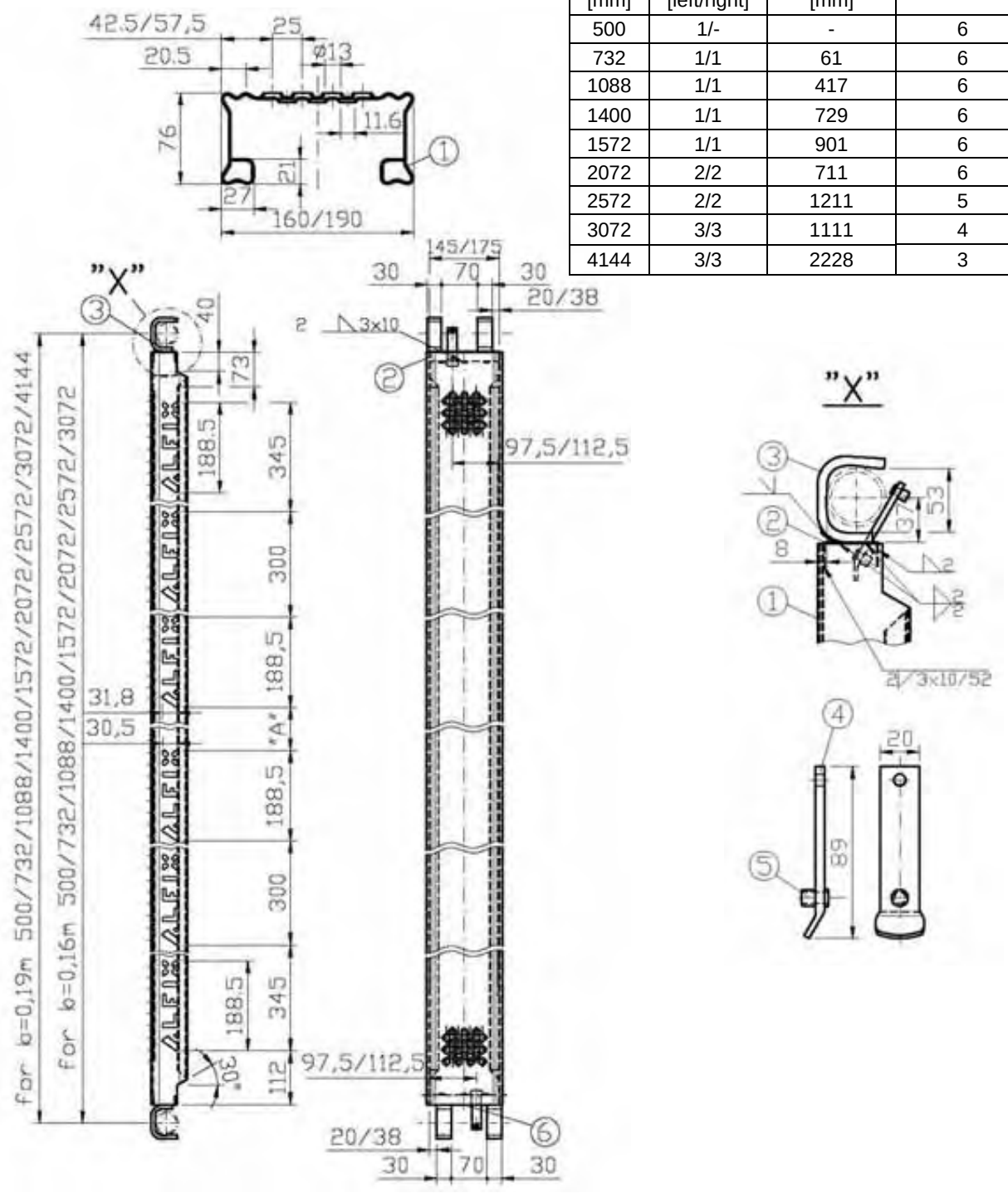
ALFIX MODUL plus II

Steel deck AF RE 0.30m, 0.34m

Bay length	Number of lettering(s)	Size “A“	Load class
[mm]	[left/right]	[mm]	
500	1/-	-	6
732	1/1	61	6
1088	1/1	417	6
1400	1/1	729	6
1572	1/1	901	6
2072	2/2	711	6
2572	2/2	1211	5
3072	3/3	1111	4
4144	3/3	2228	3



(1) Bd 1.5mm DIN EN 10111-DD11 ReH≥280N/mm² Rm≥360N/mm²
alternatively: DIN EN 10025-2 S235JR ReH≥280N/mm² Rm≥360N/mm²
(2) U 45x20x2 S235JR
(3) Bd 30x8 S355J2 alternatively: S355MC
(4) Fl 20x5 S235JR
(5) Blind rivet Ø4.8x16 DIN 7337
(6) Marking

galvanized; all welds a=2mm

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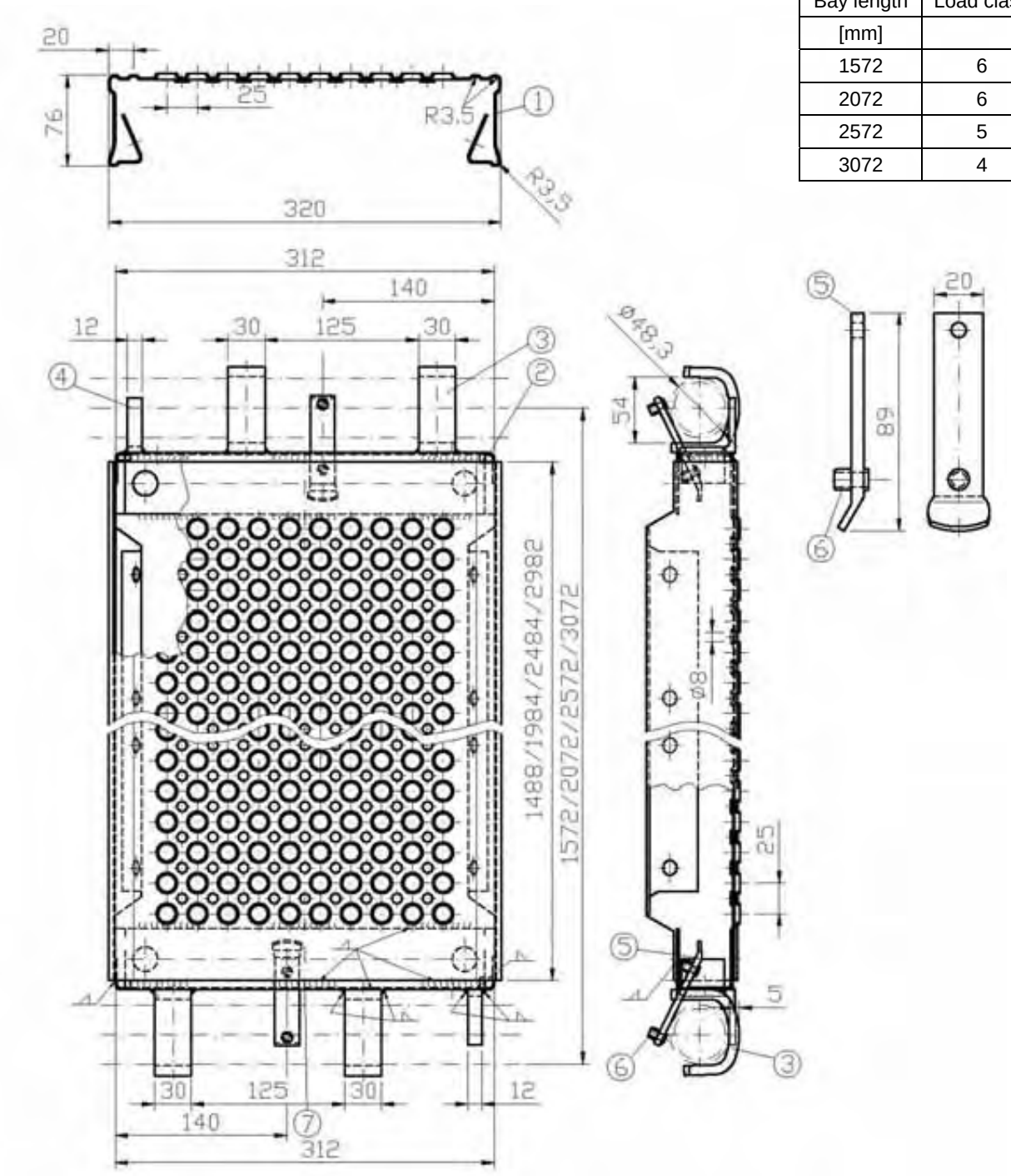
ALFIX MODUL plus II

Intermediate deck AF RE

0.16m, 0.19m

Bay length	Load class
[mm]	
1572	6
2072	6
2572	5
3072	4



(1)	Bd 590x1.5	DIN EN 10111- DD11	ReH≥280N/mm²
(2)	Bd 140x2	DIN EN 10111- DD11	ReH≥280N/mm²
(3)	Bd 30x8	S355J2 alternatively: S355MC	
(4)	L 45x45x5	S235JR	
(5)	Fl 20x5	S235JR	
(6)	Blind rivet Ø4.8x16	DIN 7337	
(7)	Marking:	manufacturer's mark – AF XX – year of manufacture	

galvanized; all welds a=2mm

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ALFIX MODUL plus II

Steel deck RE

Former design

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of 13. October 2011
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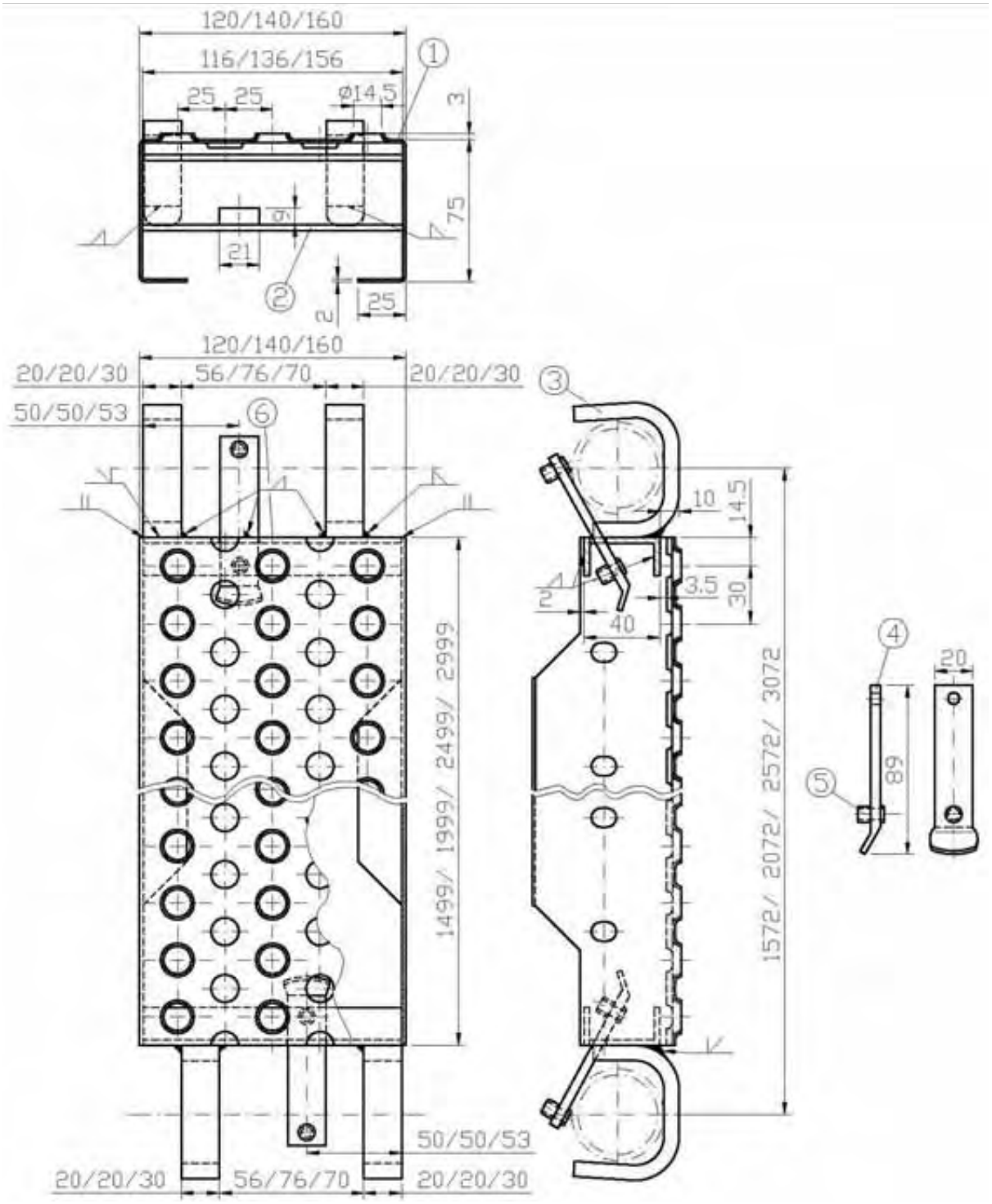
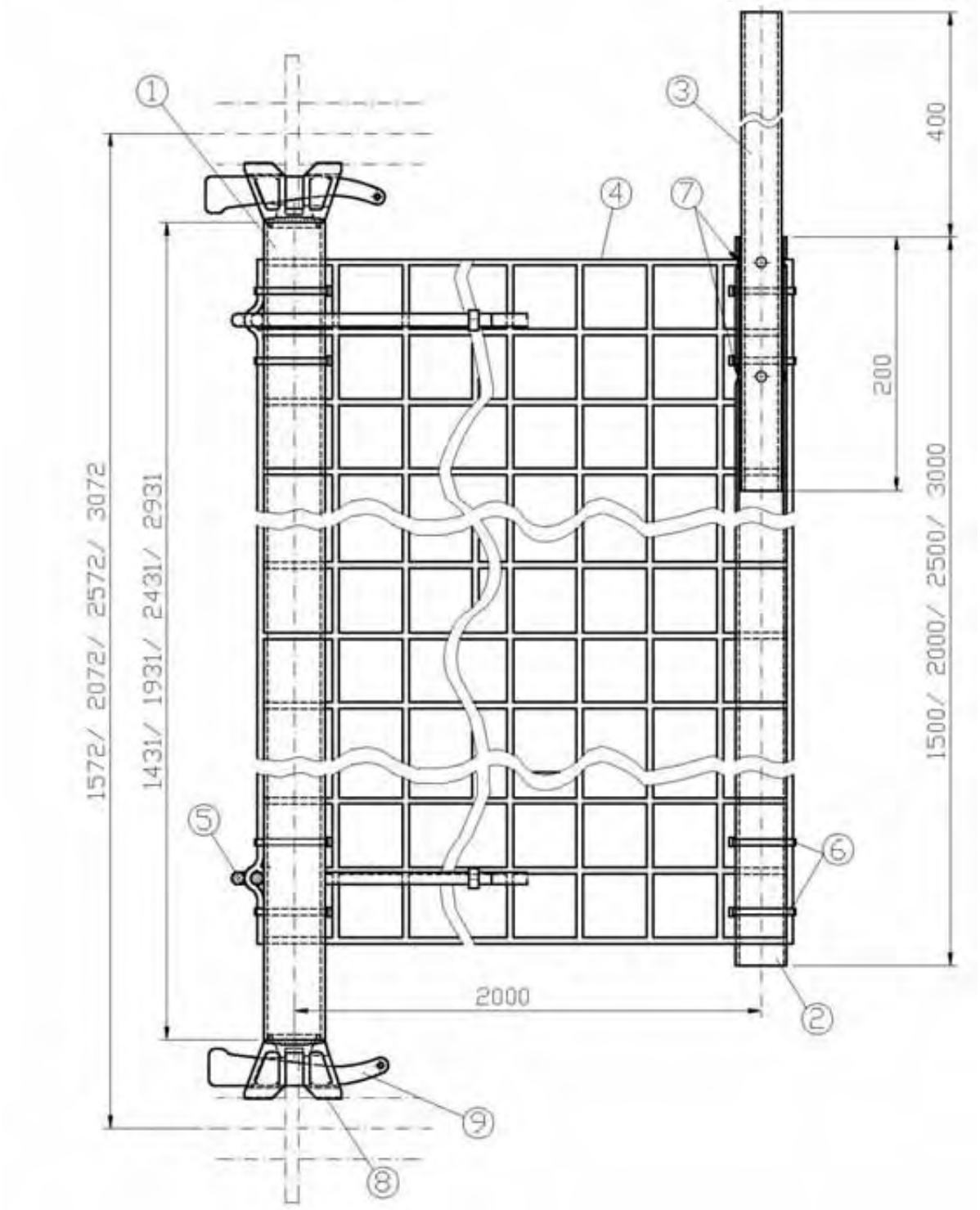
M709-B023



(1) Profiled safety grating, round
(2) U 40x20x3 S235JR
(3) Bd 20x8/30x8 S355J2 alternatively: S355MC
(4) Fl 20x5 S235JR
(5) Blind rivet Ø4.8x16 DIN 7337
(6) Marking: manufacturer's mark – AF XX – year of manufacture

galvanized; all welds a=3mm



(1) Tube ledger
(2) R 40x2.5 EN AW-6060-T66
(3) R 32x3 EN AW-6060-T66
(4) Safety mesh guard DIN EN 1263-1-U-A2-M100-Q
(5) Rope Ø10x3500 Polyamide
(6) Cable tie 5x270
(7) 4x circumferentially quadruple-swaged
(8) Tube ledger connection
(9) Wedge 6mm S550MC

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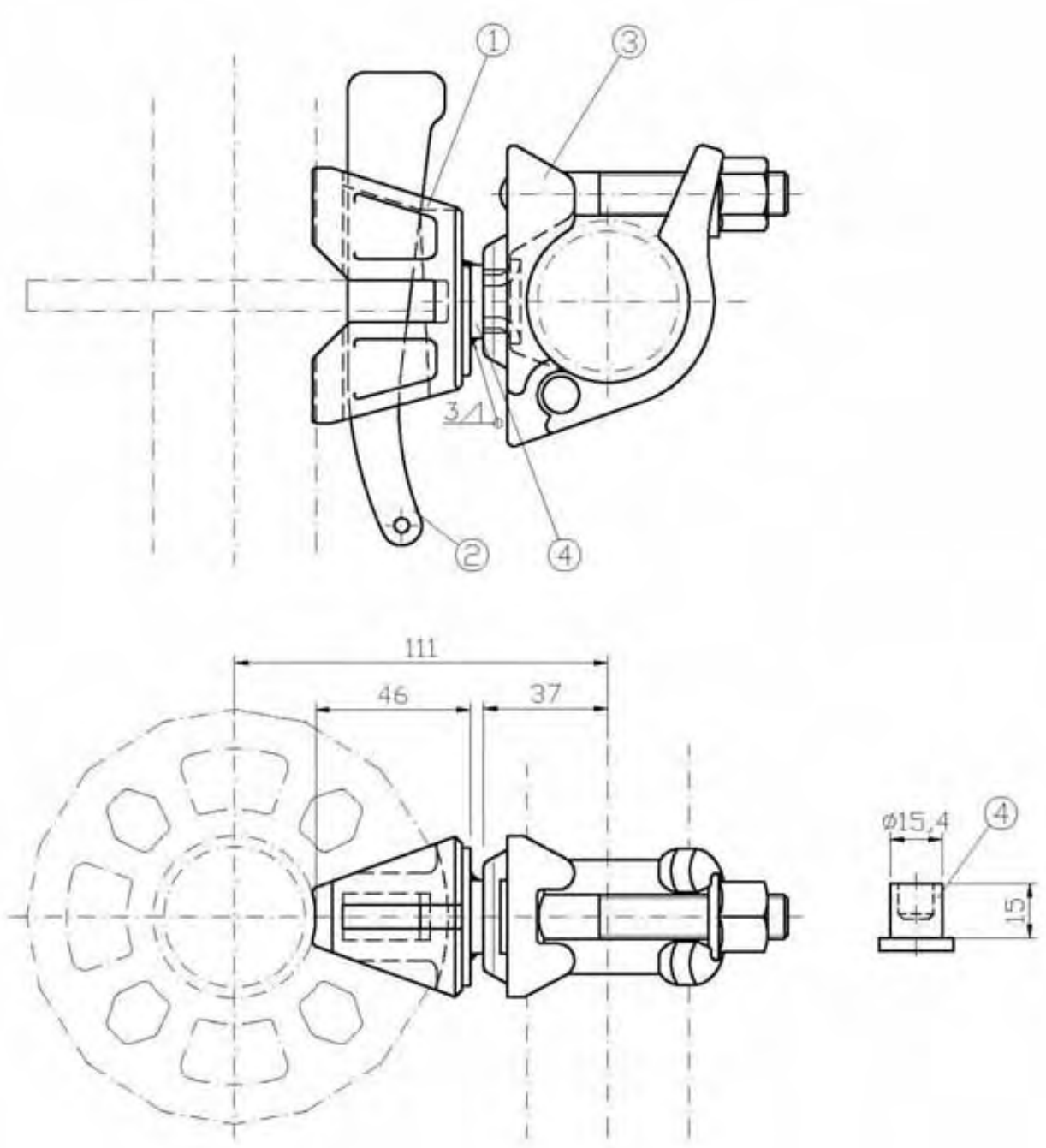
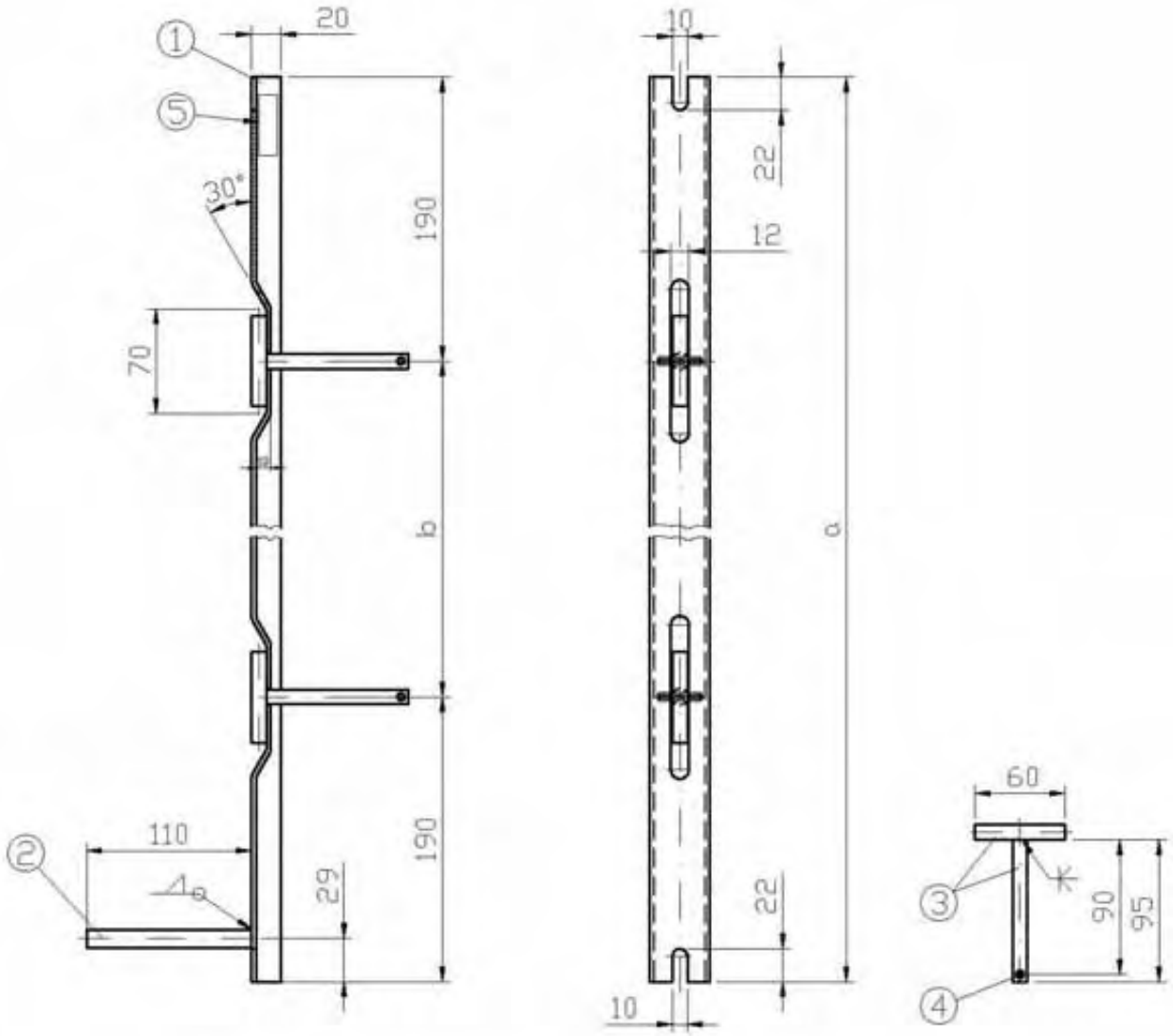
ALFIX MODUL plus II

Modular safety mesh guard



(1) U-ledger connection
(2) Wedge 6mm S550MC
(3) Halfcoupler, class B
(4) Rivet, wedge head coupler QST 36

galvanized



⑥	a (mm)	b (mm)
732	648	268
1088	1004	624
1400	1316	936
1572	1488	1108
2072	1988	1608
2572	2488	2108
3072	2988	2608

(1)	U 40x20x3	S235JR
(2)	Rd 12 (alternatively for ALFIX toeboard)	S235JR
(3)	Rd 10	S235JR
(4)	Straight grooved pin	DIN 1473-5x30-steel, galvanized
(5)	Marking	
(6)	Length L (mm)	

galvanized

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ALFIX MODUL plus II

Modular deck retainer

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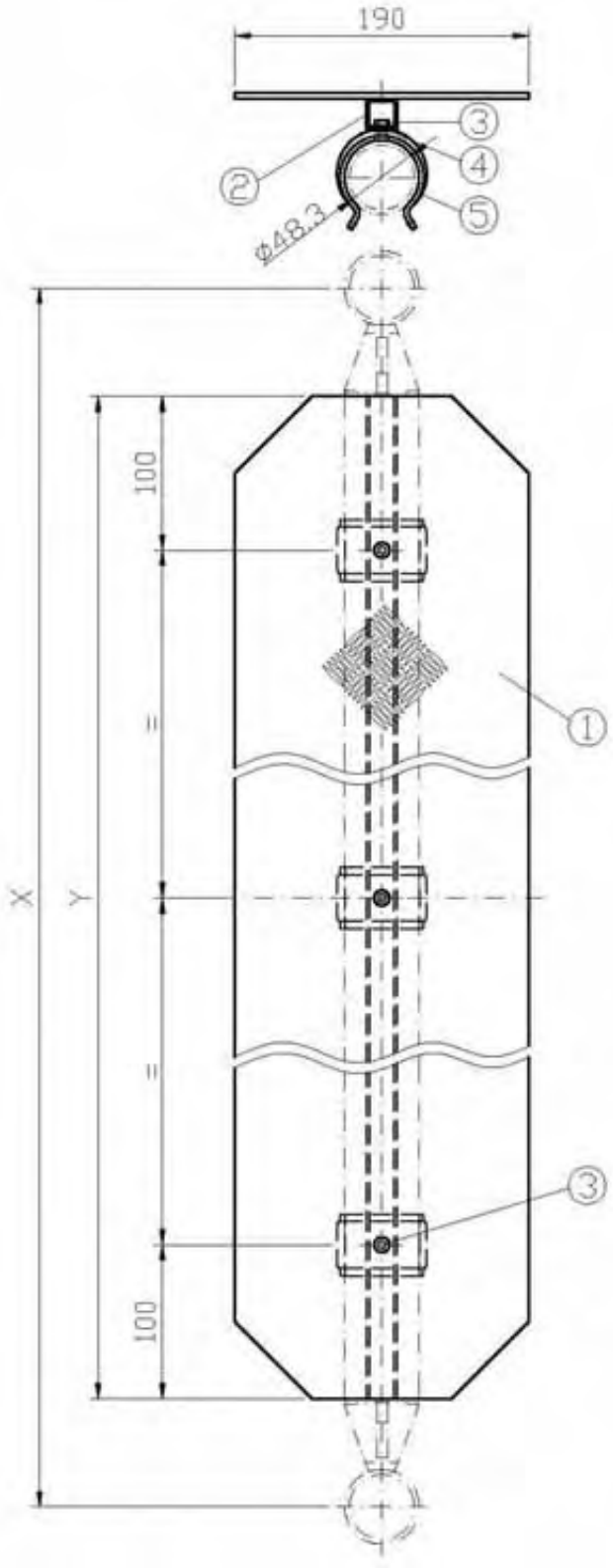
Deutsches Institut für Bautechnik

M710-B130



X	Y
732	591
1088	947
1286	1145
1400	1259
1572	1431
2072	1931
2572	2431
3072	2931
4144	4003

(1)	Checker plate, quintet W5 2.5/3.3x190	DIN EN 1386	EN AW-5083 H224
(2)	RV 20x20x2	EN AW-6060-T66	
(3)	Blind rivet Ø5x12	DIN 7337	EN AW-5754 H112
(4)	Disc 5.3	DIN 125	
(5)	Pipe clamp, galvanized		

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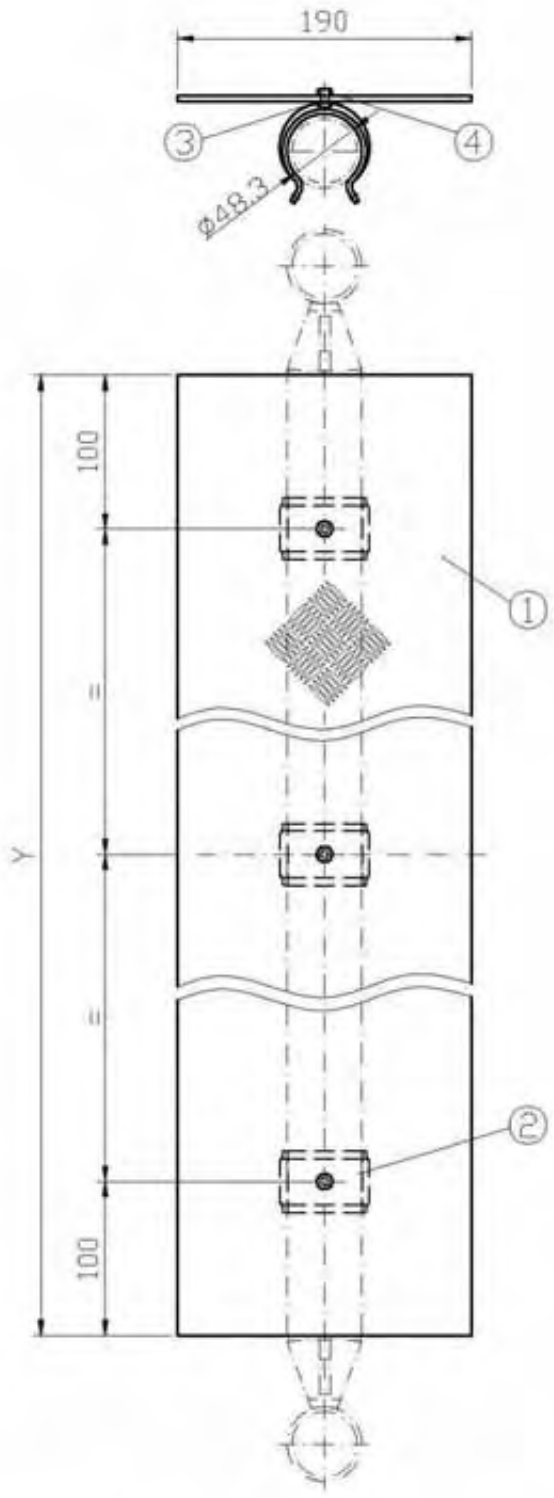
ALFIX MODUL plus II

Modular gap cover



X	Y
732	591
1088	947
1286	1145
1400	1259
1572	1431
2072	1931
2572	2431
3072	2931
4144	4003

(1)	Checker plate, quintet W5 2.5/3.3x190	DIN EN 1386	EN AW-5083 H224
(2)	Pipe clamp, galvanized		
(3)	Disc 5.3	DIN 125	
(4)	Blind rivet Ø5x12	DIN 7337	EN AW-5754 H112

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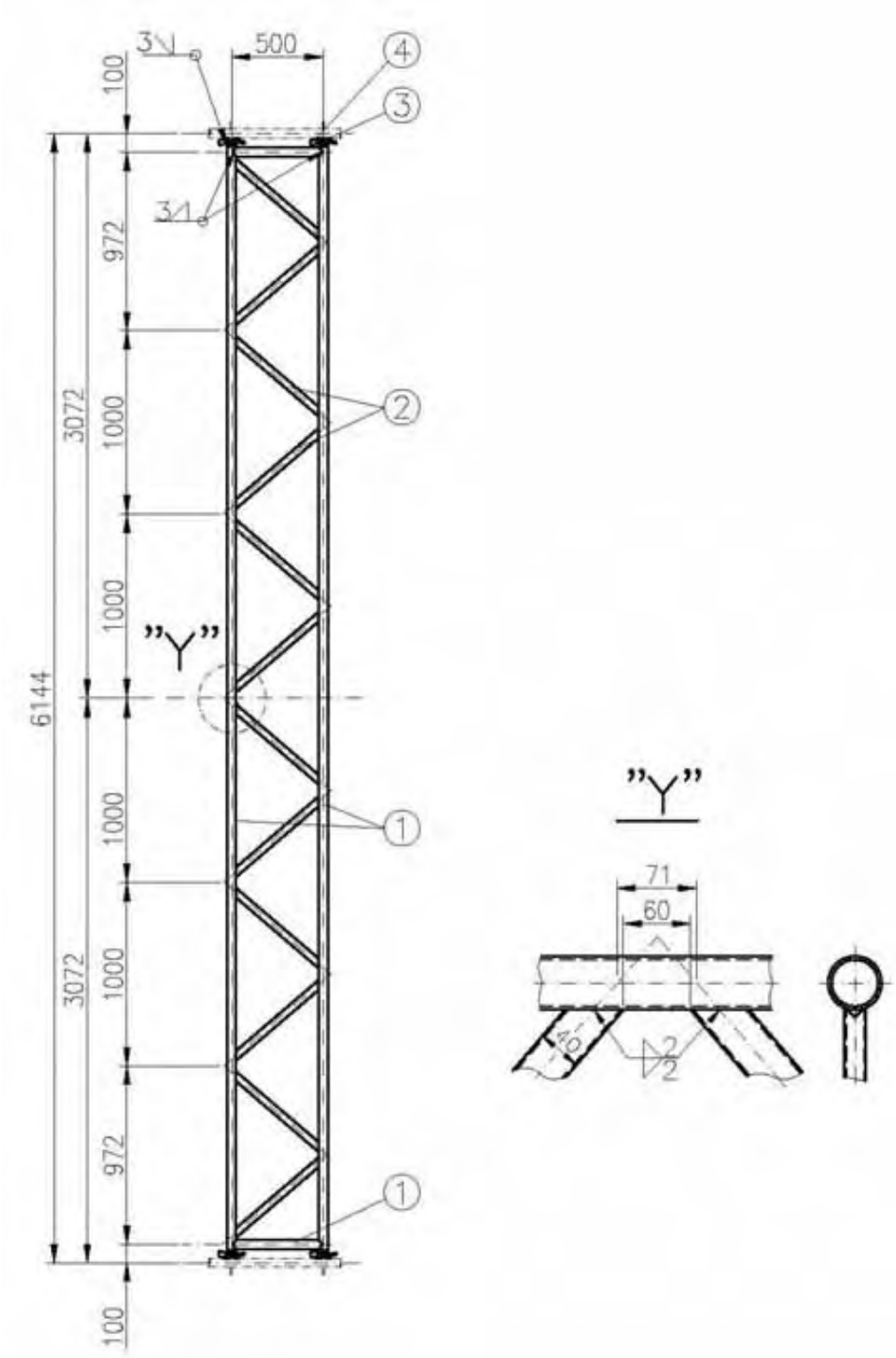
ALFIX MODUL plus II

Modular gap cover RE



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm²
(2)	RV 40x20x2	S235JRH	ReH≥320N/mm²
(3)	Tube ledger connection		
(4)	Wedge 6mm	S550MC	

galvanized

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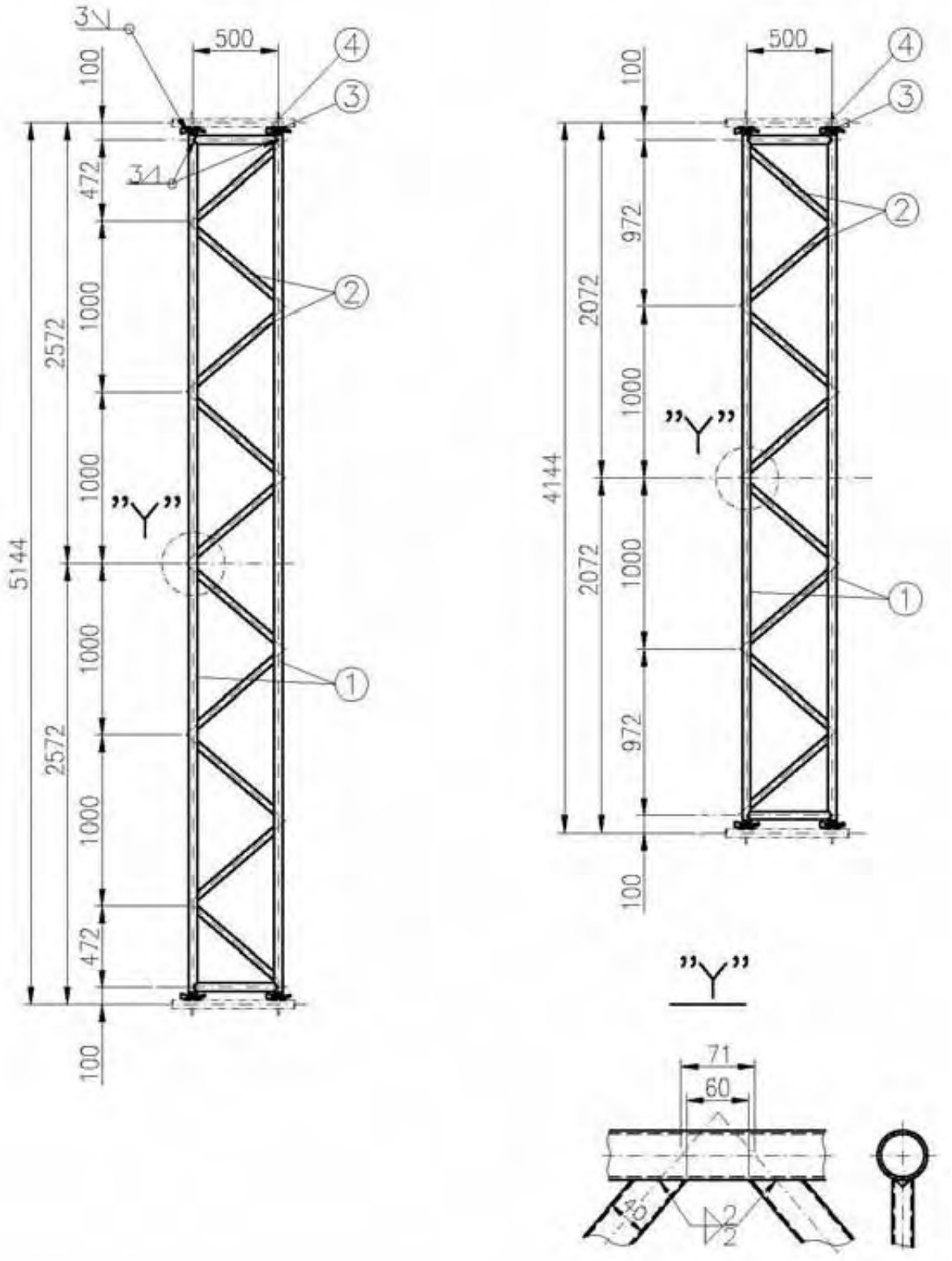
ALFIX MODUL plus II

Modular lattice girder

6.14m



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm²
(2)	RV 40x20x2	S235JRH	ReH≥320N/mm²
(3)	Tube ledger connection		
(4)	Wedge 6mm	S550MC	

galvanized

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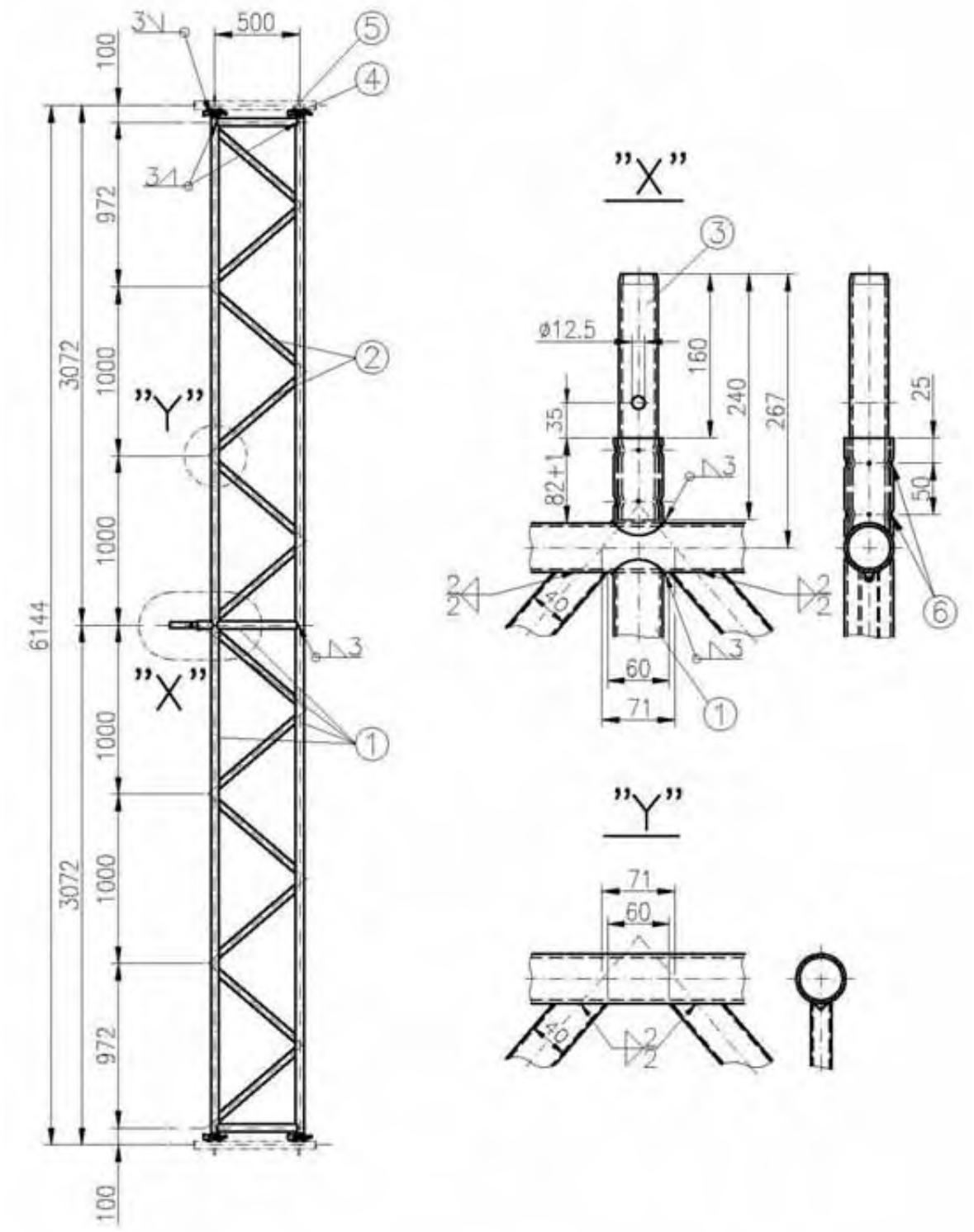
ALFIX MODUL plus II

Modular lattice girder

5.14m/ 4.14m



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm²
(2)	RV 40x20x2	S235JRH	ReH≥320N/mm²
(3)	R 38x3.6	S235JRH	ReH≥320N/mm²
(4)	Tube ledger connection		
(5)	Wedge 6mm	S550MC	
(6)	4x spot-swaging		

galvanized

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ALFIX MODUL plus II

Modular lattice girder with spigot fitting 6.14m

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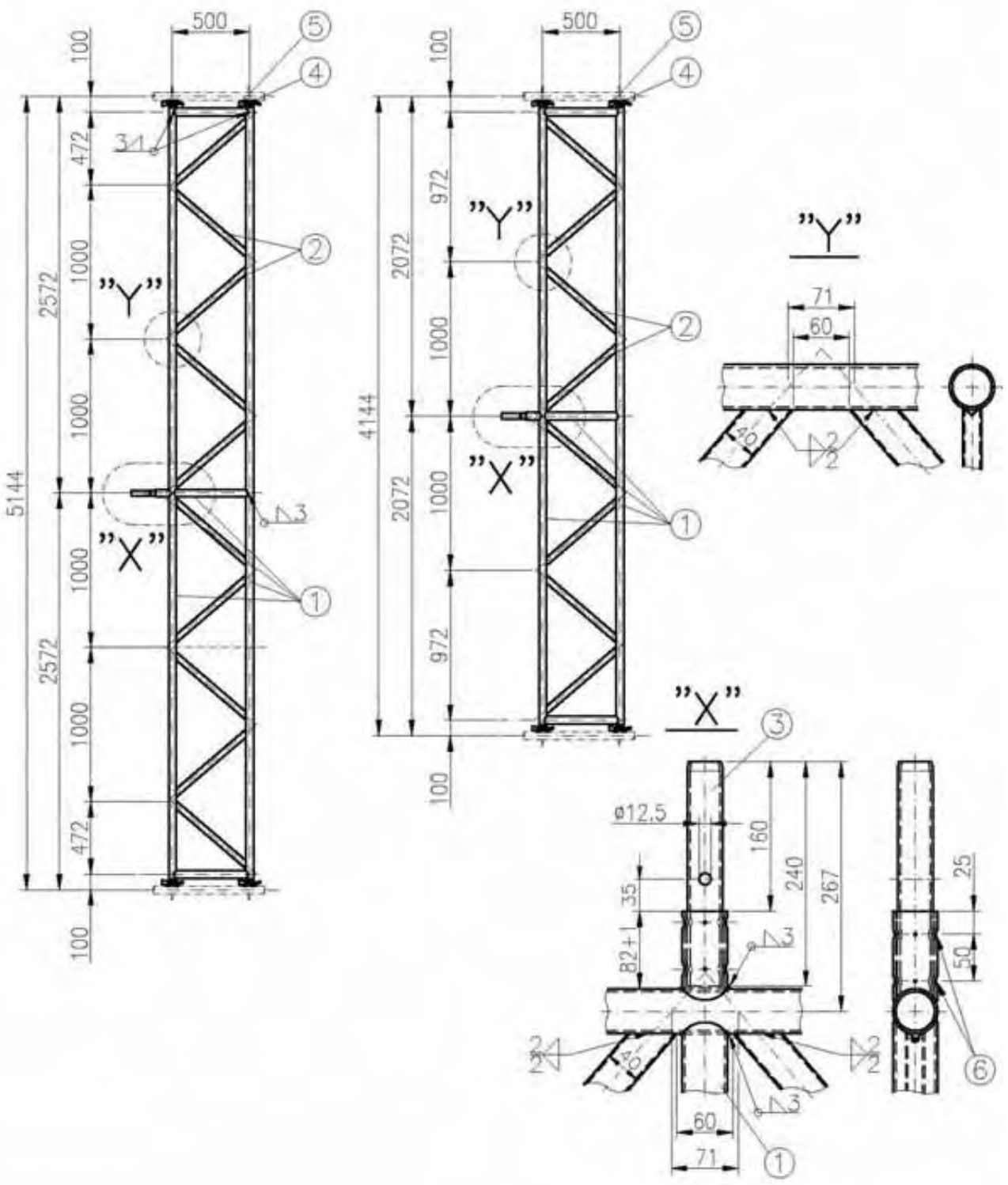
M710-B135



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm²
(2)	RV 40x20x2	S235JRH	ReH≥320N/mm²
(3)	R 38x3.6	S235JRH	ReH≥320N/mm²
(4)	Tube ledger connection		
(5)	Wedge 6mm	S550MC	
(6)	4x spot-swaging		

galvanized

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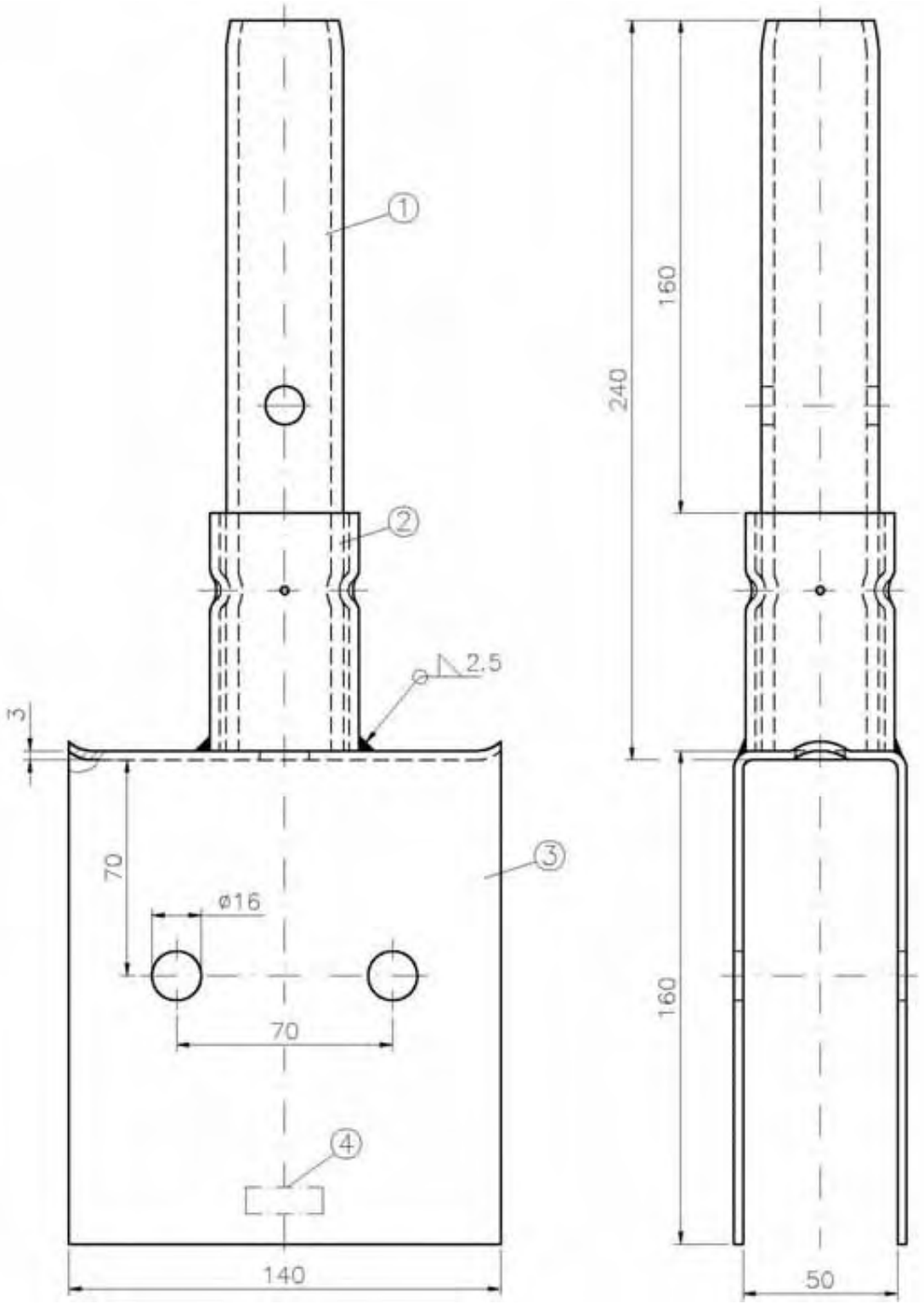
ALFIX MODUL plus II

Modular lattice girder with spigot fitting 4.14m/ 5.14m



(1) R 38x3.6 S235JRH ReH≥320N/mm²
(2) R 48.3x3.2 S235JRH ReH≥320N/mm²
(3) BI 3 S235JRH
(4) Marking

galvanized

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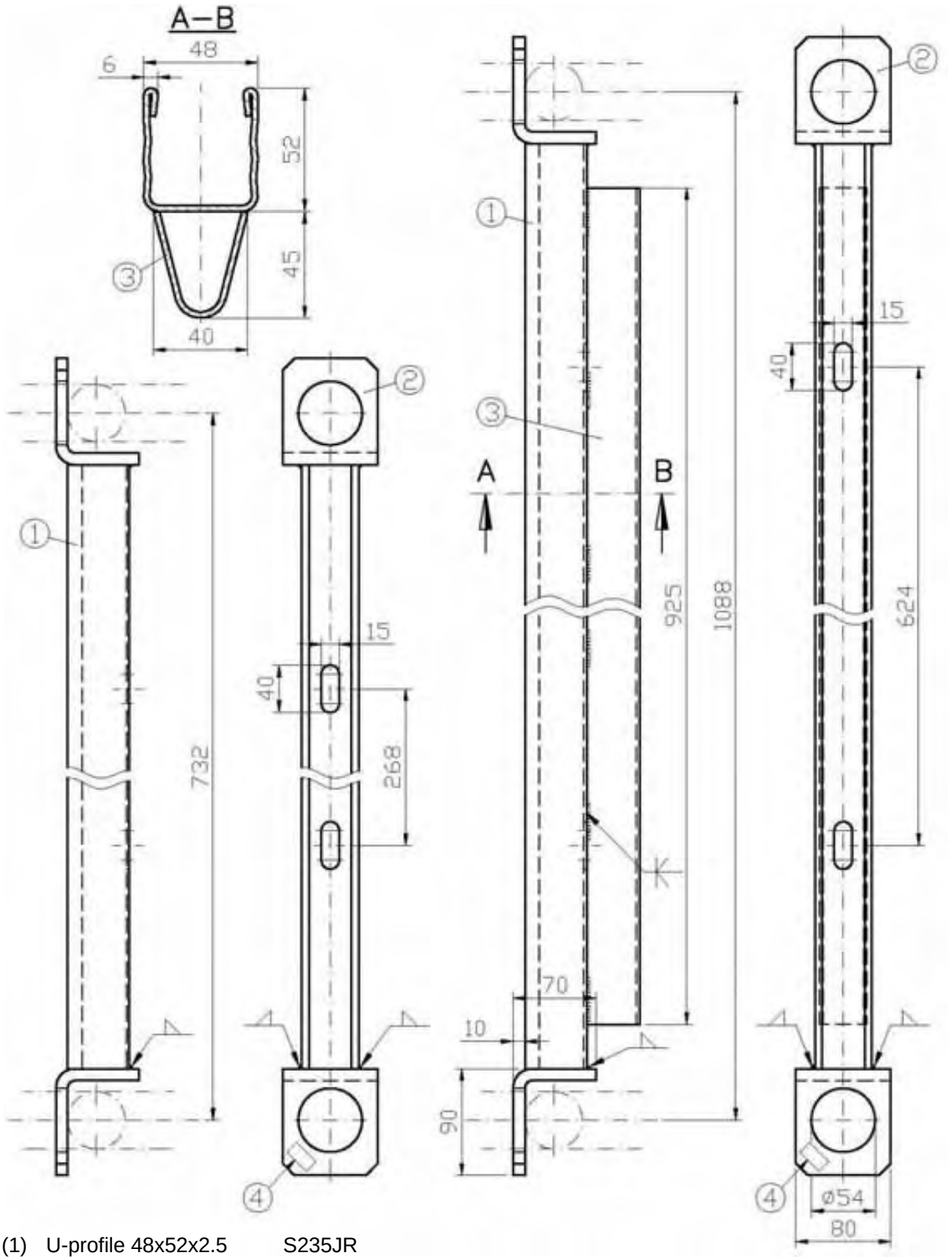
ALFIX MODUL plus II

Modular spigot fitting U



(1) U-profile 48x52x2.5 S235JR
(2) Fl 80x10 S235JR
(3) Bl 3 S235JR
(4) Marking

galvanized; all welds a=3mm

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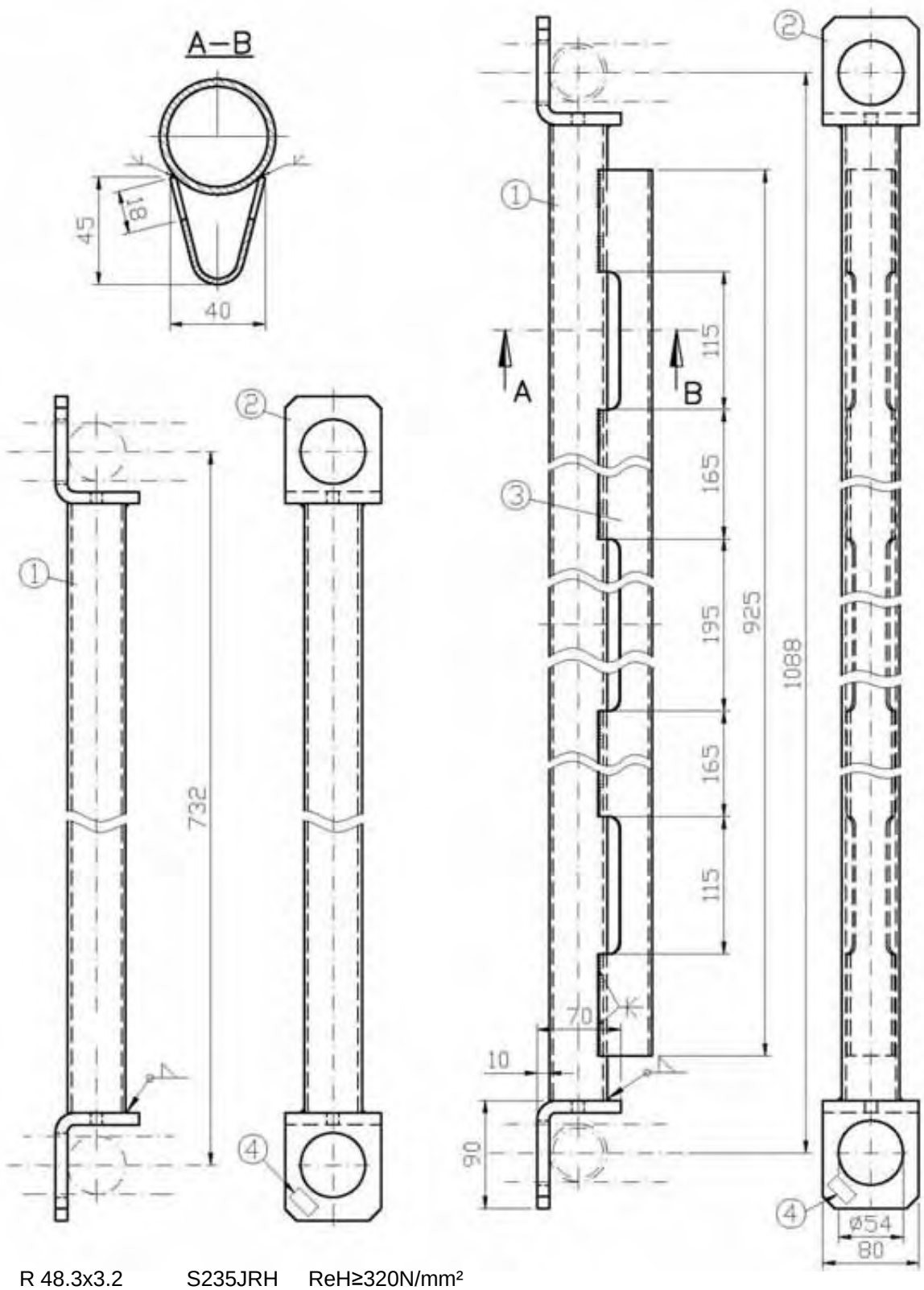
ALFIX MODUL plus II

U-transom GT 0.73m
U-transom GT 1.09m V



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm²
(2)	Fl 80x10	S235JR	
(3)	Bl 3	S235JR	
(4)	Marking		

galvanized; all welds a=3mm

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ALFIX MODUL plus II

Tube transom GT 0.73m

Tube transom GT 1.09m V

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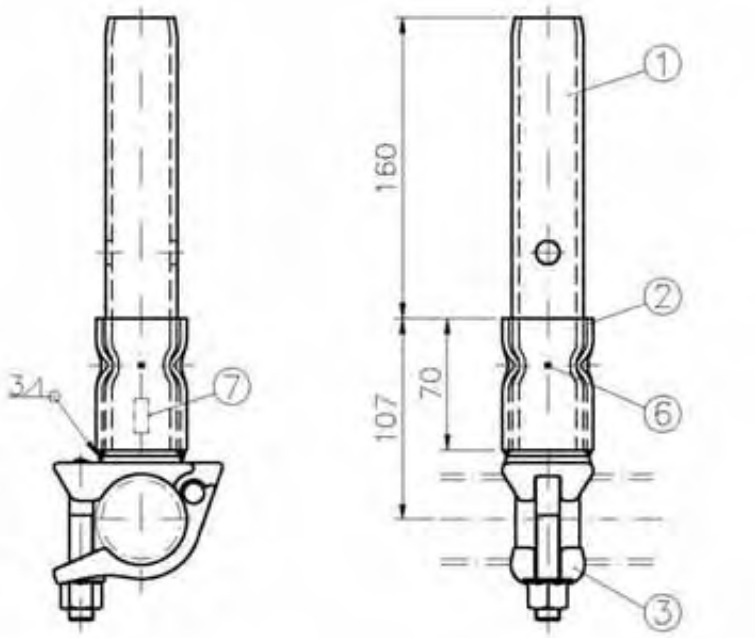
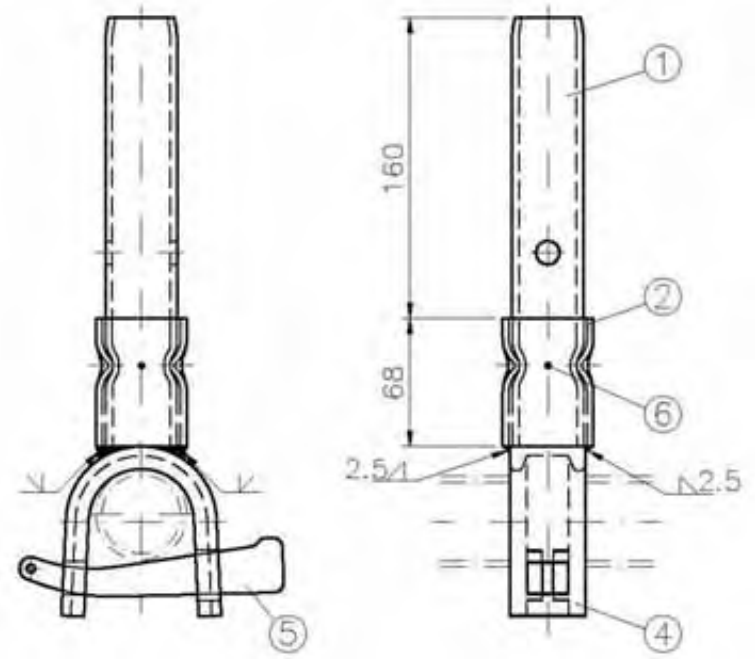
with halfcoupler

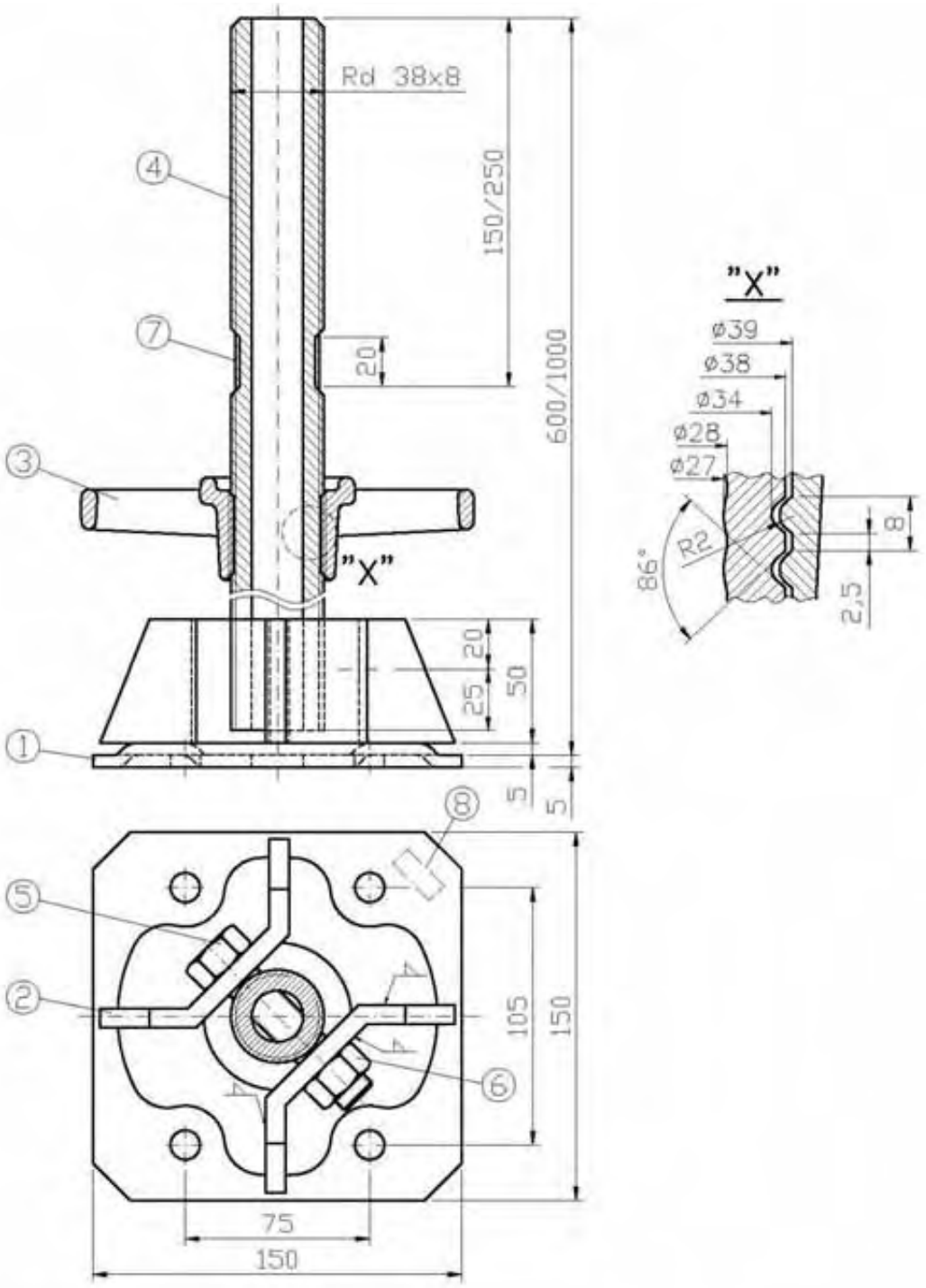


with wedge



(1)	R 38x3.6	S235JRH	ReH≥320N/mm²
(2)	R 48.3x3.2	S235JRH	ReH≥320N/mm²
(3)	Halfcoupler, class B		
(4)	Double bead profile 40x12x5x7	S235JR	
(5)	Wedge 6mm	S550MC	
(6)	4x spot-swaging	alternatively:	2x spot welding 12
(7)	Marking		

galvanized



(1)	Bl t=5mm	S235JR
(2)	Fl 50x8	S235JR
(3)	Adjusting nut, zinc-plated	G20Mn5 DIN EN 10293
(4)	Thread rolled on tube Ø38x4.5	S355J2H
(5)	Hex nut, self-locking	DIN 985-M16-8- galvanized
(6)	Hexagon screw	DIN 931-M16x75-8.8- galvanized
(7)	Thread damaged by two dents	
(8)	Marking	

galvanized; all welds a=3mm

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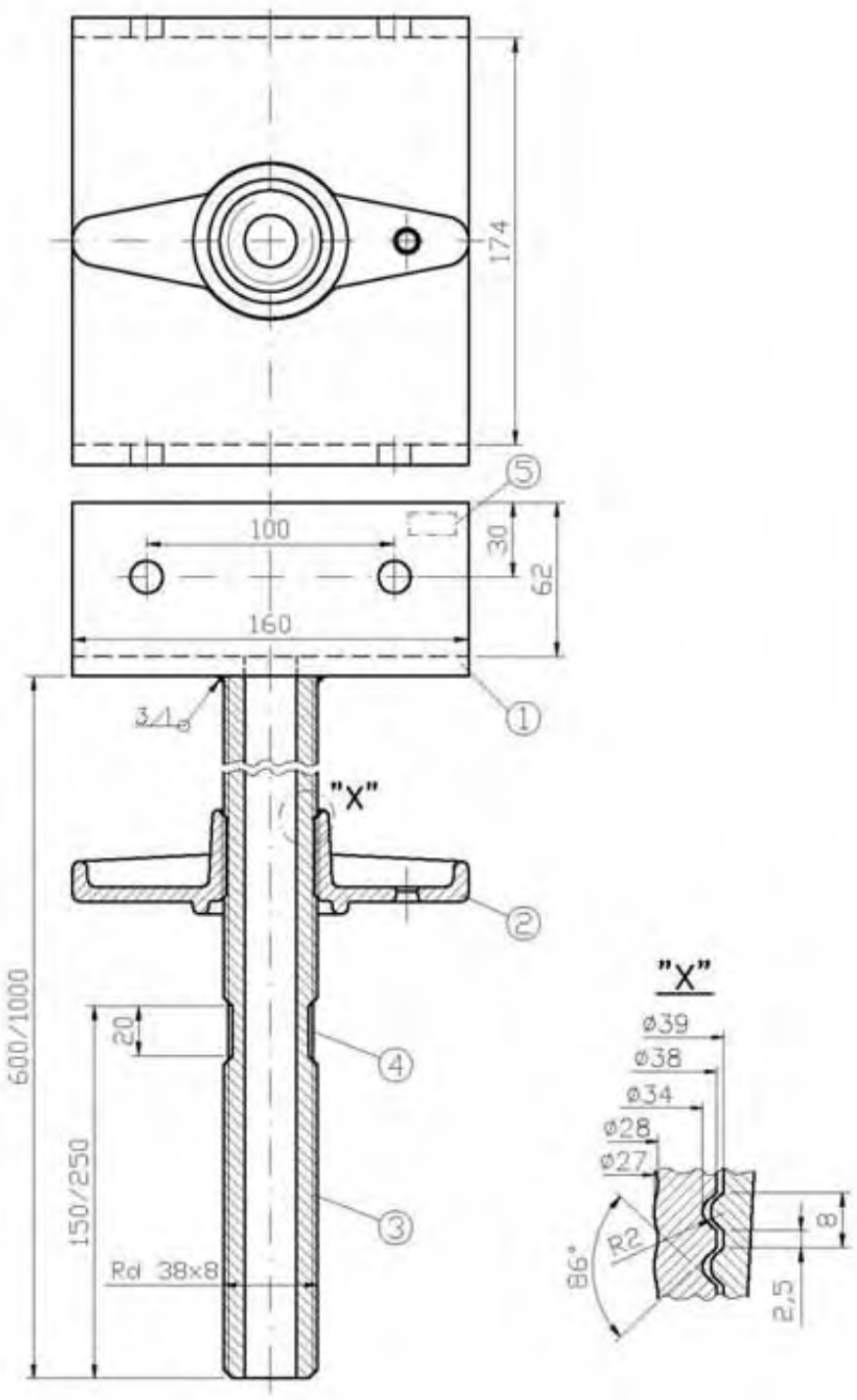
ALFIX MODUL plus II

Base jack, swivelling



(1) Bl t=8mm S235JR
(2) Adjusting nut, zinc-plated G20Mn5 DIN EN 10293
(3) Thread rolled on tube ø38x4.5 S355J2H
(4) Thread damaged by two dents
(5) Marking

galvanized

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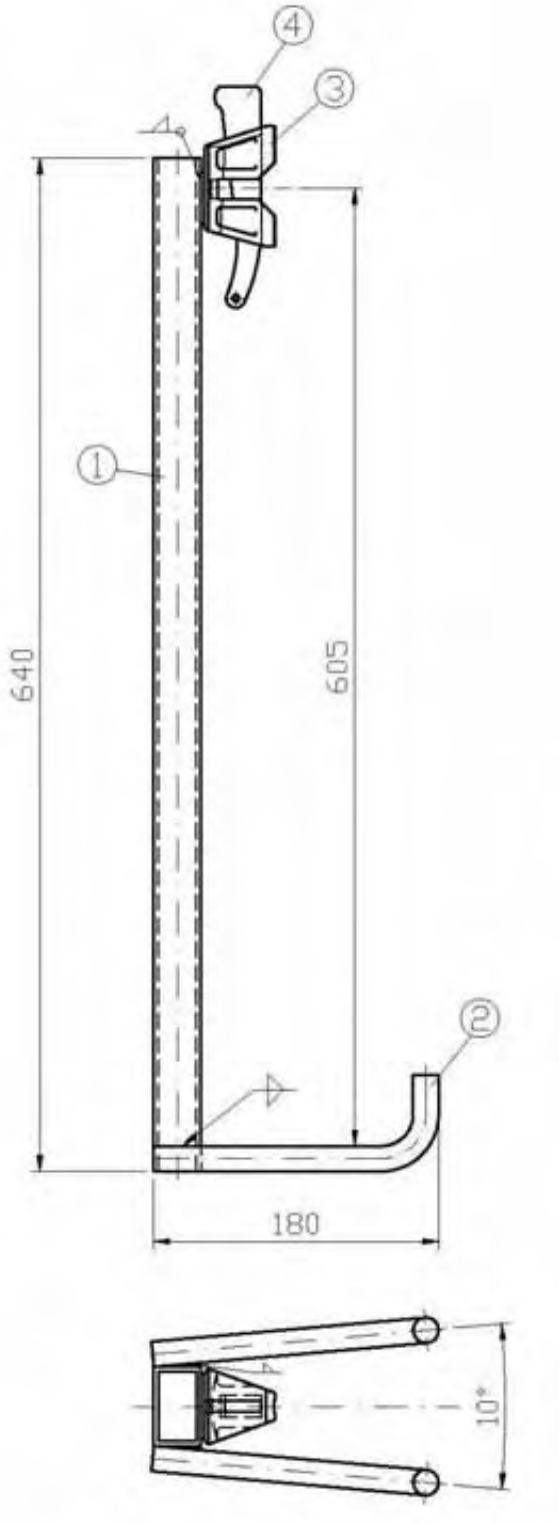
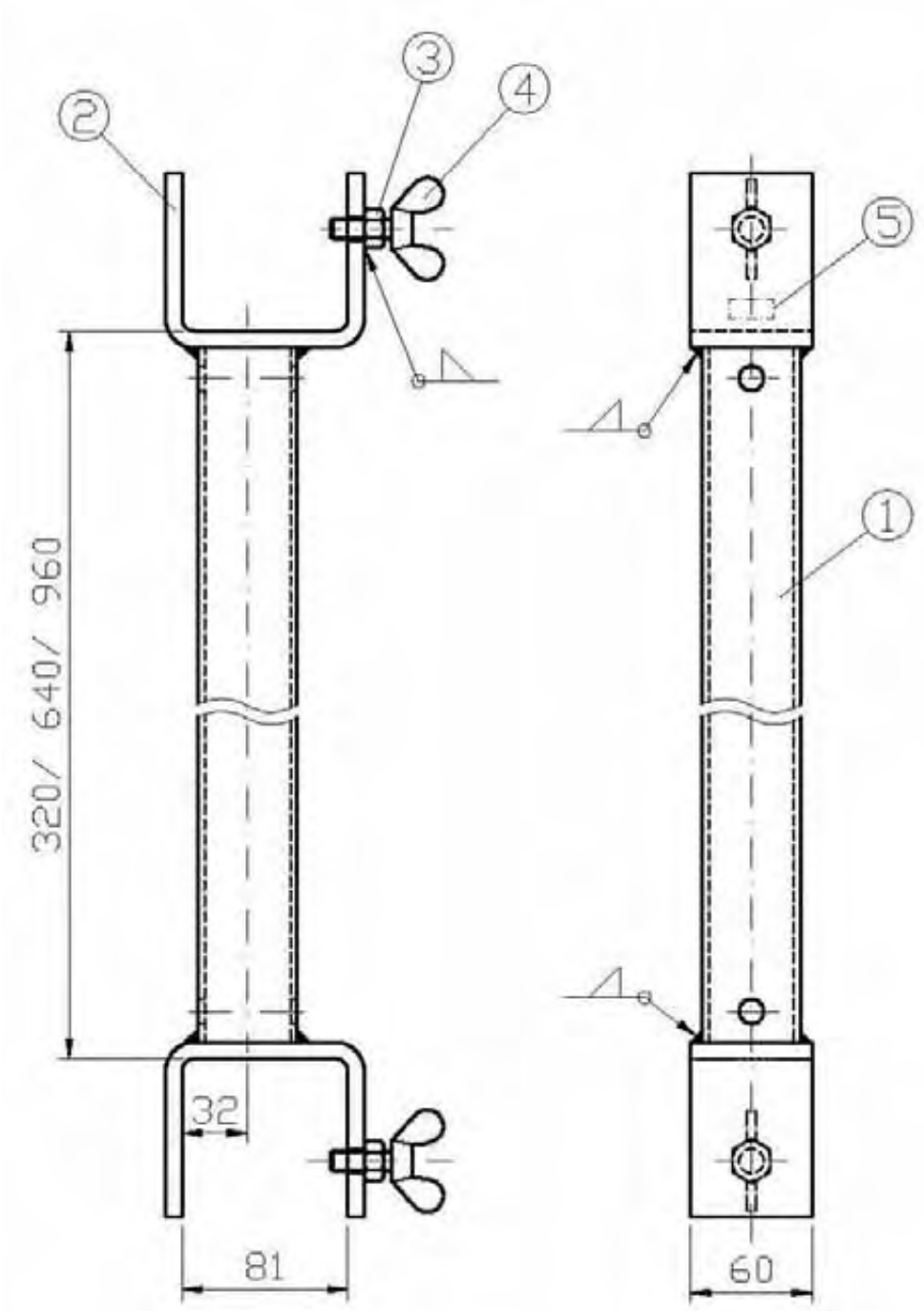
ALFIX MODUL plus II

Head spindle U



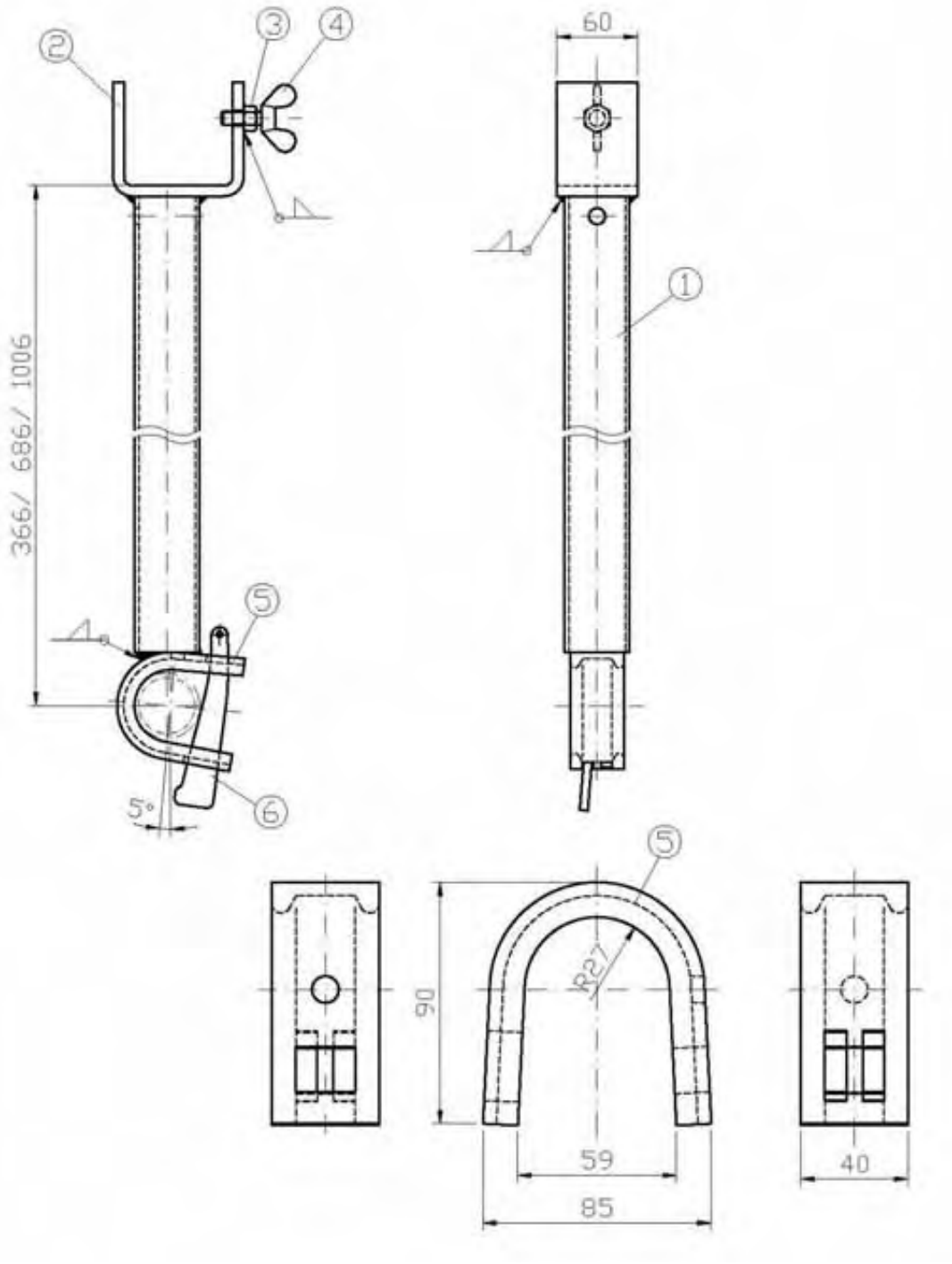
(1)	RV 50x30x3	S235JRH
(2)	Rd 16	S235JR
(3)	U-ledger connection	
(4)	Wedge 6mm	S550MC

galvanized; all welds a=3mm



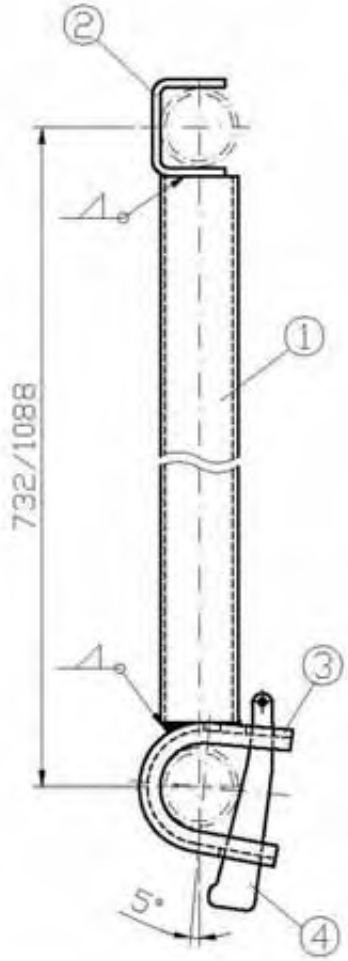
(1)	R 48.3x3.2	S235JRH ReH≥320N/mm^2
(2)	Bl t=8mm	S355MC
(3)	Hexagon weld nut	DIN 929 – M10-steel
(4)	Wing screw	DIN 316 – M10x30-steel, galvanized
(5)	Marking	

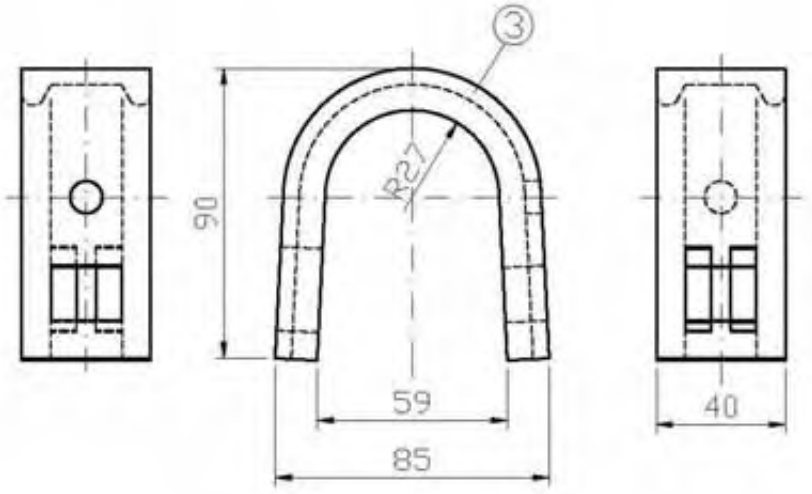
galvanized; all welds a=3mm



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	Bl t=8mm	S355MC	
(3)	Hexagon weld nut	DIN 929 - M10-steel	
(4)	Wing screw	DIN 316 - M10x30-steel, galvanized	
(5)	Double bead profile 40x13x5x6.5	S235JR	
(6)	Wedge 6mm	S550MC	

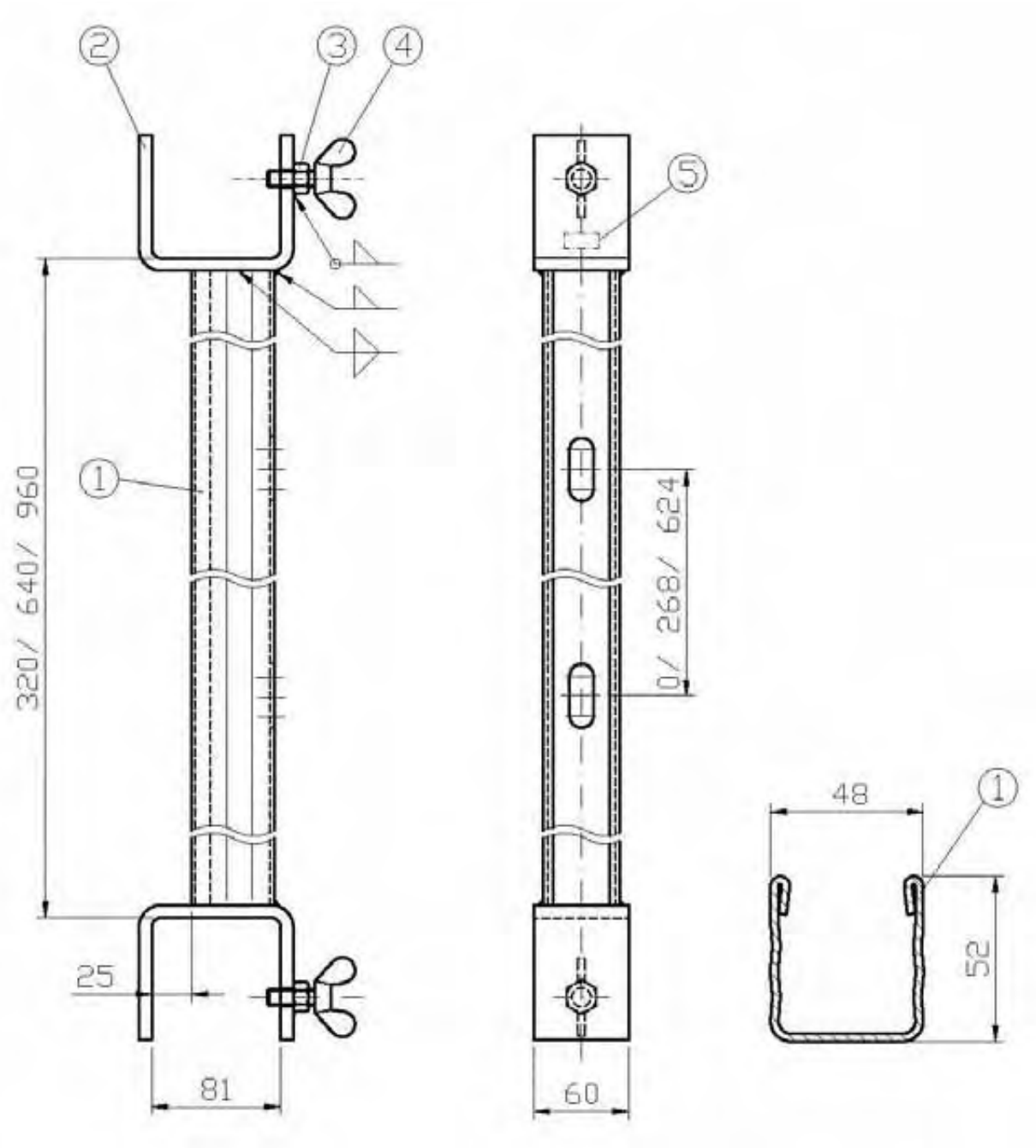
galvanized; all welds a=3mm





(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	Bd 50x5	S235JR	
(3)	Double bead profile 40x13x5x6.5	S235JR	
(4)	Wedge 6mm	S550MC	

galvanized; all welds a=3mm



(1)	U-profile 48x52x2.5	S235JR
(2)	Bl t=8mm	S235JR
(3)	Hexagon weld nut	DIN 929 – M10-steel
(4)	Wing screw	DIN 316 - M10x30-steel, galvanized
(5)	Marking	

galvanized; all welds a=3mm

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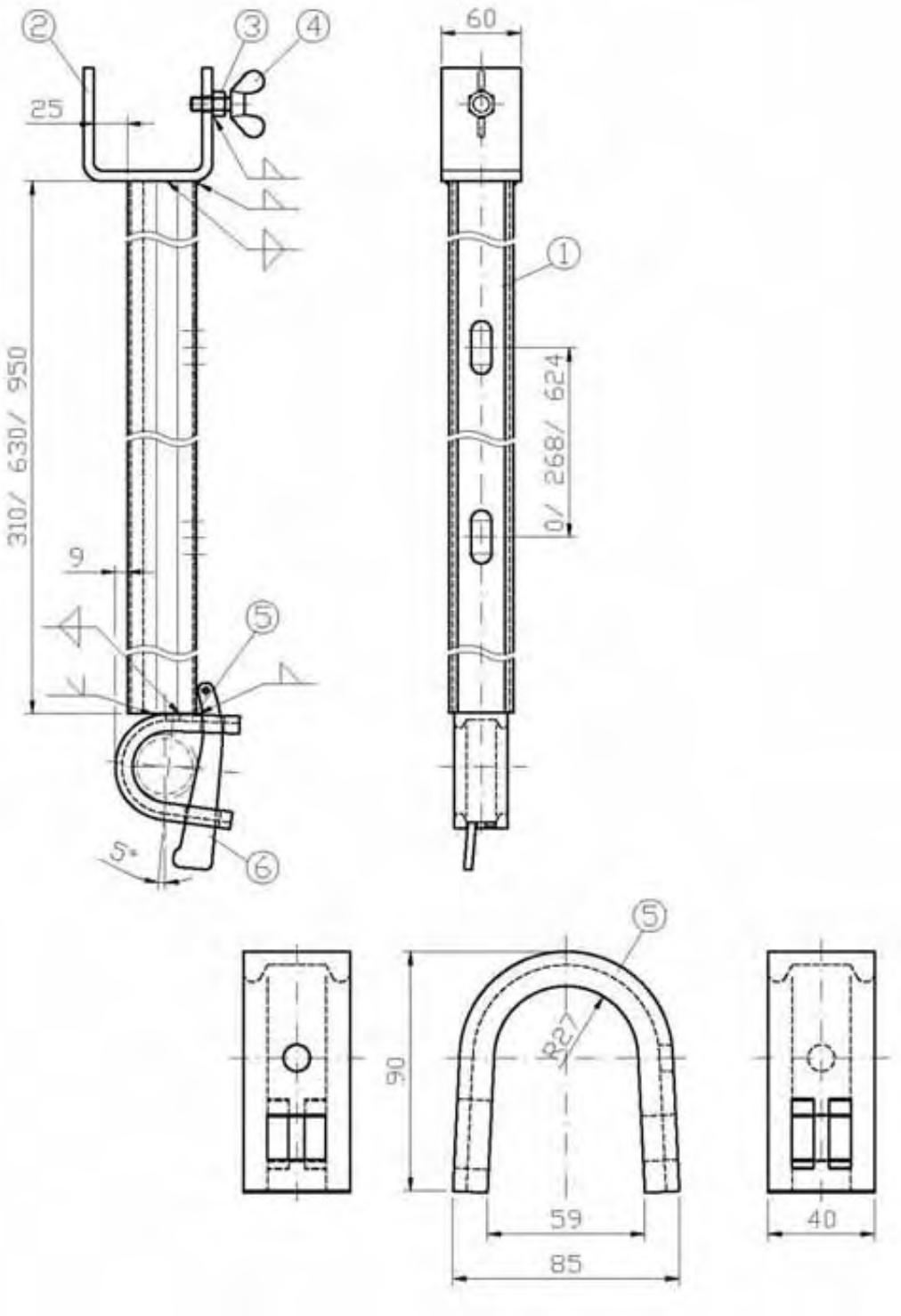
ALFIX MODUL plus II

Intermediate deck ledger –M



(1)	U-profile 48x52x2.5	S235JR
(2)	Bl t=8mm	S235JR
(3)	Hexagon weld nut	DIN 929 – M10-steel
(4)	Wing screw	DIN 316 – M10x39-steel, galvanized
(5)	Double bead profile 40x13x5x6.5	S235JR
(6)	Wedge 6mm	S550MC

galvanized; all welds a=3mm

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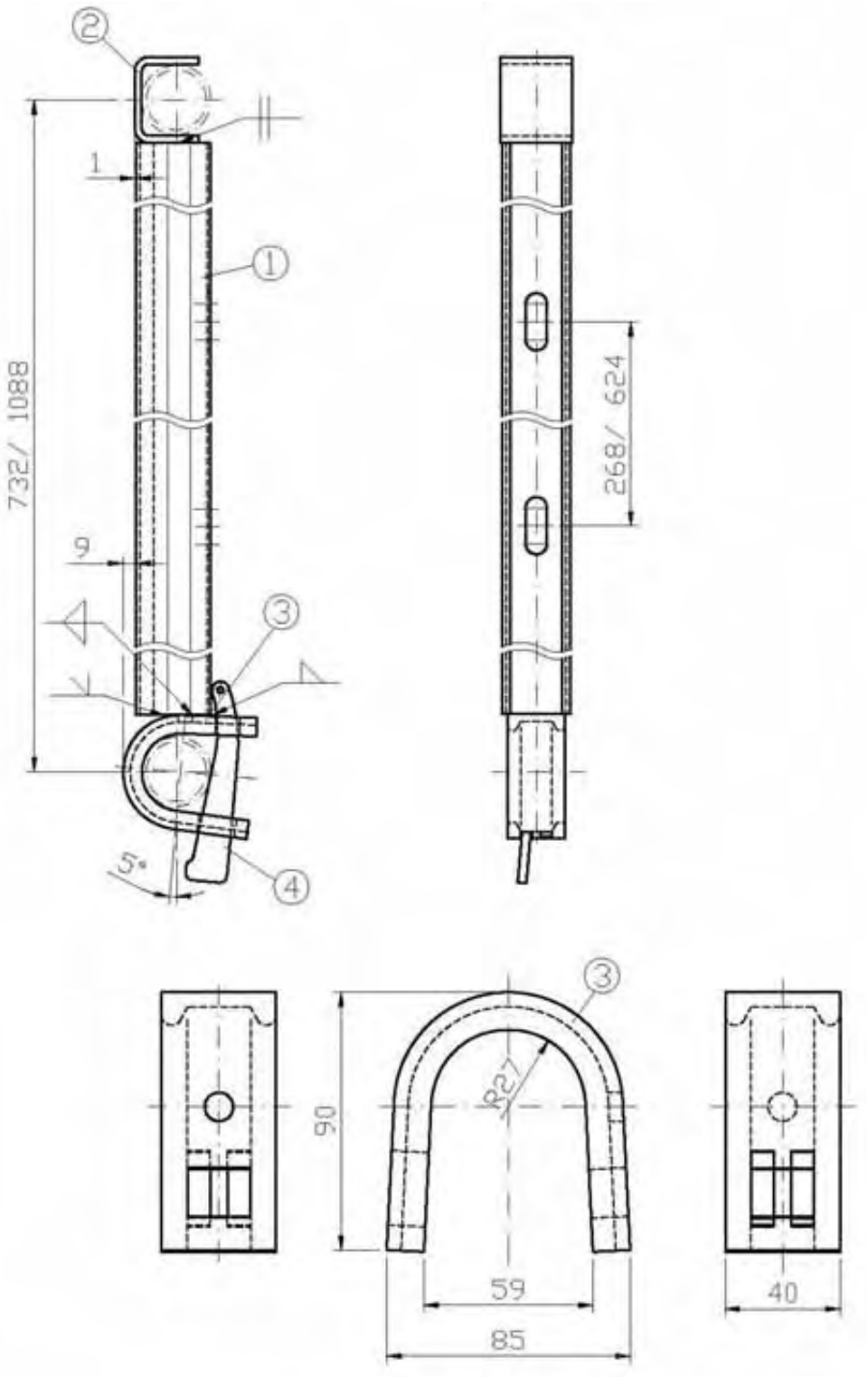
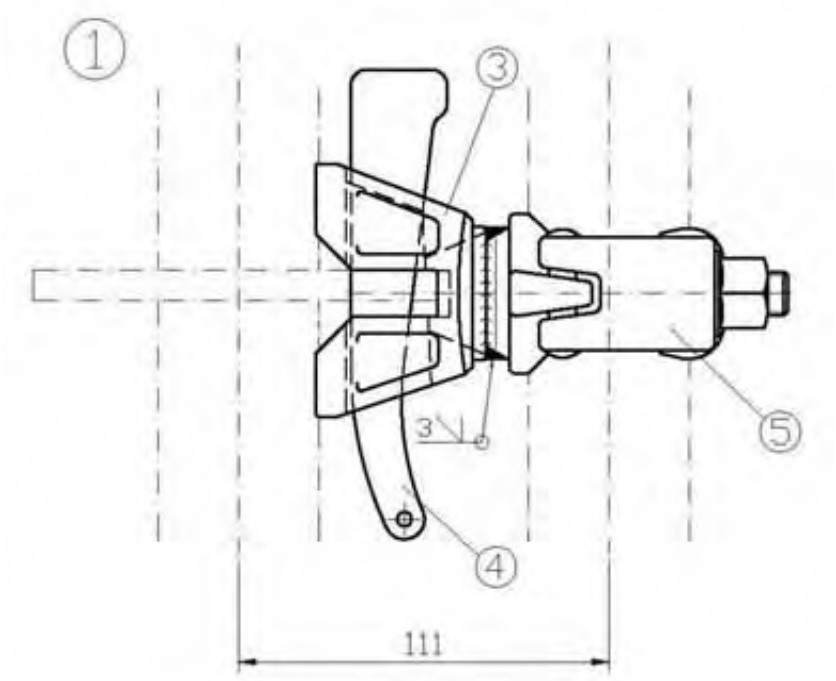
ALFIX MODUL plus II

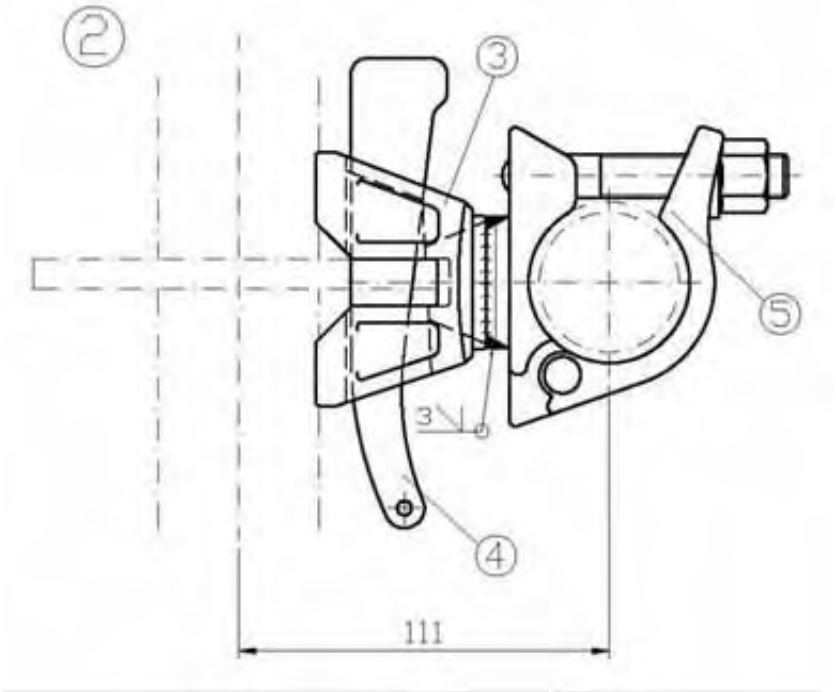
Intermediate deck ledger –R



(1)	U-profile 48x52x2.5	S235JR
(2)	Bd 50x5	S235JR
(3)	Double bead profile 40x13x5x6.5	S235JR
(4)	Wedge 6mm	S550MC

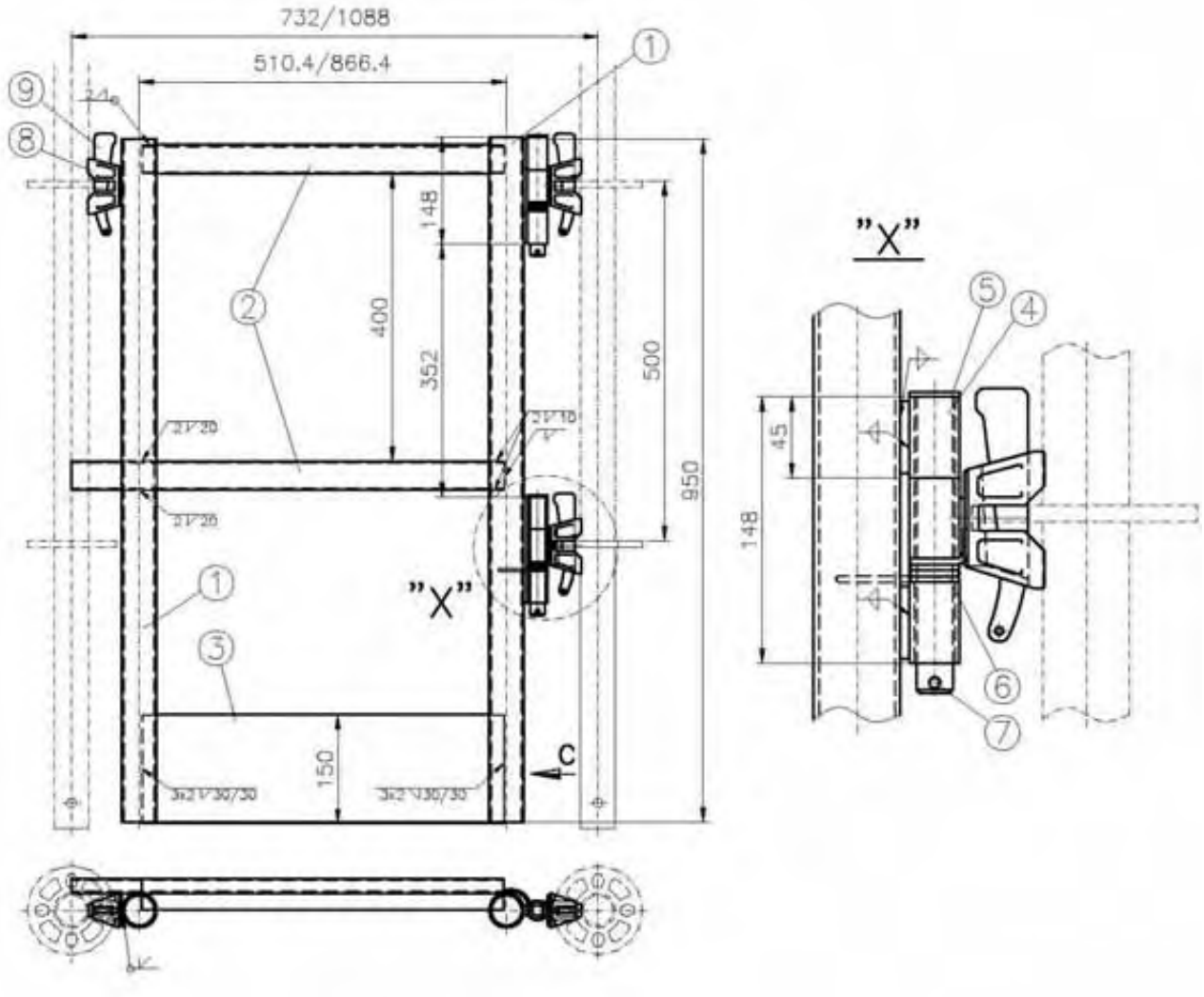
galvanized; all welds a=3mm





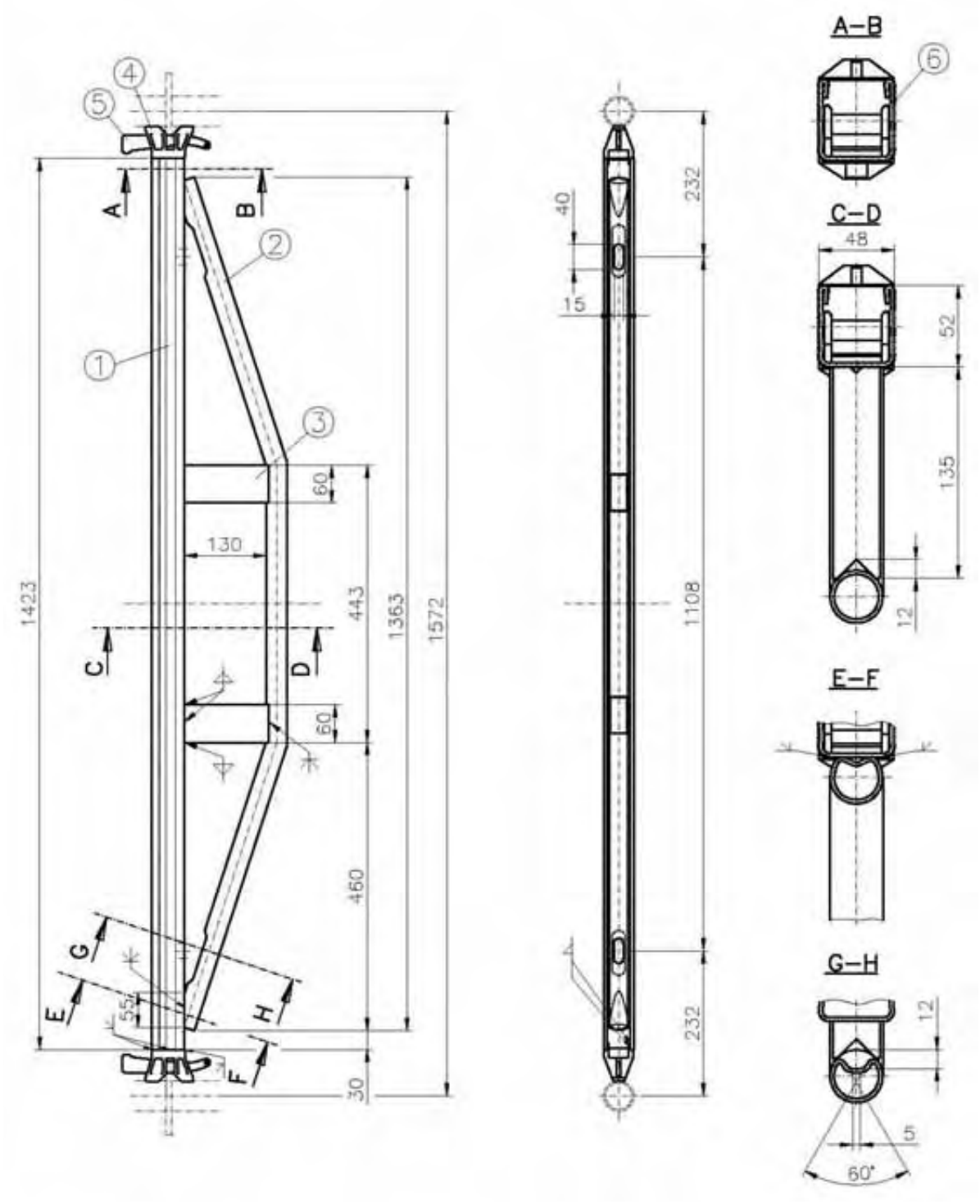
(1) Wedge head coupler, fixed parallel
(2) Wedge head coupler, fixed rectangular
(3) Tube ledger connection
(4) Wedge 6mm S550MC
(5) Halfcoupler, class B

galvanized



(1)	R 48.3x2.7	S235JRH	ReH≥320N/mmm^2
(2)	RV 40x20x2	S235JRH	
(3)	Bl 1.5	S235JR	
(4)	R 28x2.5	S235JRH	DIN 2394
(5)	Hinge pin		
(6)	Spring		
(7)	Cotter pin	DIN 94 – 4x40-steel, galvanized	
(8)	U-ledger connection		
(9)	Wedge 6mm	S550MC	

galvanized



(1) U-profile 48x52x2.5 S235JR
(2) R 33.7x2.6 S235JRH ReH≥320N/mm^2
(3) RV 60x30x2 S235JR
(4) U-ledger connection
(5) Wedge 6mm S550MC
(6) Welded area

galvanized; all fillet welds a=2.5mm; all single-V butts a=3mm

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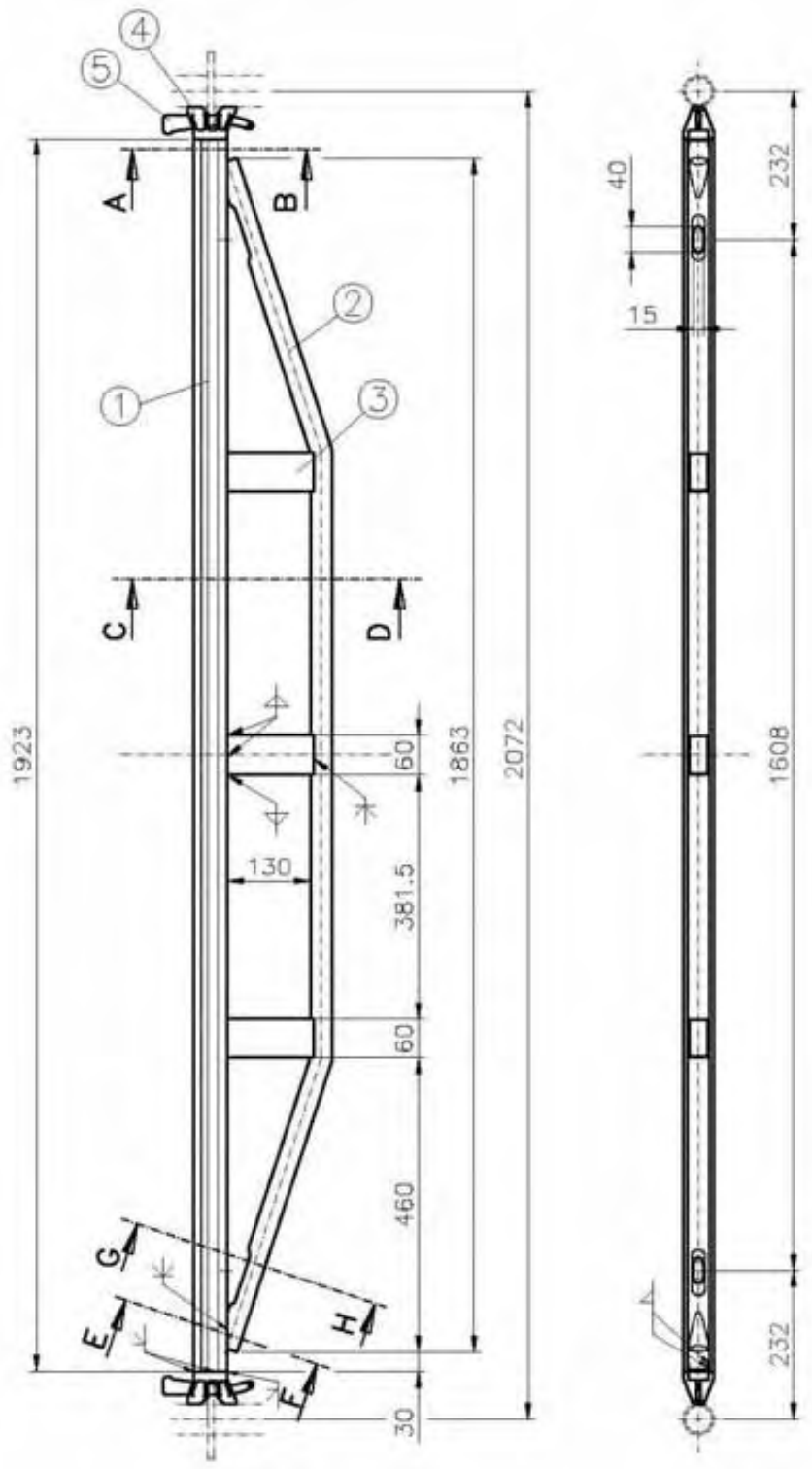
ALFIX MODUL plus II

U-bridging ledger 1.57m



(1)	U-profile 48x52x2.5	S235JR	
(2)	R 33.7x2.6	S235JRH	ReH≥320N/mm^2
(3)	RV 60x30x2	S235JR	
(4)	U-ledger connection		
(5)	Wedge 6mm	S550MC	

galvanized; all fillet welds a=2.5mm; all single-V butts

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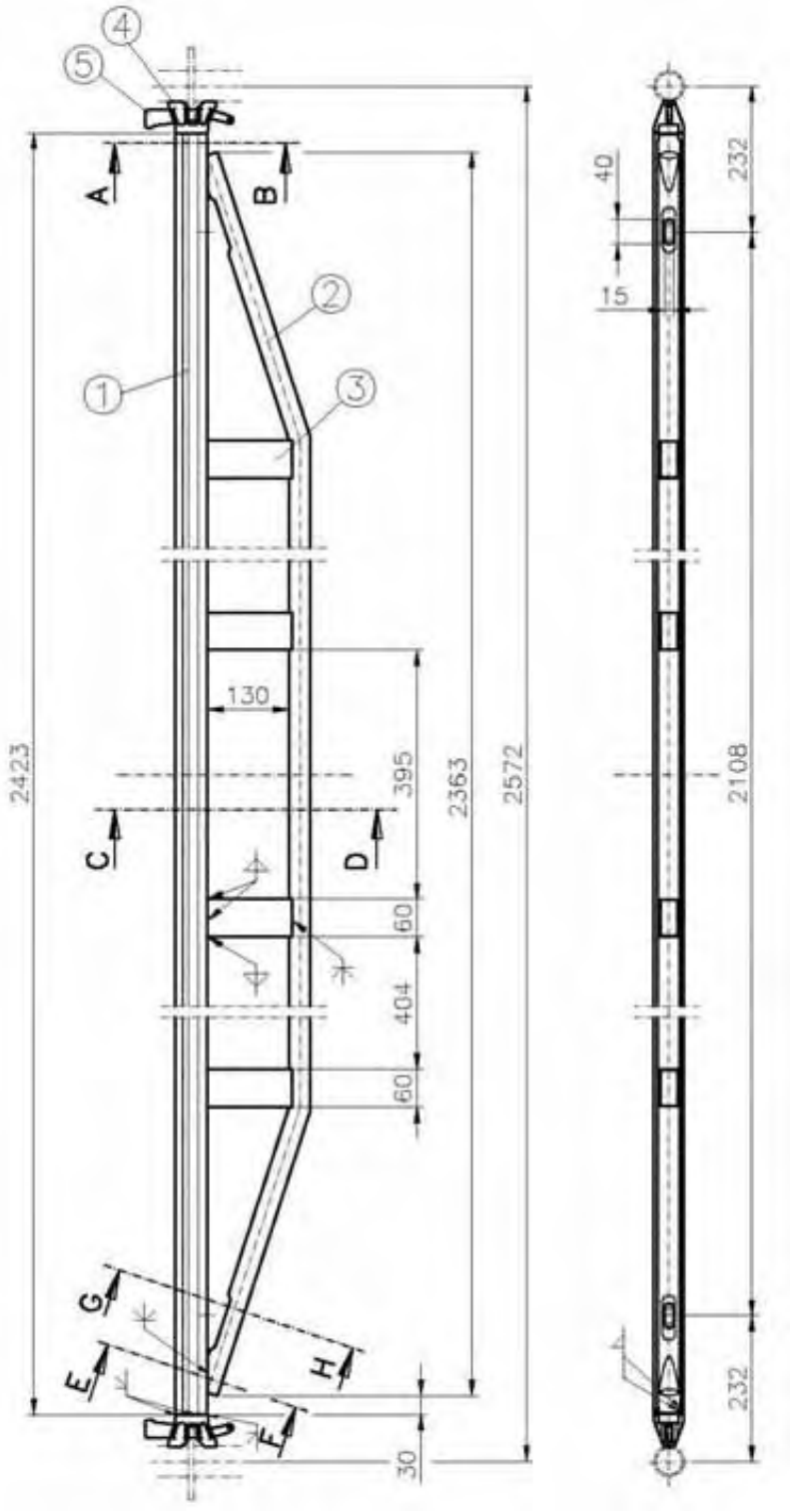
ALFIX MODUL plus II

U-bridging ledger 2.07m



(1)	U-profile 48x52x2.5	S235JR	
(2)	R 33.7x2.6	S235JRH	ReH≥320N/mm^2
(3)	RV 60x30x2	S235JR	
(4)	U-ledger connection		
(5)	Wedge 6mm	S550MC	

galvanized; all fillet welds a=2.5mm; all single-V butts a=3mm

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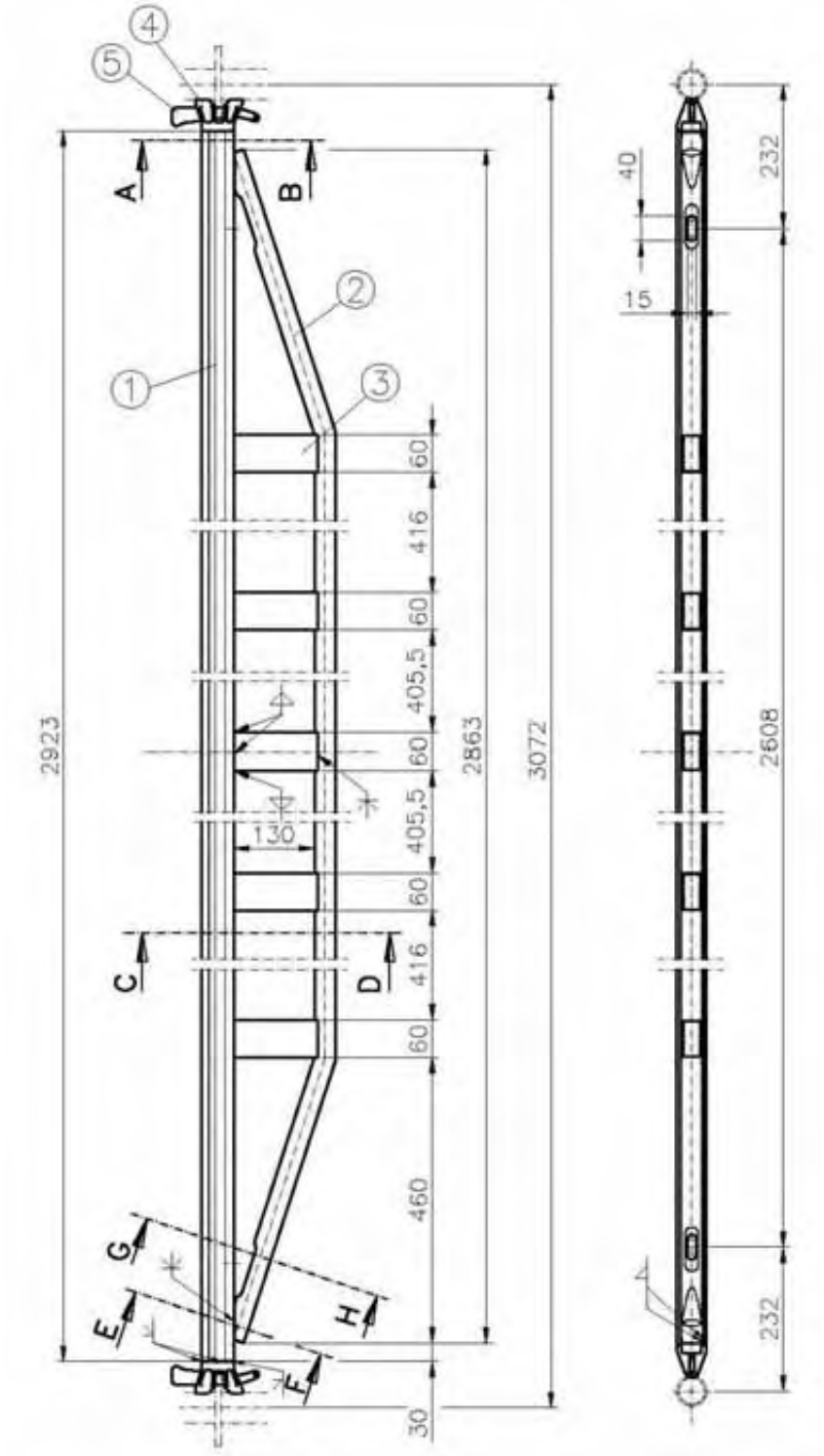
ALFIX MODUL plus II

U-bridging ledger 2.57m



(1)	U-profile 48x52x2.5	S235JR	
(2)	R 33.7x2.6	S235JRH	ReH≥320N/mm^2
(3)	RV 60x30x2	S235JR	
(4)	U-ledger connection		
(5)	Wedge 6mm	S550MC	

galvanized; all fillet welds a=2.5mm; all single-V butts a=3mm

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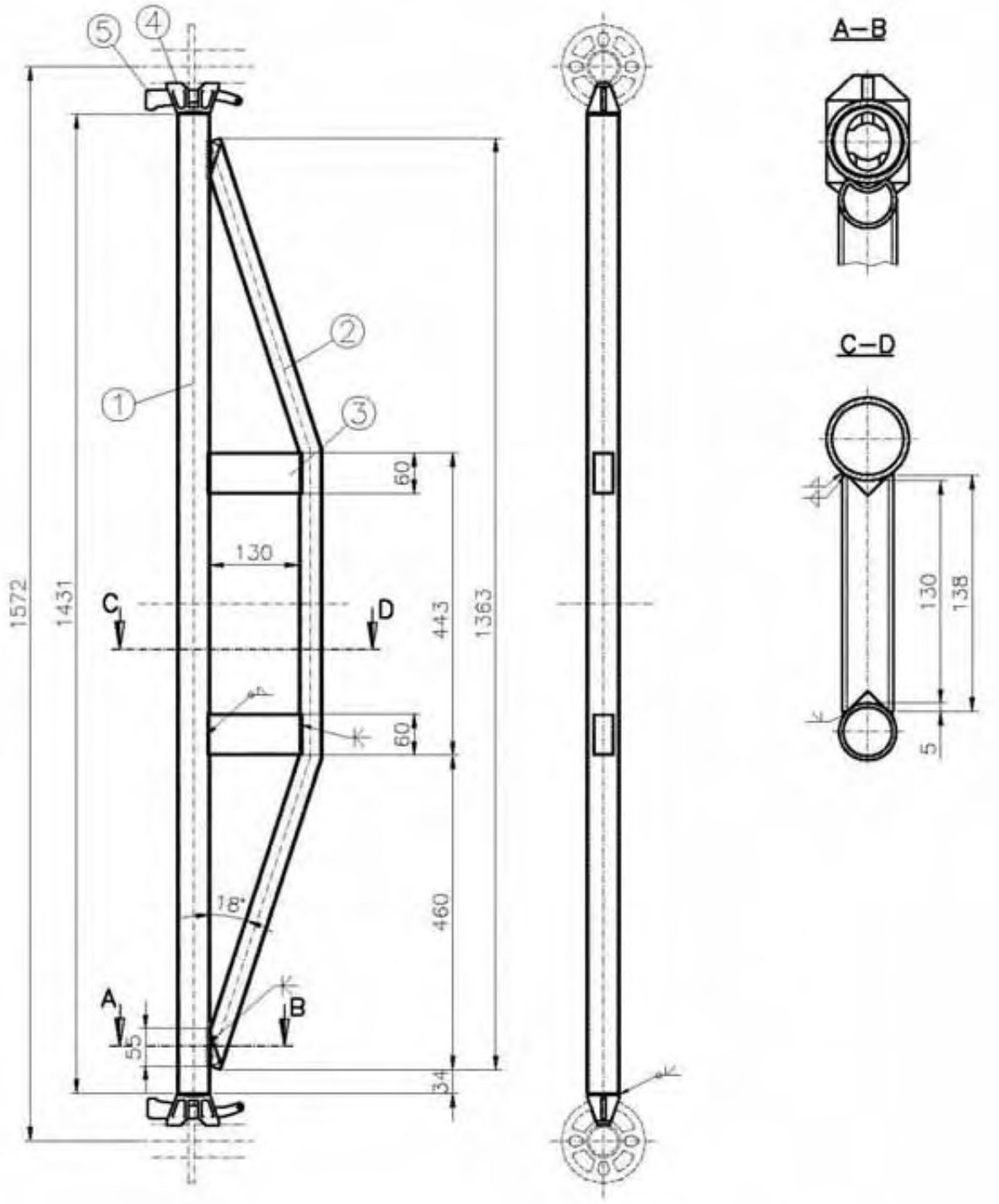
ALFIX MODUL plus II

U-bridging ledger 3.07m



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	R 33.7x2.6	S235JRH	ReH≥320N/mm^2
(3)	RV 60x30x2	S235JR	
(4)	Tube ledger connection		
(5)	Wedge 6mm	S550MC	

galvanized; all welds a=3mm

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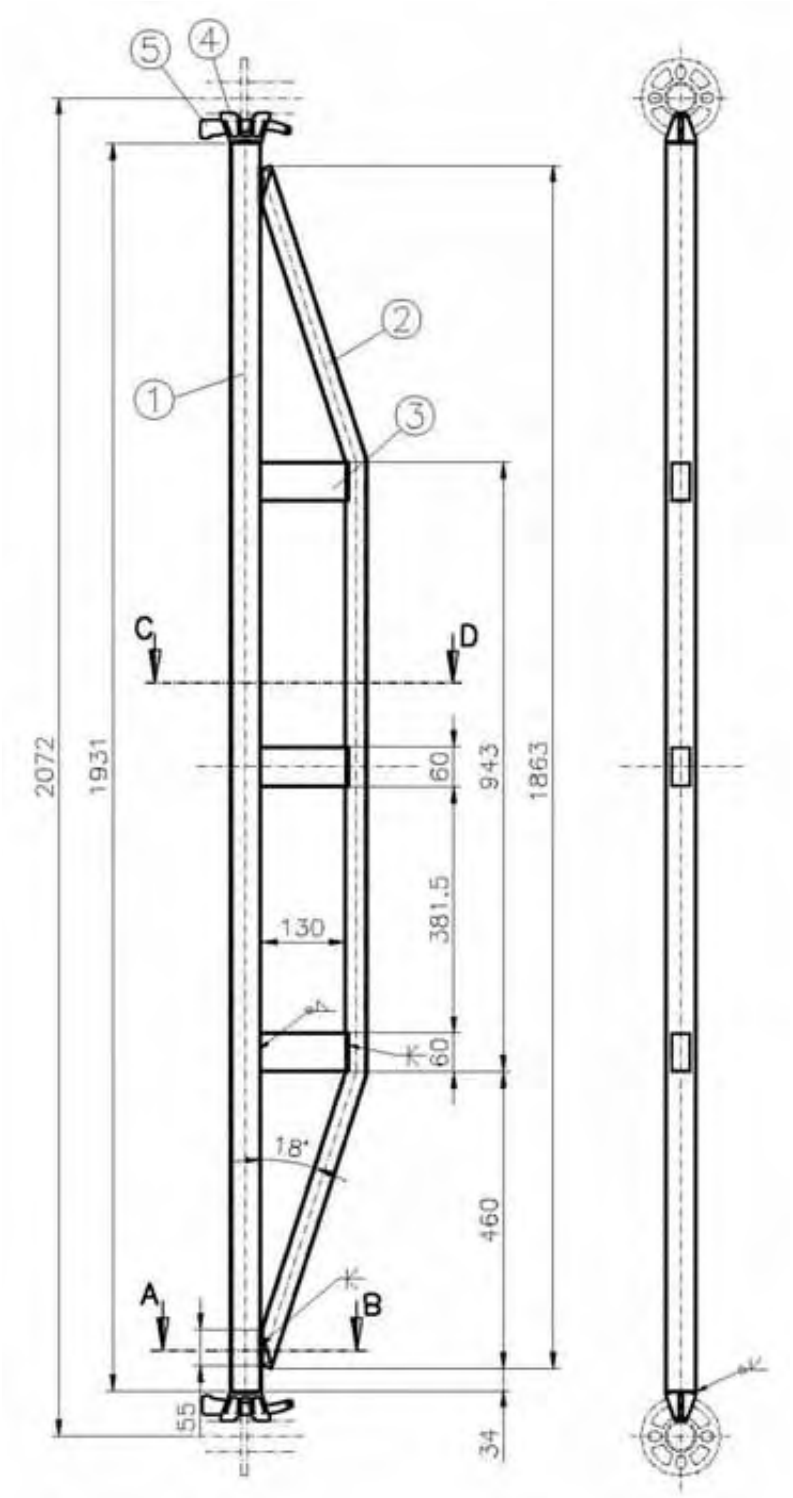
09603 Großschirma

ALFIX MODUL plus II

Double tube ledger 1.57m

Annex B, page 56 to
the national technical
approval Z-8.22-906
of 13. October 2011
Deutsches Institut für Bautechnik

M710-B156



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	R 33.7x2.6	S235JRH	ReH≥320N/mm^2
(3)	RV 60x30x2	S235JR	
(4)	Tube ledger connection		
(5)	Wedge 6mm	S550MC	

galvanized; all welds a=3mm

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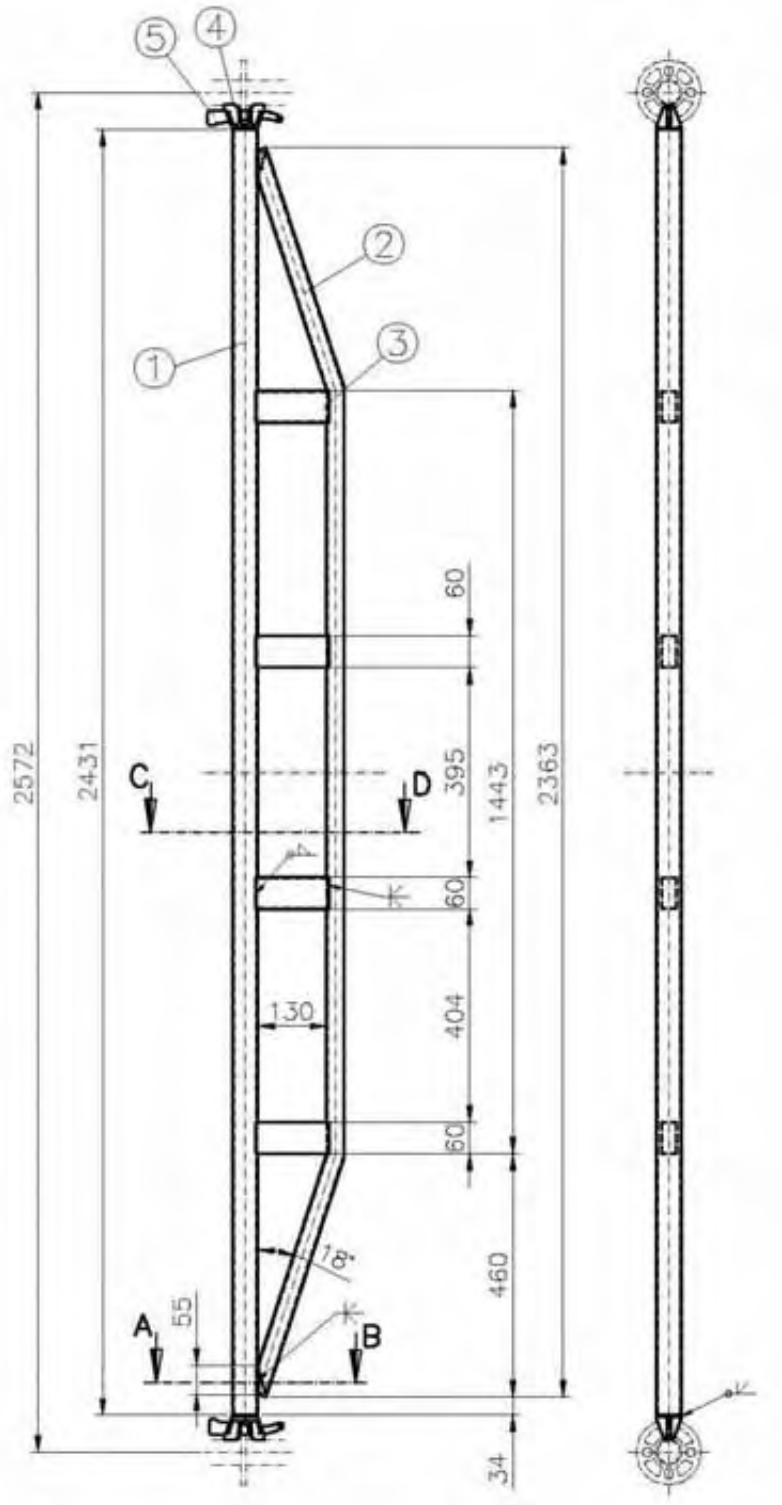
ALFIX MODUL plus II

Double tube ledger 2.07m



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	R 33.7x2.6	S235JRH	ReH≥320N/mm^2
(3)	RV 60x30x2	S235JR	
(4)	Tube ledger connection		
(5)	Wedge 6mm	S550MC	

galvanized; all welds a=3mm

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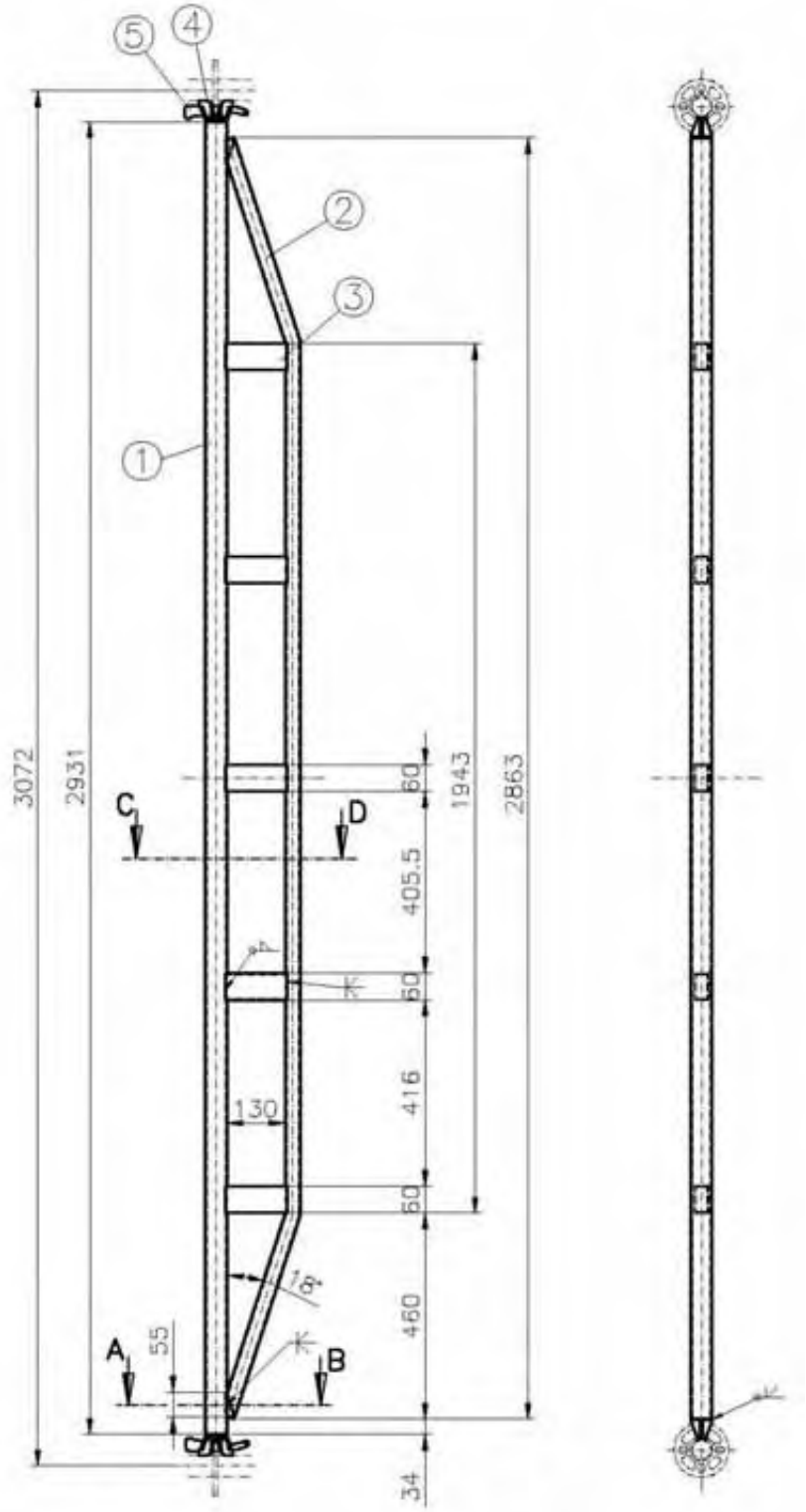
ALFIX MODUL plus II

Double tube ledger 2.57m



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	R 33.7x2.6	S235JRH	ReH≥320N/mm^2
(3)	RV 60x30x2	S235JR	
(4)	Tube ledger connection		
(5)	Wedge 6mm	S550MC	

galvanized; all welds a=3mm

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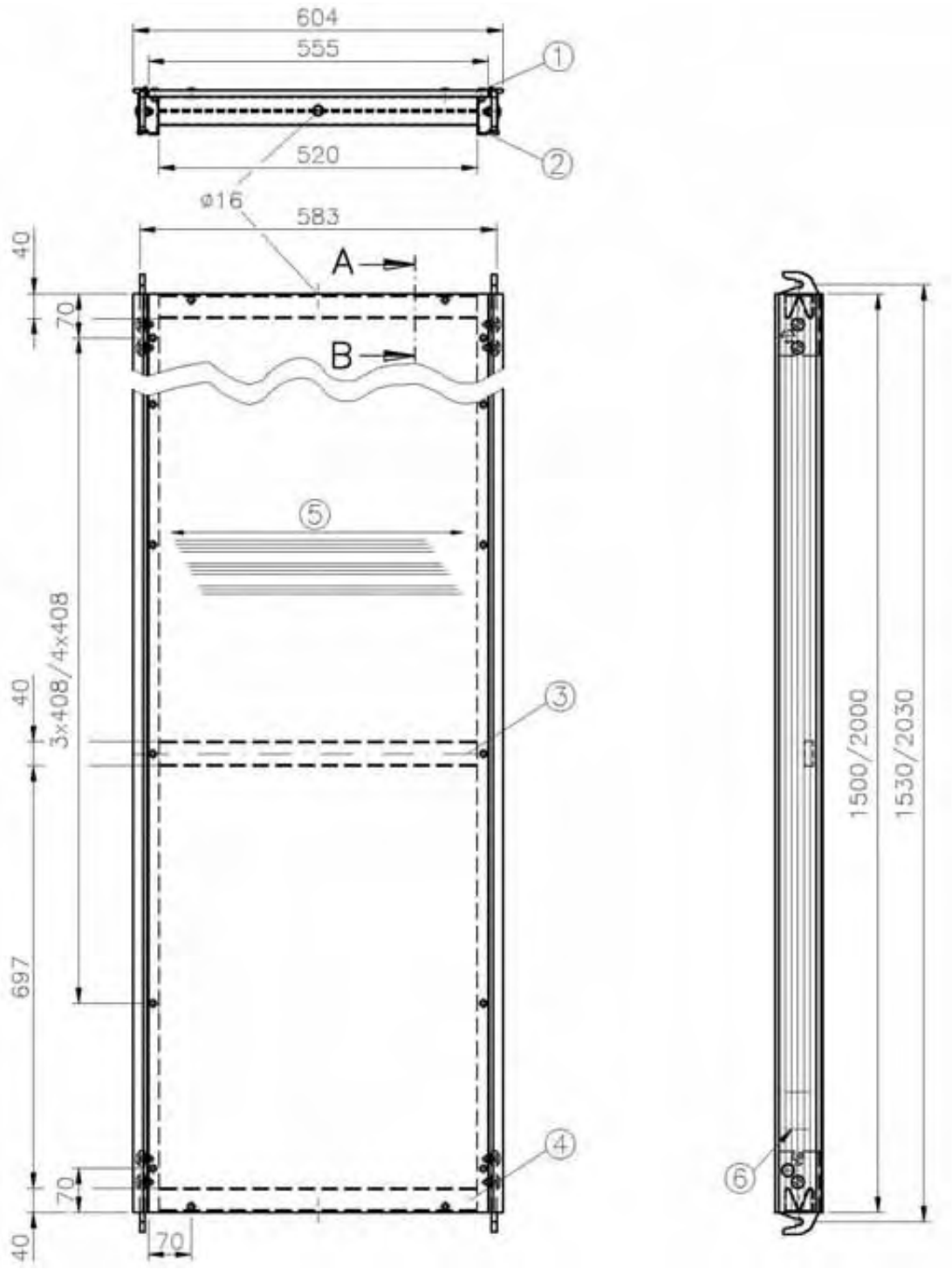
ALFIX MODUL plus II

Double tube ledger 3.07m



(1)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU (construction veneer plywood) 100-G
(2)	Brace profile 78x42	EN AW-6063-T66
(3)	RV 40x15x2	EN AW-6063-T66
(4)	Gripping profile	EN AW-6063-T66
(5)	Fibre direction	
(6)	Marking	

Details, see M709-B162

Load class 3

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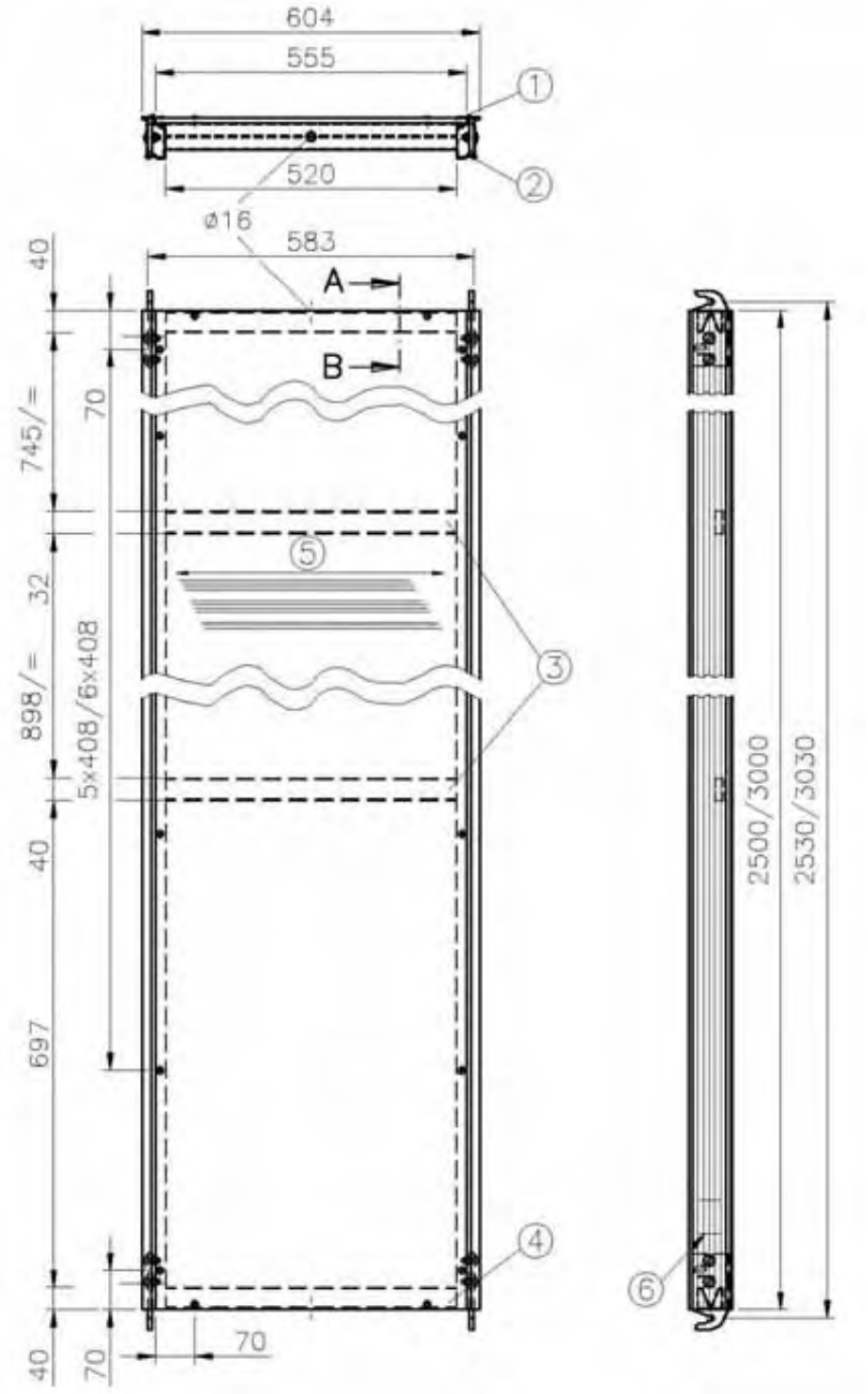
ALFIX MODUL plus II

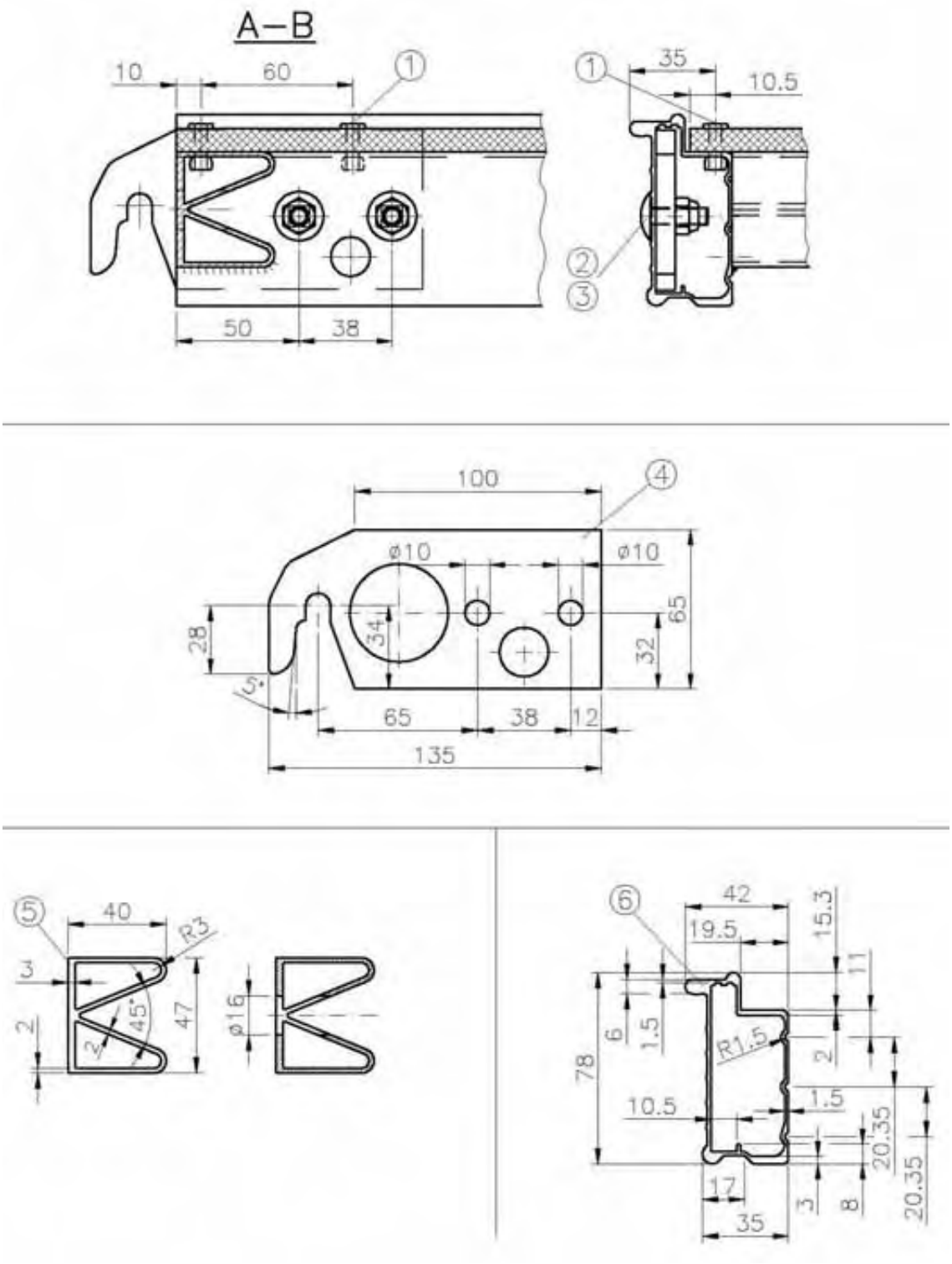
Aluminium frame deck with plywood 1.57m; 2.07m



(1)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU (construction veneer plywood) 100-G
(2)	Brace profile 78x42	EN AW-6063-T66
(3)	RV 40x15x2	EN AW-6063-T66
(4)	Gripping profile	EN AW-6063-T66
(5)	Fibre direction	
(6)	Marking	

Details, see M709-B162

Load class 3



(1)	Blind rivet Ø5x20	DIN 7337	EN AW-5754 H112
(2)	Round-head bolt	M8x20 DIN 603	
(3)	Nut, self-locking	M8 DIN 980	
(4)	Mounting claw	Bl 8	S235JR, galvanized
(5)	Gripping profile; web thickness 2mm		EN AW-6063-T66
(6)	Aluminium brace profile		EN AW-6063-T66

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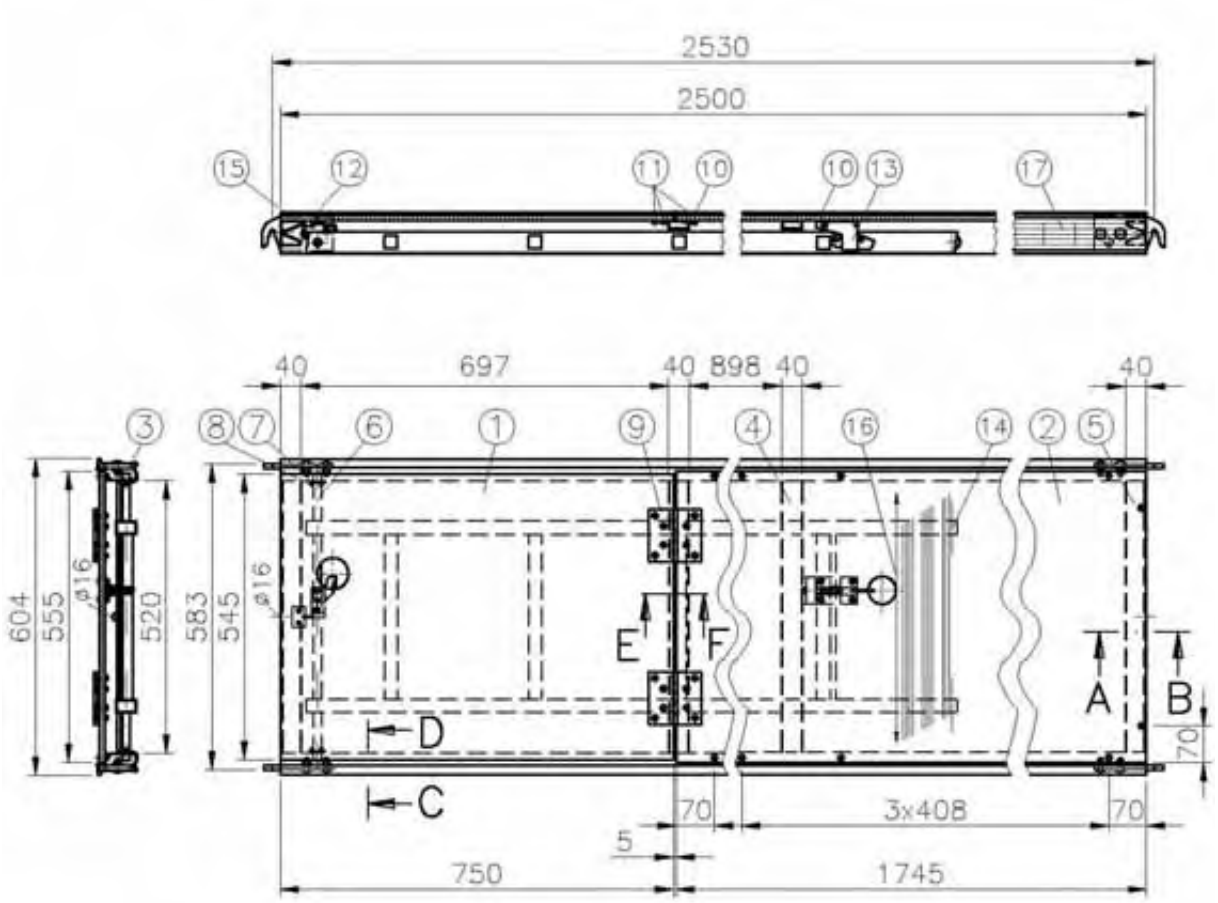
ALFIX MODUL plus II

Details

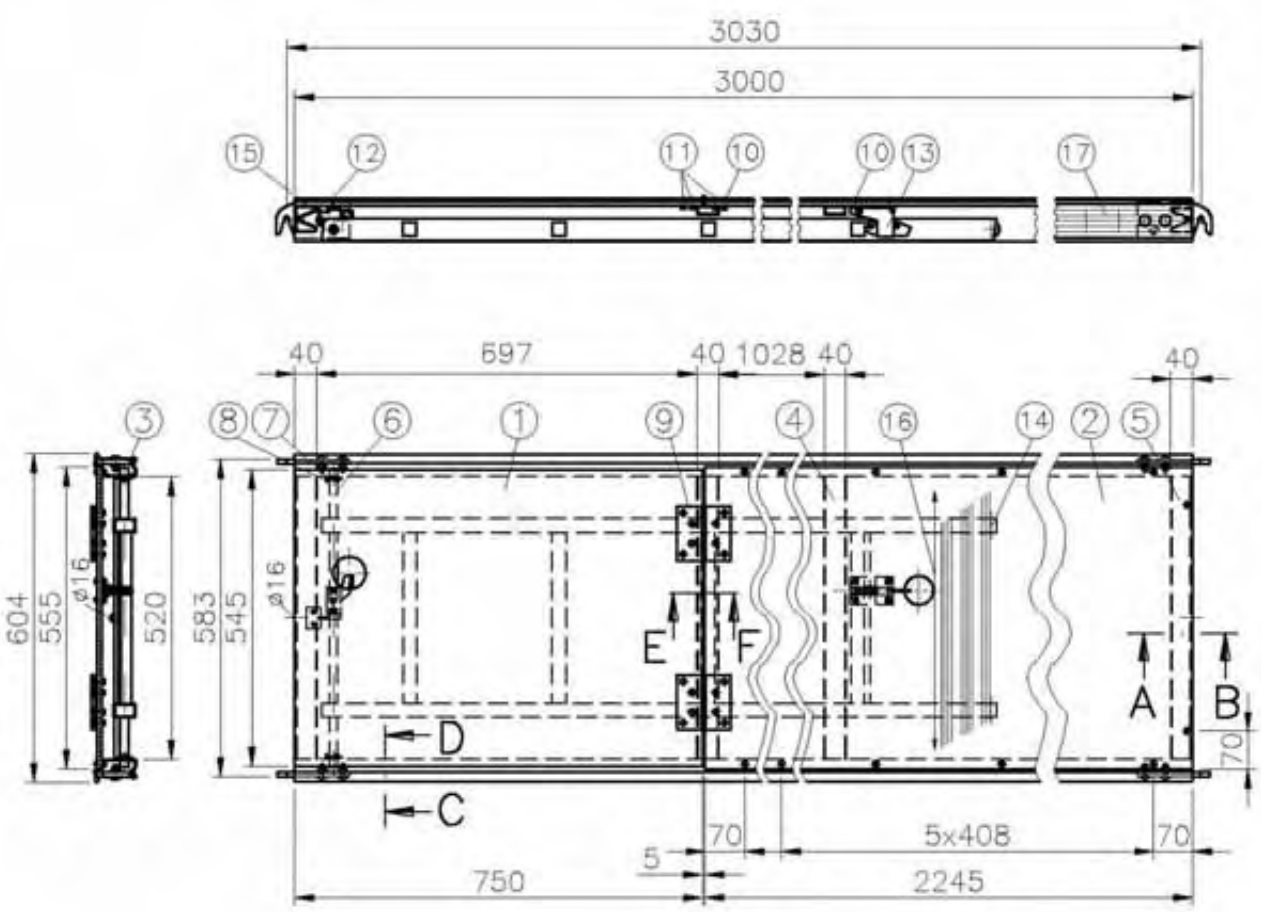
Aluminium frame deck



(1)	WISA Combi Mirror plywood 10x545 in acc. with Z-9.1-430	BFU (construction veneer plywood) 100-G
(2)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU 100-G
(3)	Brace profile 78x42	EN AW-6063-T66
(4)	RV 40x15x2	EN AW-6063-T66
(5)	Gripping profile	EN AW-6063-T66
(6)	Tube 15x2	S235JRH
(7)	Disc Ø17	DIN 125
(8)	Cotter pin Ø4x25	DIN 94
(9)	Hinge 100x100x1.6	
(10)	Blind rivet Ø5x20	EN AW-5754 H112
(11)	Blind rivet Ø5x18	EN AW-5754 H112
(12)	Blind rivet Ø4.8x16	EN AW-5754 H112
(13)	Ladder holder	
(14)	Ladder,	see A709-A115
(15)	Ledger	
(16)	Fibre direction	
(17)	Marking	

Details, see M709-B162 and M709-B165

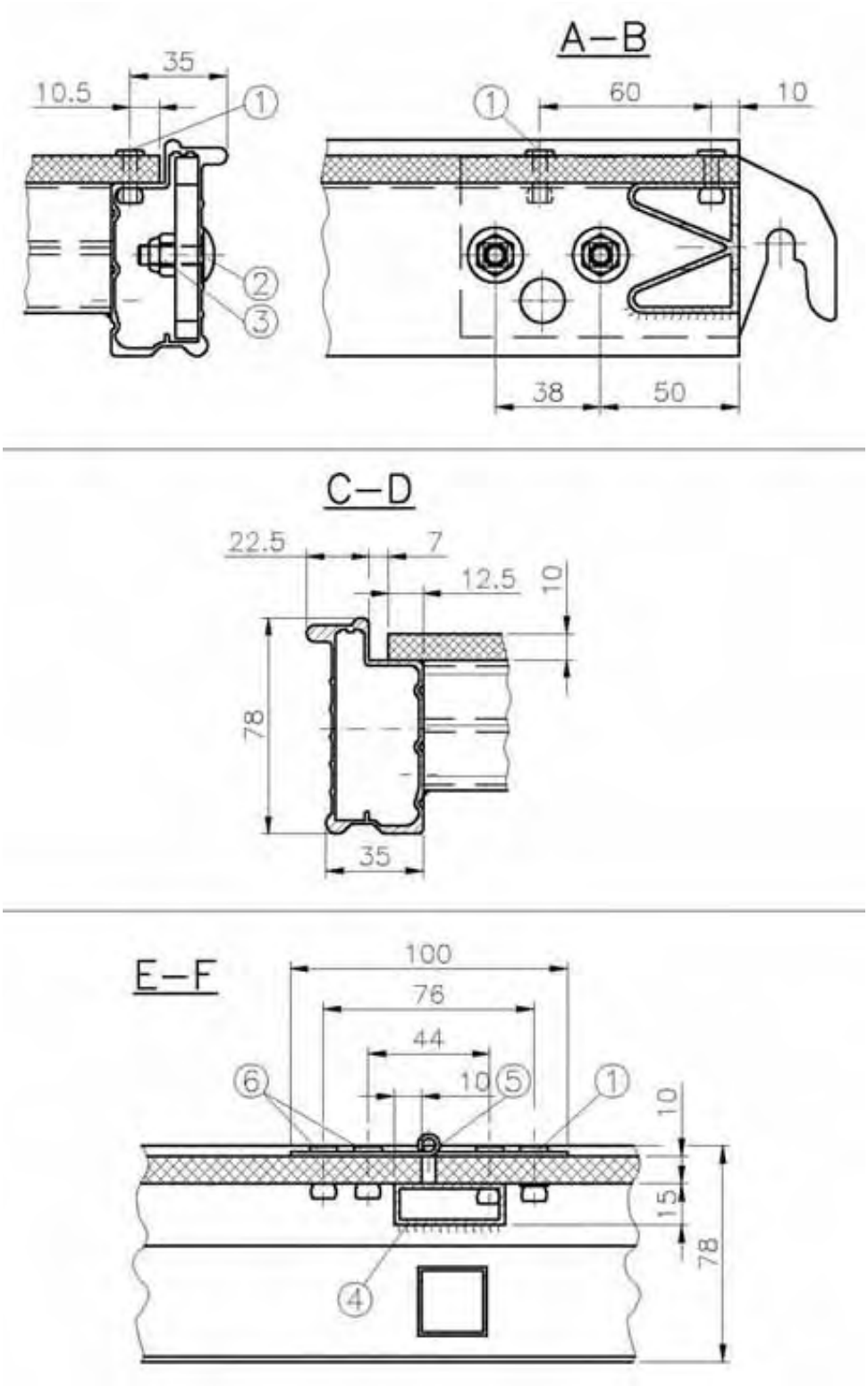
Load class 3



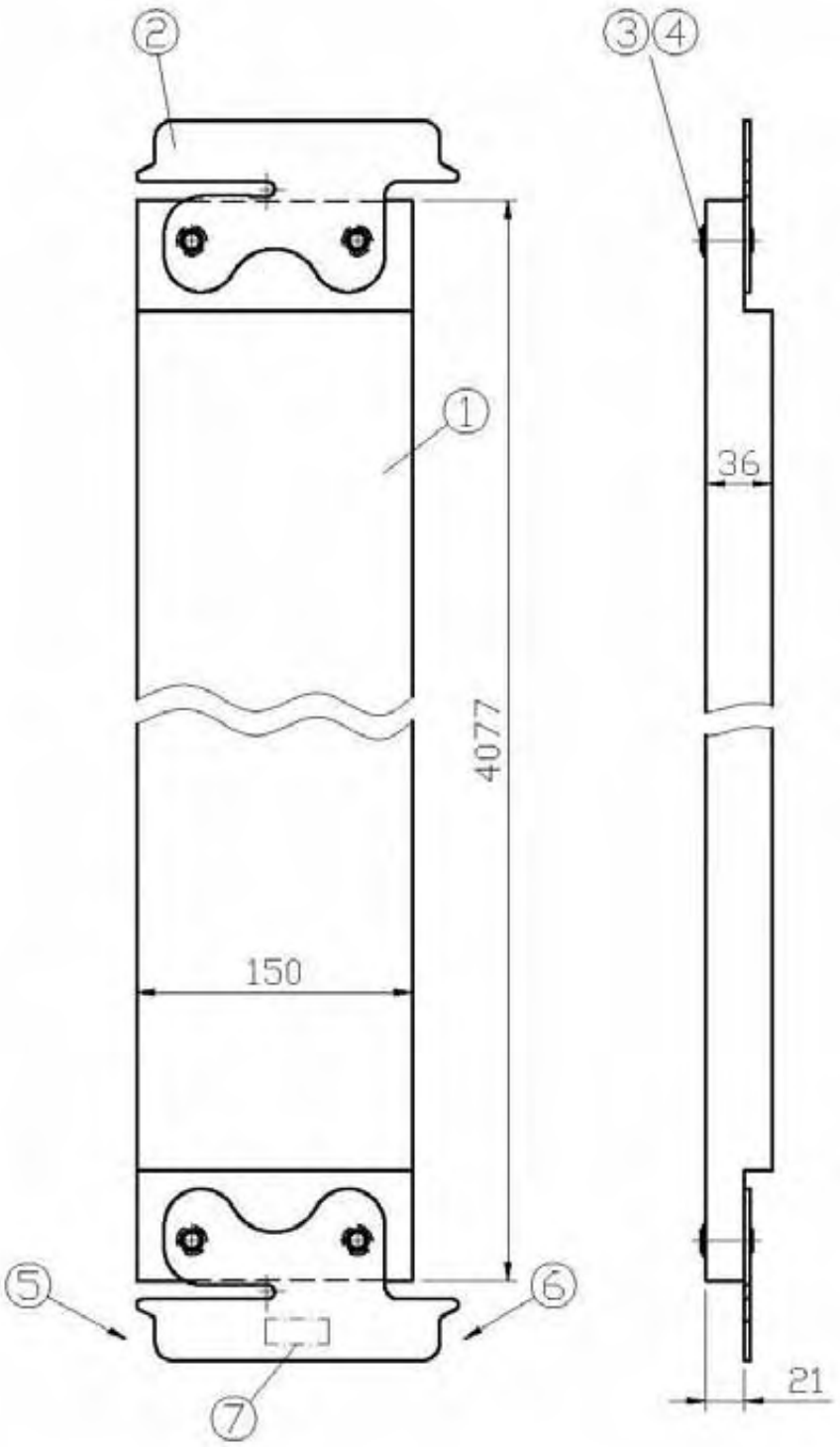
(1)	WISA Combi Mirror plywood 10x545 in acc. with Z-9.1-430 BFU (construction veneer plywood) 100-G	
(2)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430 BFU 100-G	
(3)	Brace profile 78x42	EN AW-6063-T66
(4)	RV 40x15x2	EN AW-6063-T66
(5)	Gripping profile	EN AW-6063-T66
(6)	Tube 15x2	S235JRH
(7)	Disc Ø17	DIN 125
(8)	Cotter pin Ø4x25	DIN 94
(9)	Hinge 100x100x1.6	
(10)	Blind rivet Ø5x20	EN AW-5754 H112
(11)	Blind rivet Ø5x18	EN AW-5754 H112
(12)	Blind rivet Ø4.8x16	EN AW-5754 H112
(13)	Ladder holder	
(14)	Ladder,	see A709-A115
(15)	Ledger	
(16)	Fibre direction	
(17)	Marking	

Details, see M709-B162 and M709-B165

Load class 3



(1)	Blind rivet Ø5x20	DIN 7337	EN AW-5754 H112
(2)	Round-head bolt	M8x20	DIN 603
(3)	Nut, self-locking	M8	DIN 980
(4)	RV 40x15x2		EN AW-6063-T66
(5)	Hinge 100x100x1.6		
(6)	Blind rivet Ø5x20	DIN 7337	EN AW-5754 H112



(1)	Board	DIN 4074 – S10-Fl
(2)	Slit strip 175x2	DIN EN 10111-DD11, galvanized
(3)	Tube rivet	DIN 7340 – A8x0.75x28-steel, zinc-plated
(4)	Disc	DIN 125 – A8.4-steel, galvanized
(5)	Tube ledger connection	
(6)	U-ledger connection	
(7)	Marking	

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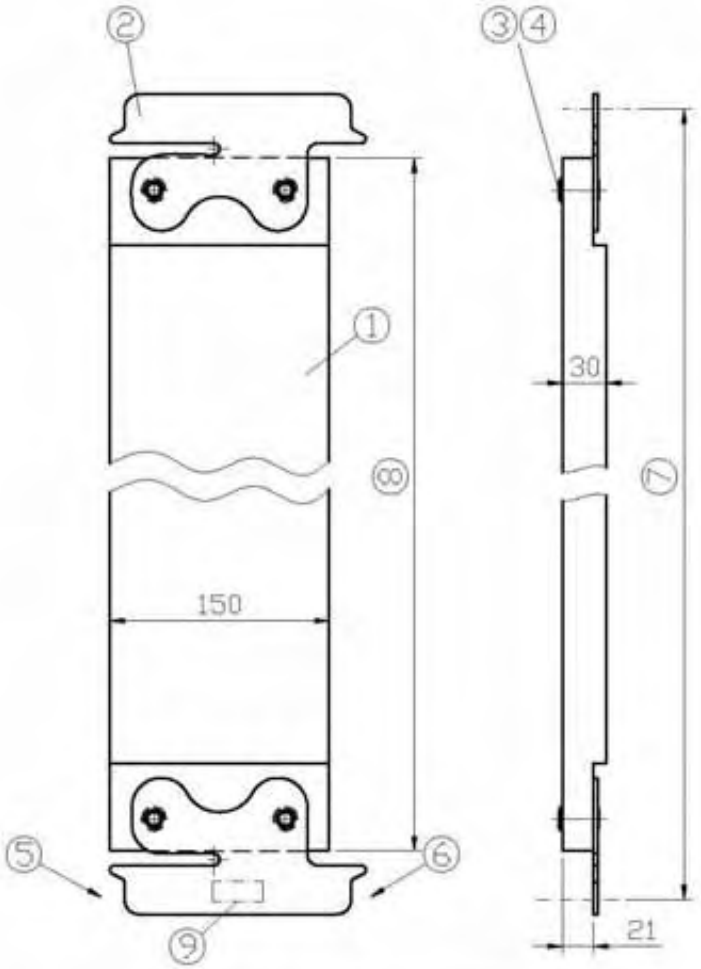
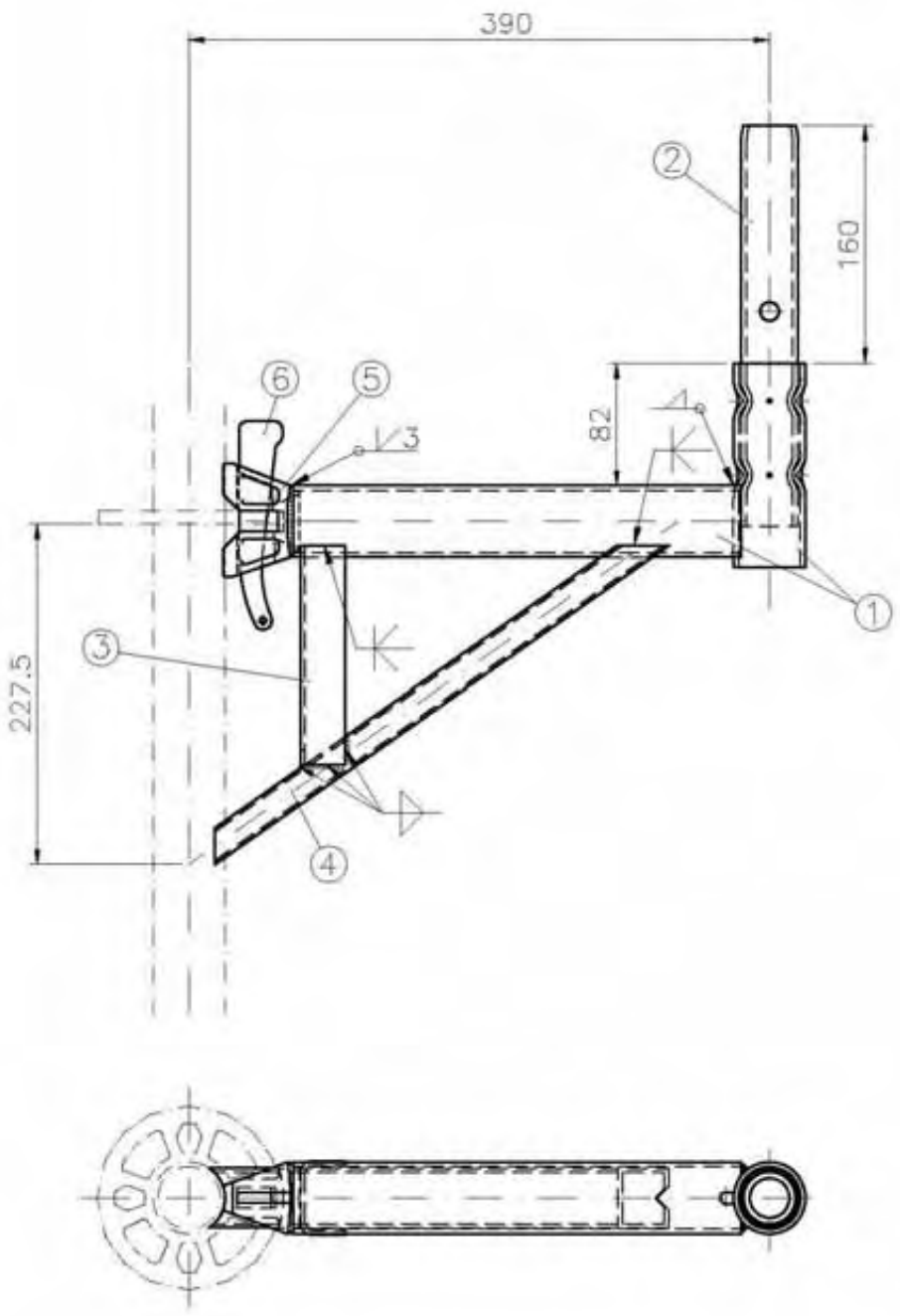
ALFIX MODUL plus II

Modular toeboard 4.14m



⑦	⑧
390	323
732	665
1088	1021
1400	1333
1572	1505
2072	2005
2572	2505
3072	3005

(1)	Board	DIN 4074 – S10-Fi
(2)	Slit strip 175x2	DIN EN 10111-DD11 galvanized
(3)	Tube rivet	DIN 7340 – A8x0.75x28-steel, zinc-plated
(4)	Disc	DIN 125 – A8.4–steel, galvanized
(5)	Tube ledger connection	
(6)	U-ledger connection	
(7)	Bay length	
(8)	Length L	
(9)	Marking	



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	R 38x3.6	S235JR	ReH≥320N/mm^2
(3)	U 50x30x3; L=147	S235JR	
	alternatively: U 47x30x3	S235JR	
(4)	RV 40x20x2	S235JRH	
(5)	Tube ledger connection		
(6)	Wedge 6mm	S550MC	

galvanized; all welds a=3mm

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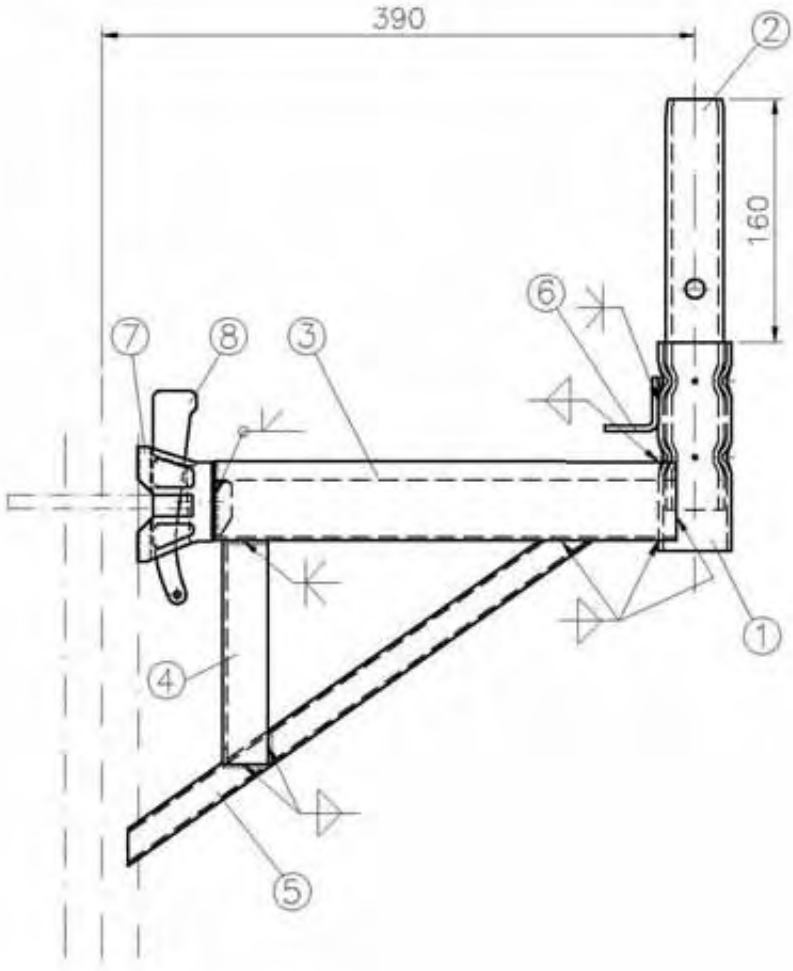
ALFIX MODUL plus II

Bracket 0.39m RE



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	R 38x3.6	S235JR	ReH≥320N/mm^2
(3)	U-profile 48x52x2.5	S235JR	
(4)	U 50x30x3; L=147	S235JR	
	alternatively: U 47x30x3	S235JR	
(5)	RV 40x20x2	S235JRH	
(6)	Fl 35x4	S235JR	
(7)	U-ledger connection		
(8)	Wedge 6mm	S550MC	

galvanized; all welds a=2.5mm

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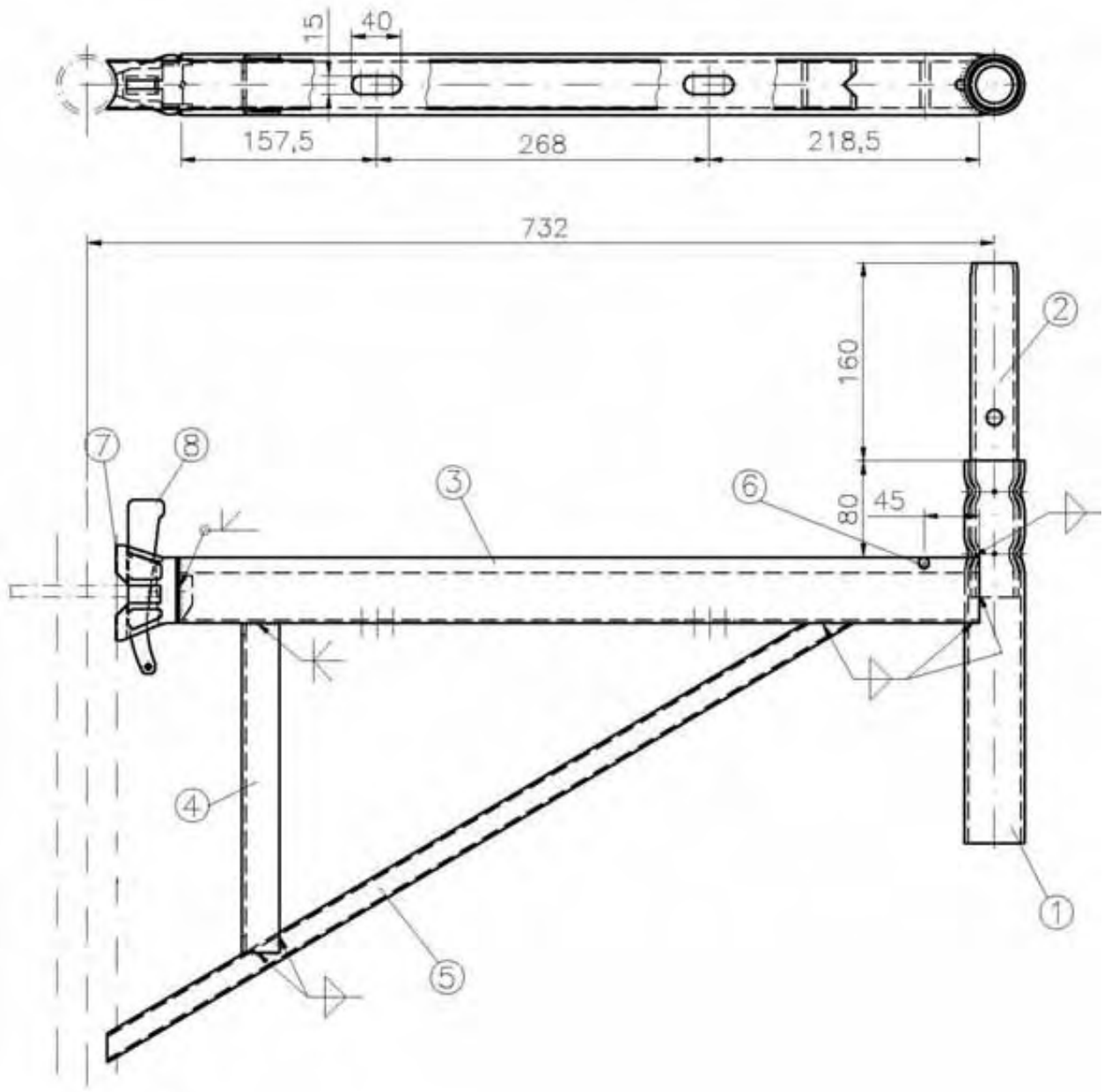
ALFIX MODUL plus II

Modular bracket 0.39m



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	R 38x3.6	S235JR	ReH≥320N/mm^2
(3)	U-profile 48x52x2.5	S235JR	
(4)	U 50x30x3; L=147	S235JR	
	alternatively: U 47x30x3	S235JR	
(5)	RV 40x20x2	S235JRH	
(6)	Rd 8	S235JR	
(7)	U-ledger connection		
(8)	Wedge 6mm	S550MC	

galvanized; all welds a=2.5mm

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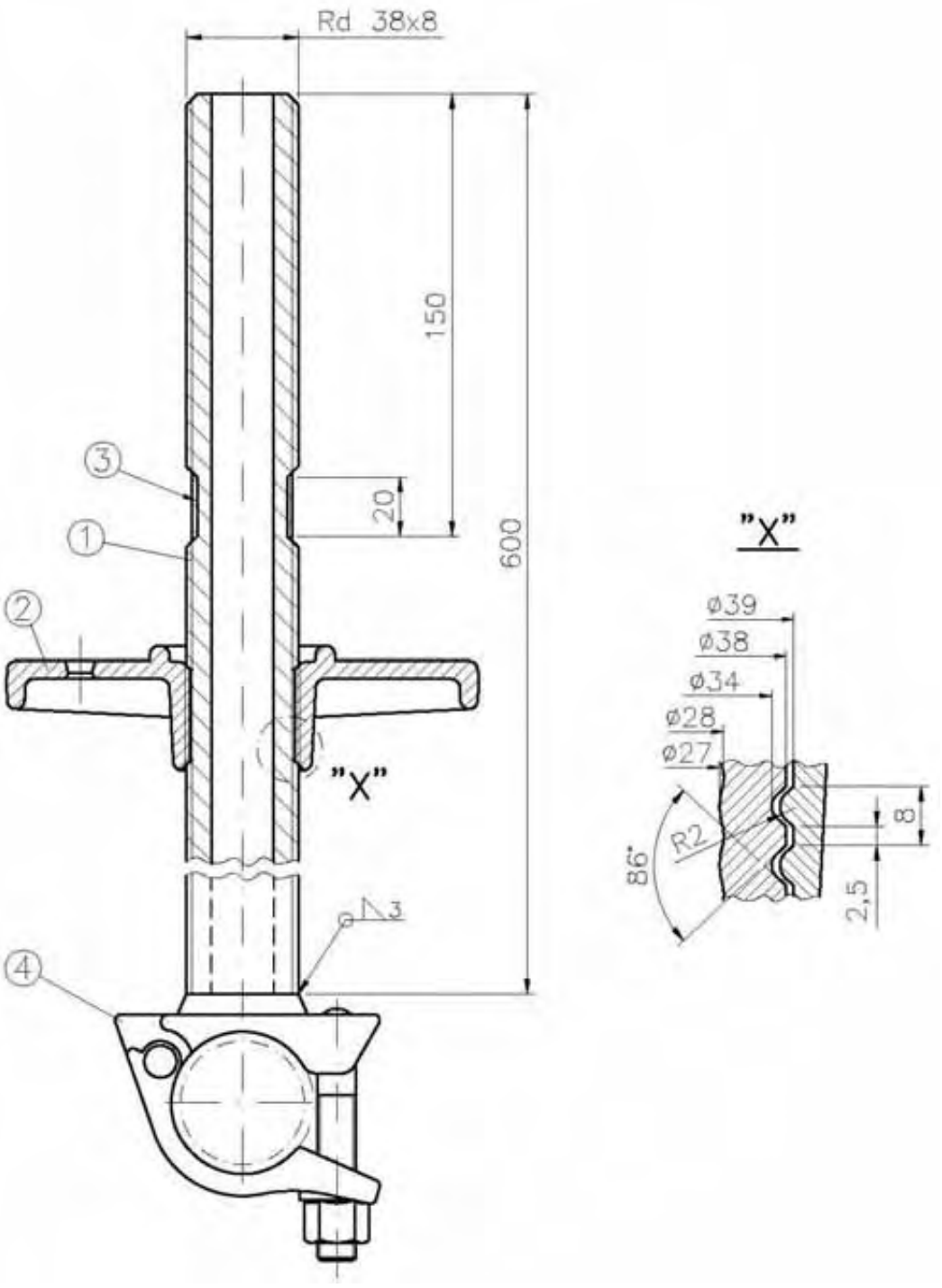
ALFIX MODUL plus II

Modular bracket 0.73m



(1) Thread rolled on tube Ø38x4.5 S355J2H
(2) Adjusting nut G20Mn5, zinc-plated
(3) Thread damaged by two dents
(4) Halfcoupler, class B

galvanized

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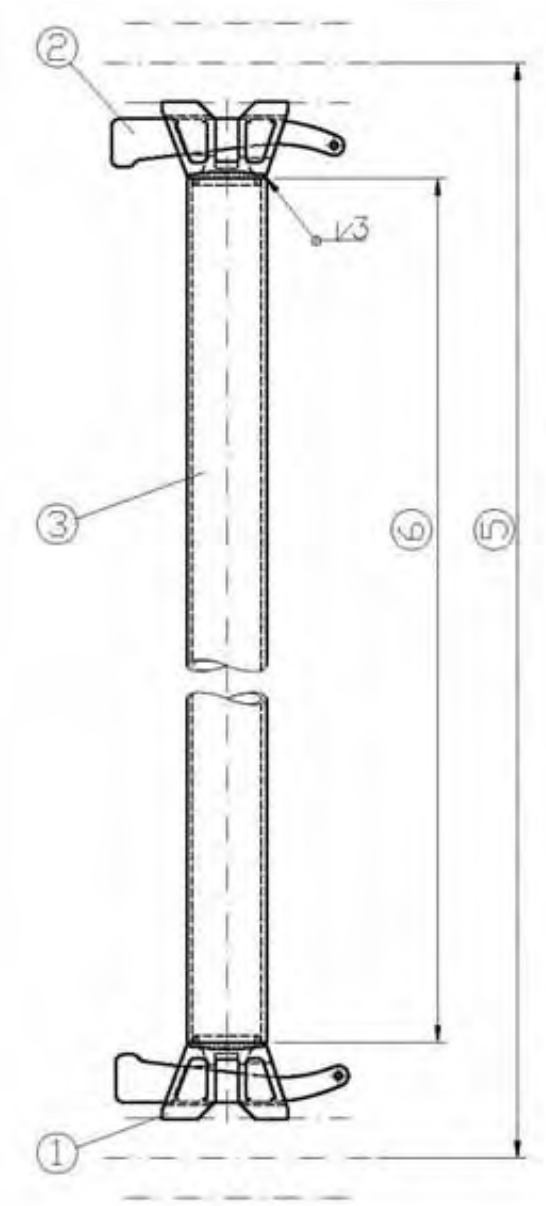
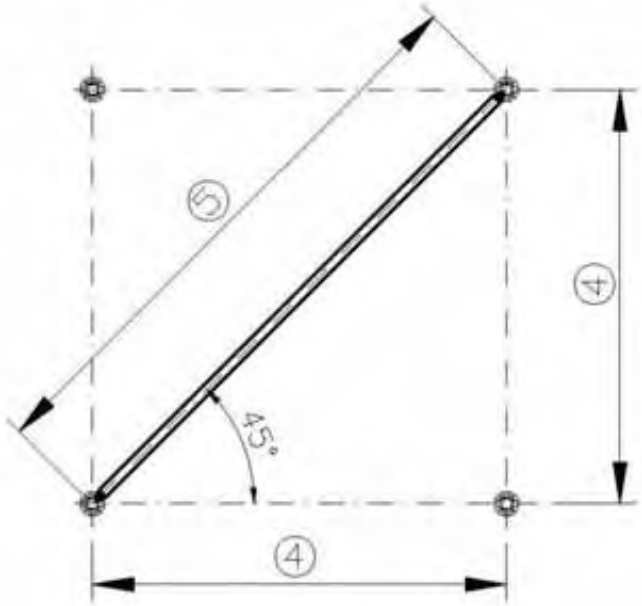
ALFIX MODUL plus II

Spindle coupling

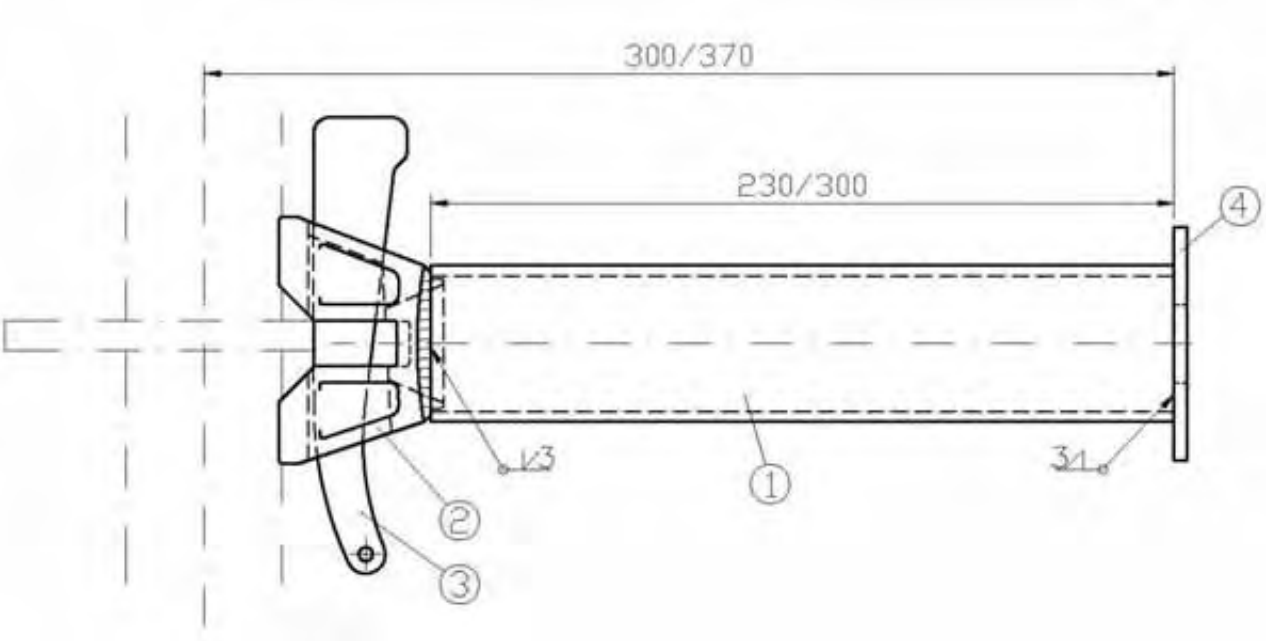




④	⑤	⑥
732	1035	894
1088	1539	1398
1286	1819	1678
1400	1980	1839
1572	2223	2082
2072	2930	2789
2572	3637	3496
3072	4344	4203

(1) Tube ledger connection
(2) Wedge 6mm S550MC
(3) R 48.3x3.2 S235JRH ReH≥320N/mm^2
(4) Bay width
(5) Bay diagonal brace
(6) Length, item 3

galvanized



(1) R 48.3x3.2 S235JRH ReH≥320N/mm^2
(2) Tube ledger connection
(3) Wedge 6mm S550MC
(4) Bl 4 S235JR

galvanized

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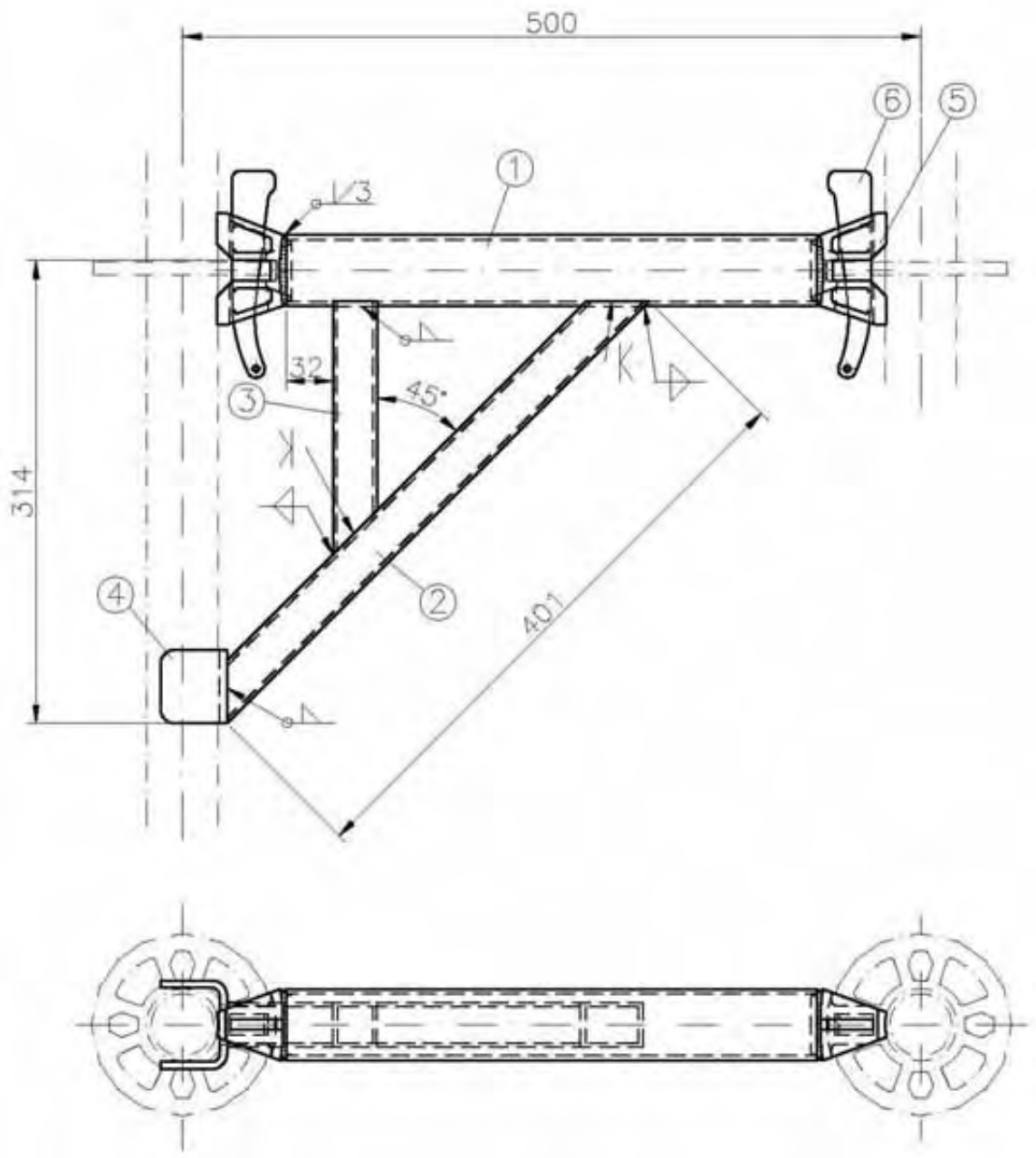
ALFIX MODUL plus II

Bracket ledger



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	RV 30x30x2.5	S235JRH	
(3)	RV 30x30x2.5	S235JRH	
(4)	Bd 50x5	S235JR	
(5)	Tube ledger connection		
(6)	Wedge 6mm	S550MC	

galvanized; all welds a=3mm

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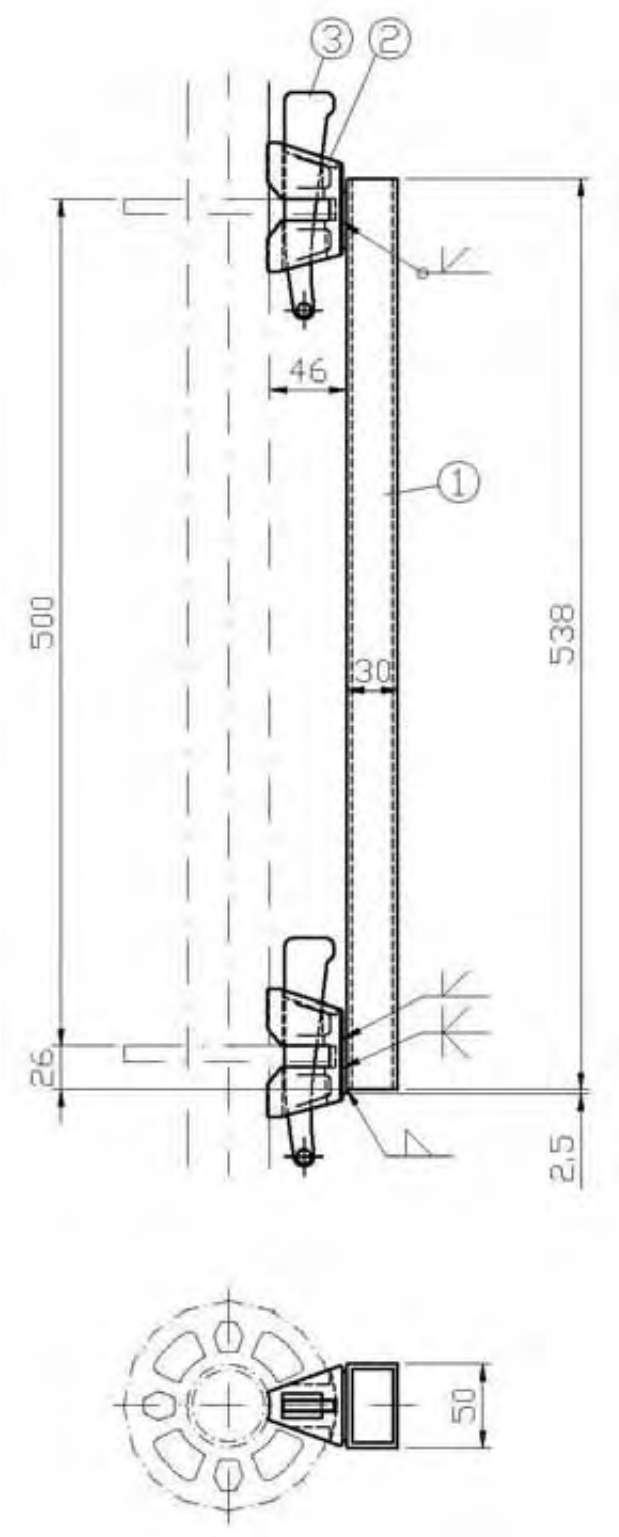
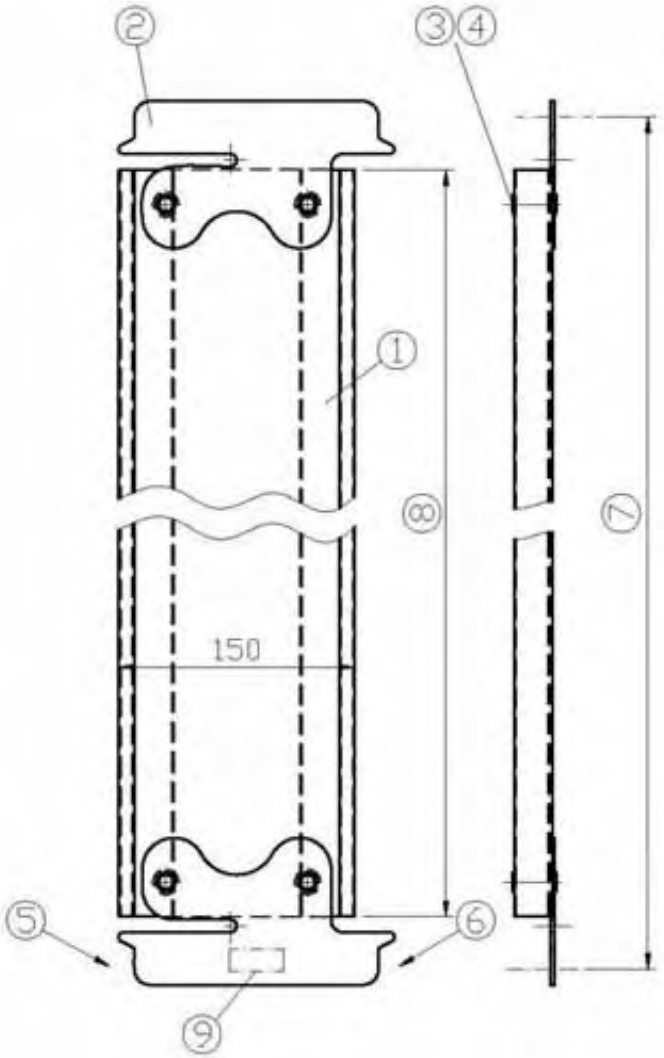
ALFIX MODUL plus II

Bracket RE 0.50m

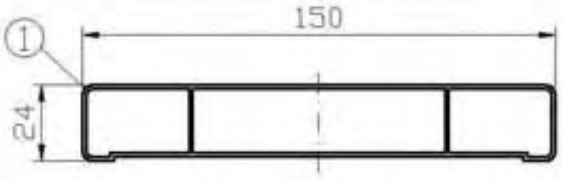


(1)	RV 50x30x3	S235JRH
(2)	U-ledger connection plus	
(3)	Wedge 6mm	S550MC

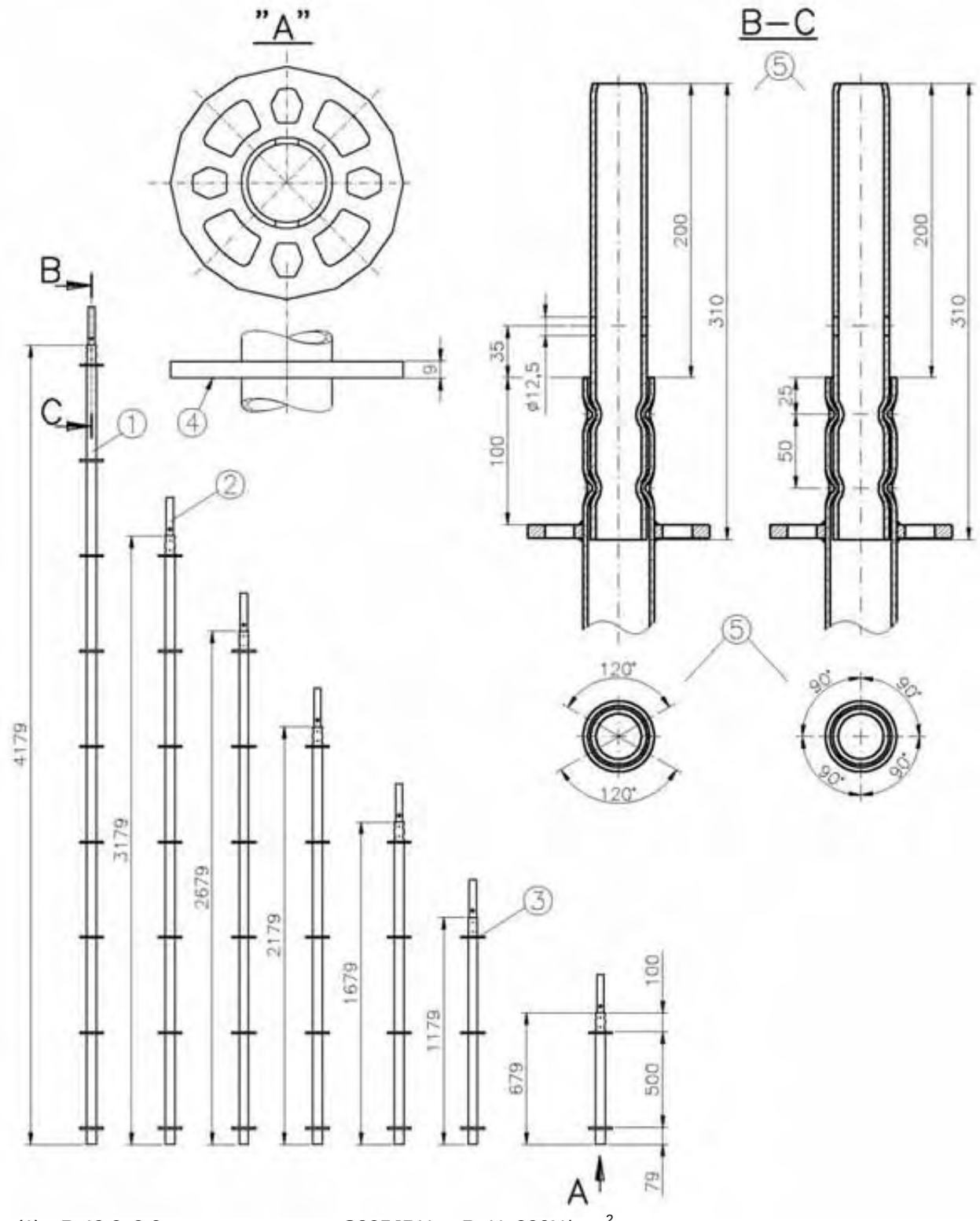
galvanized



⑦	⑧
390	323
732	665
1088	1021
1400	1333
1572	1505
2072	2005
2572	2505
3072	3005



(1)	Aluminium profile toeboard; s=1.25mm	EN AW-6063-T66
(2)	Slit strip 175x2	DIN EN 10111-DD11, galvanized
(3)	Disc	DIN 125 – A8.4-steel, galvanized
(4)	Tube rivet	DIN 7340 – A8x0.75x29-steel, zinc plated
(5)	Tube ledger connection	
(6)	U-ledger connection	
(7)	Bay length	
(8)	Length L	
(9)	Marking	



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	R 38x3.6	S235JRH	ReH≥320N/mm^2
(3)	Perforated connecting disc		
(4)	Marking		
(5)	Linear swaging	alternatively: 4x spot-swaging	

galvanized

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ALFIX MODUL plus II

Starting vertical upright

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of 13. October 2011
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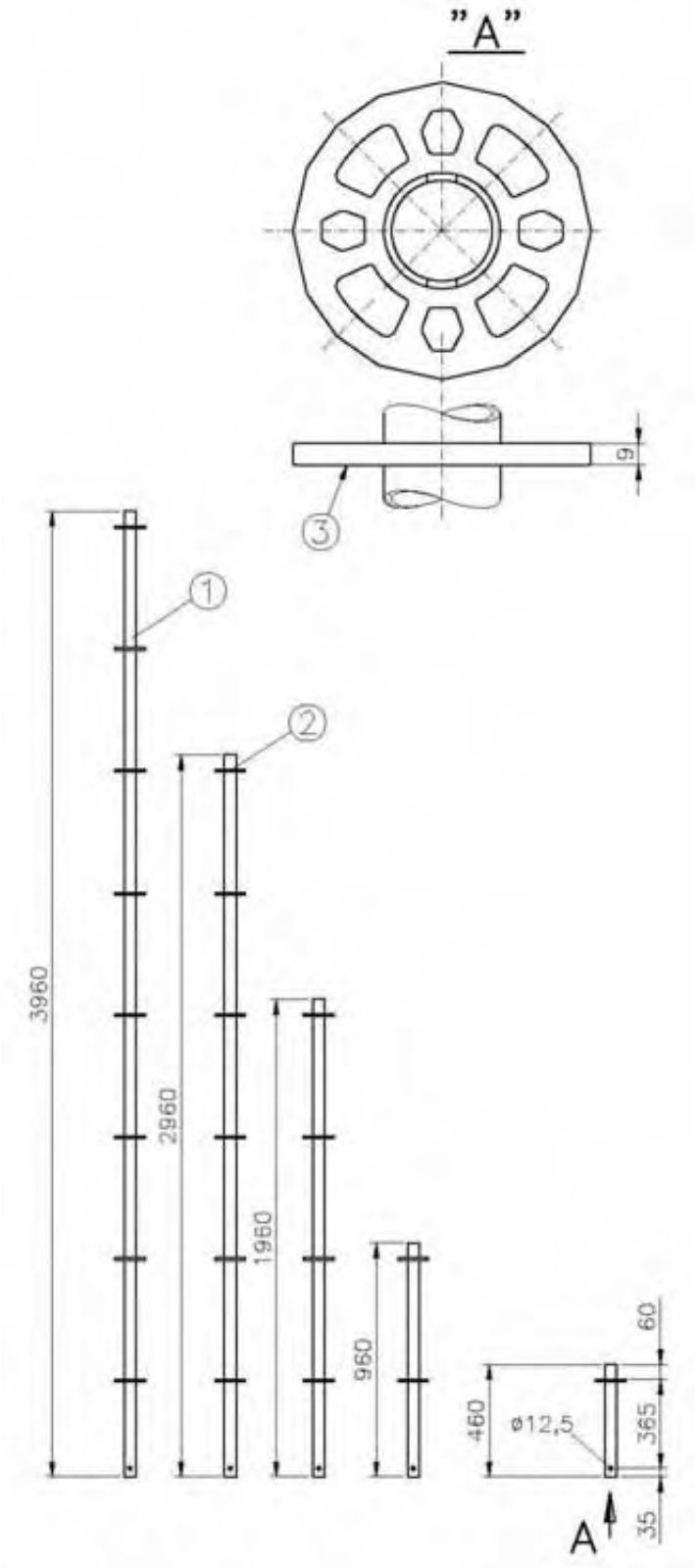
M710-B167



(1) R 48.3x3.2 S235JRH ReH≥320N/mm^2
(2) Perforated connecting disc
(3) Marking

galvanized

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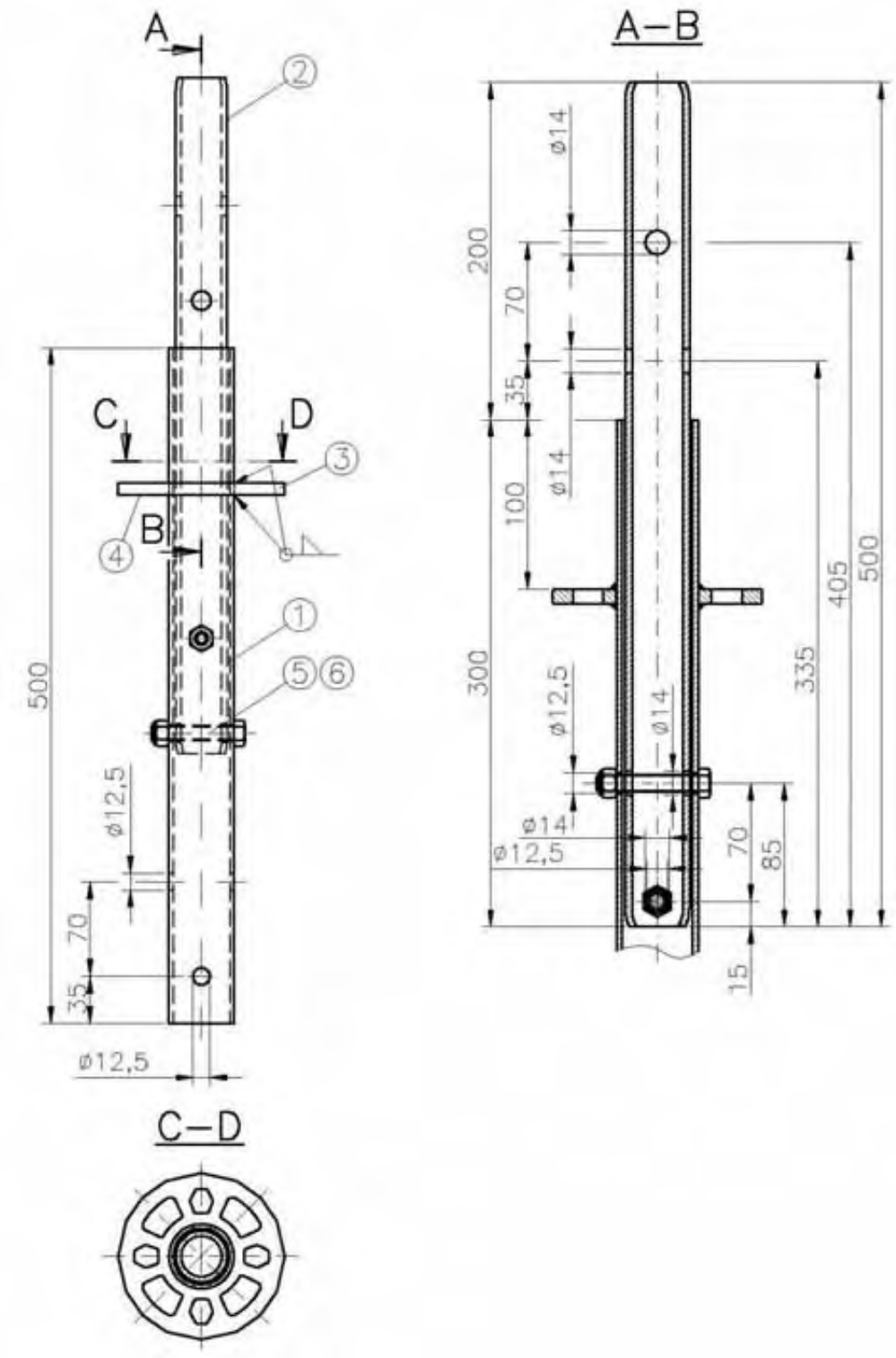
ALFIX MODUL plus II

Scaffold assembly post



(1)	R 48.3x3.2	S235JRH	ReH≥320N/mm^2
(2)	R 38x4	S235JRH	ReH≥320N/mm^2
(3)	Perforated connecting disc		
(4)	Marking		
(5)	Hexagon screw	DIN 931 – M10x60-8.8-galvanized	
(6)	Hexnut, self-locking	DIN 985 – M10-8-galvanized	

galvanized

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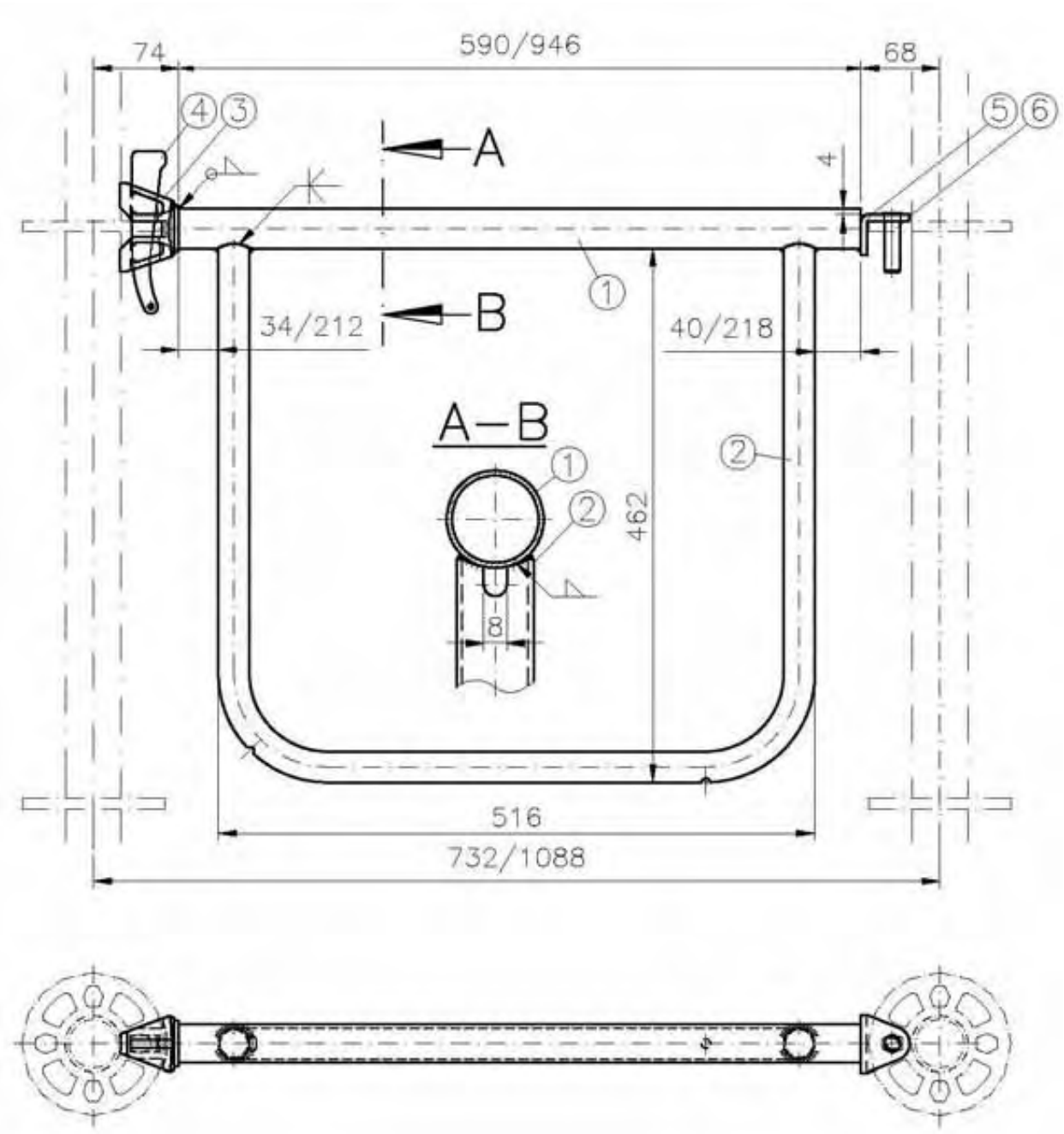
ALFIX MODUL plus II

Vertical upright 0.50m with detachable spigot fitting 500



(1)	R 33.7x1.8	S235JRH	ReH≥320N/mm^2
	alternatively: tube 33.7x2.0	S235JR	
(2)	Tube 26.9x2	S235JR	
(3)	Tube ledger connection		
(4)	Wedge 6mm	S550MC	
(5)	Fl 50x5	S235JR	
(6)	Rd 14	S235JR	

galvanized; all welds a=2.5mm

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ALFIX MODUL plus II

Modular double-end guardrail

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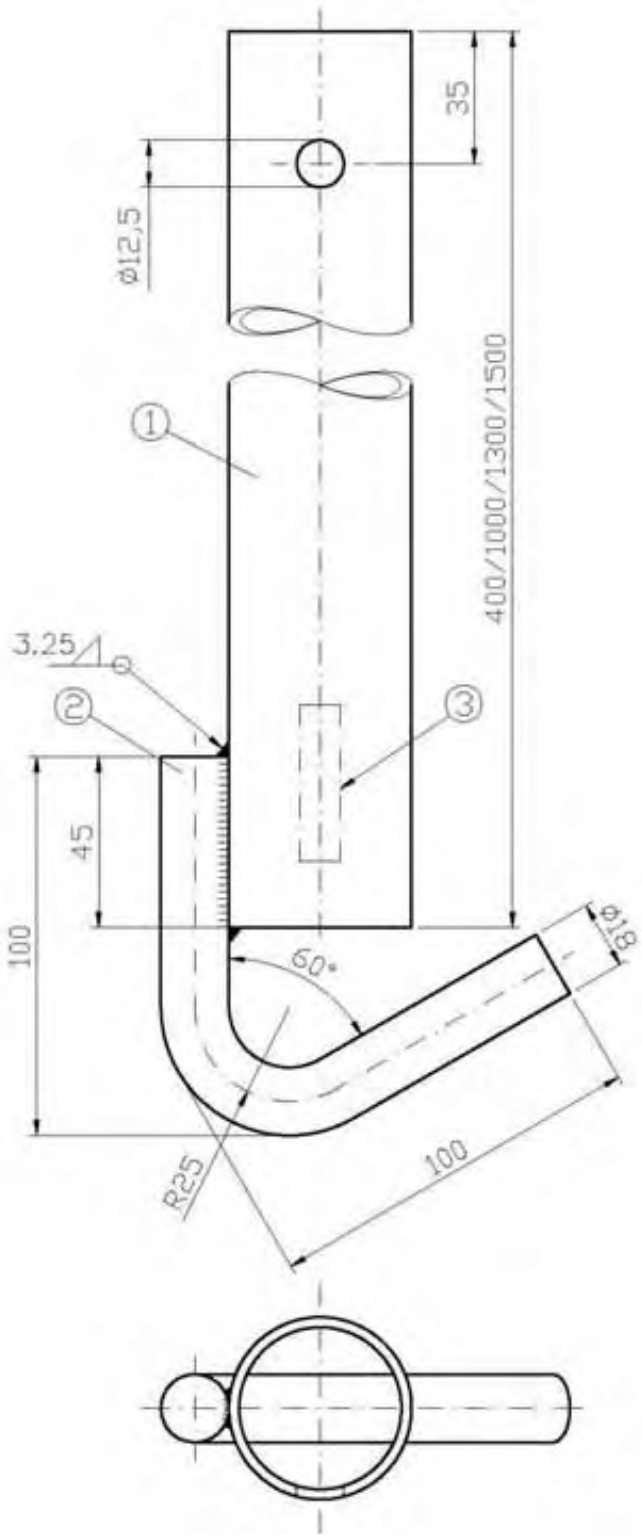
the national technical
approval Z-8.22-906
of 13. October 2011
Deutsches Institut für Bautechnik

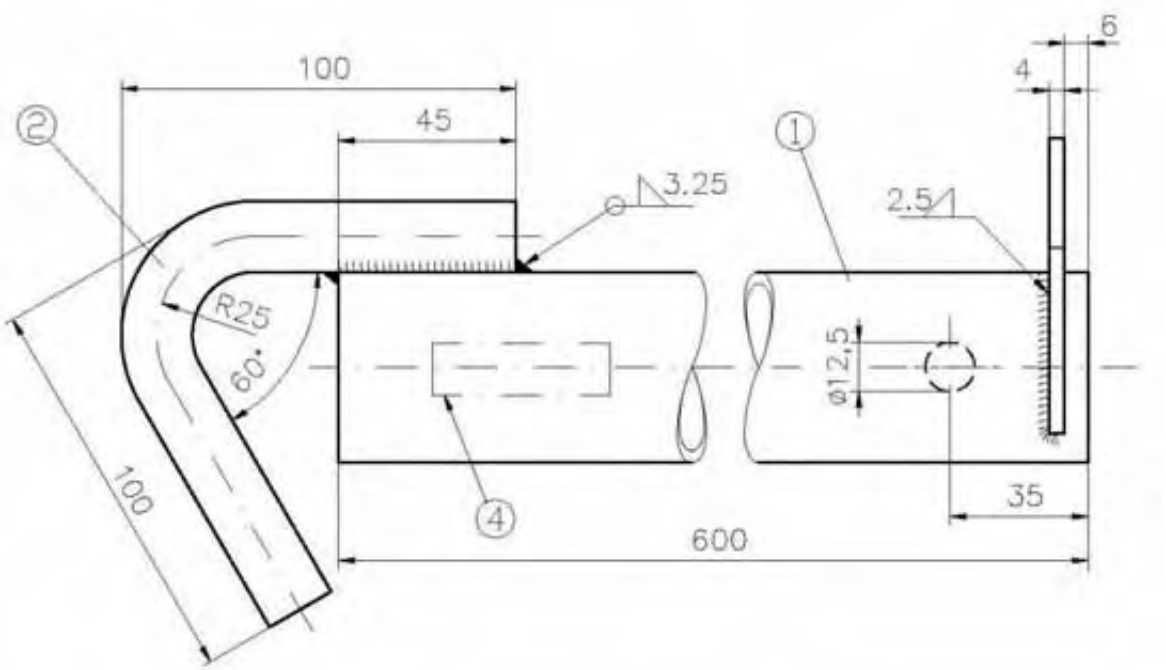
M711-B208

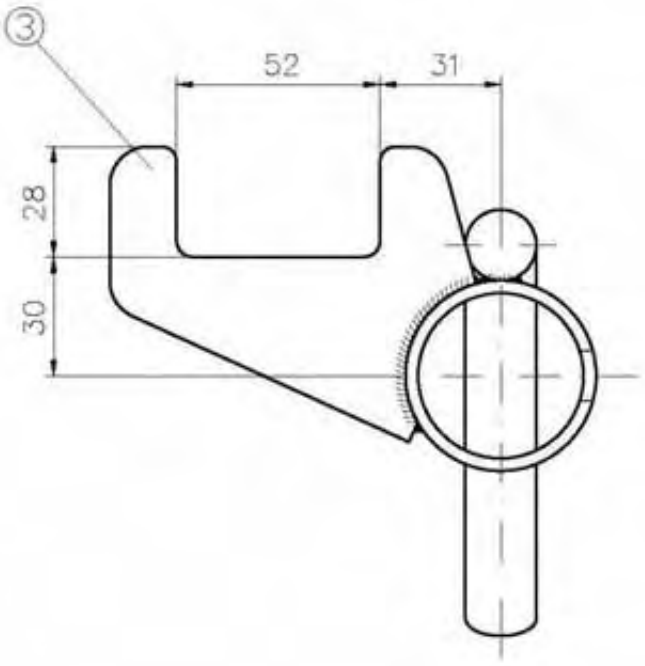


(1) R 48.3xt S235JRH ReH≥320N/mm^2
t=2.7mm; alternatively 3.2mm
(2) Rd 18 S355J2
(3) Marking

galvanized

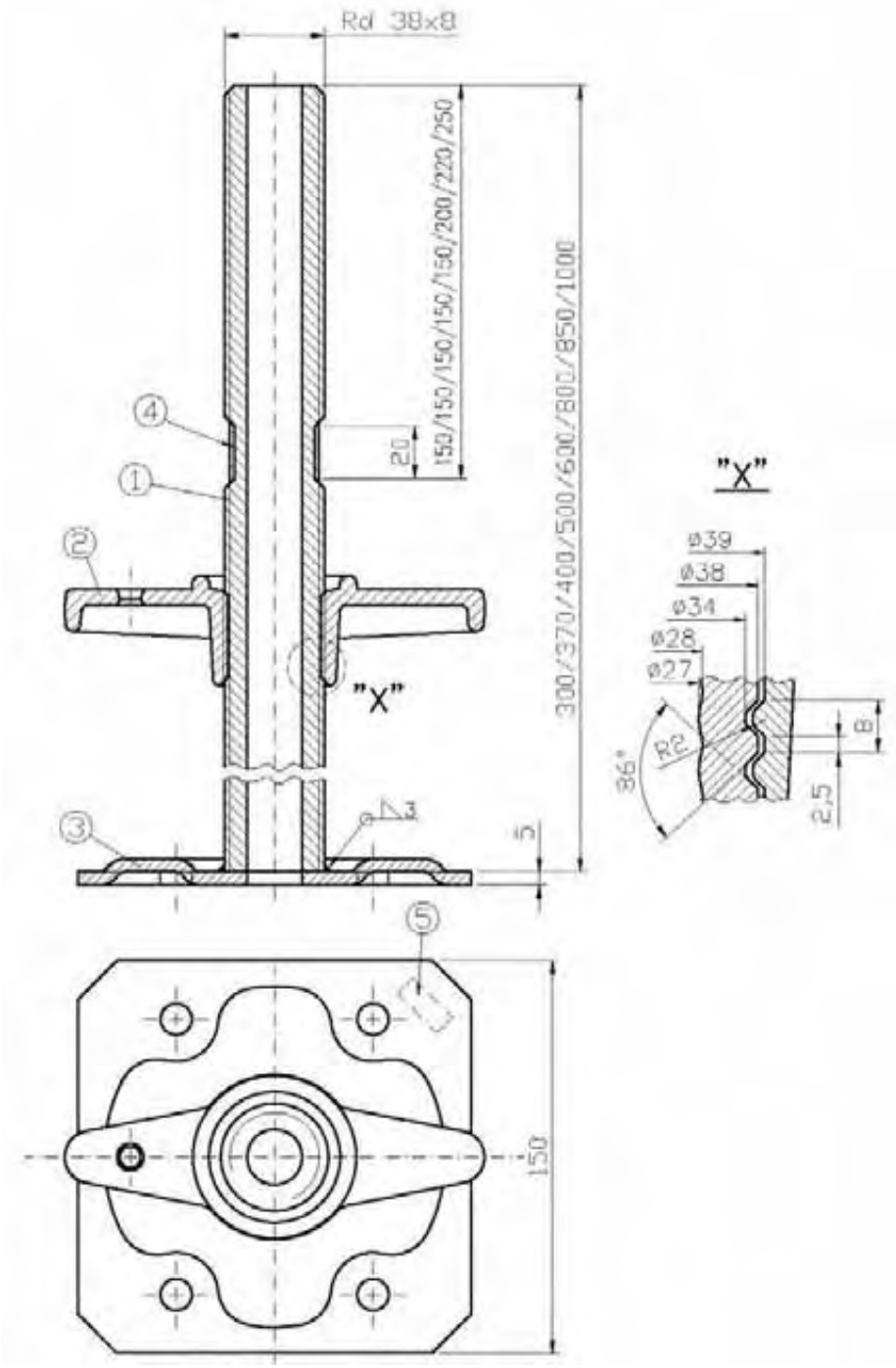
ALFIX GmbH 63828 Edelbach 09603 Großschirma	**ALFIX MODUL plus II** **Scaffold retainer** according to Z-8.1-862	Annex B, page 81 to the national technical approval Z-8.22-906 of 13. October 2011 Deutsches Institut für Bautechnik A709-A129_MPII





(1)	R 48.3xt t=2.7mm; alternatively 3.2mm	S235JRH	ReH≥320N/mm^2
(2)	Rd 18	S355J2	
(3)	Bl 4	S235JR	
(4)	Marking		

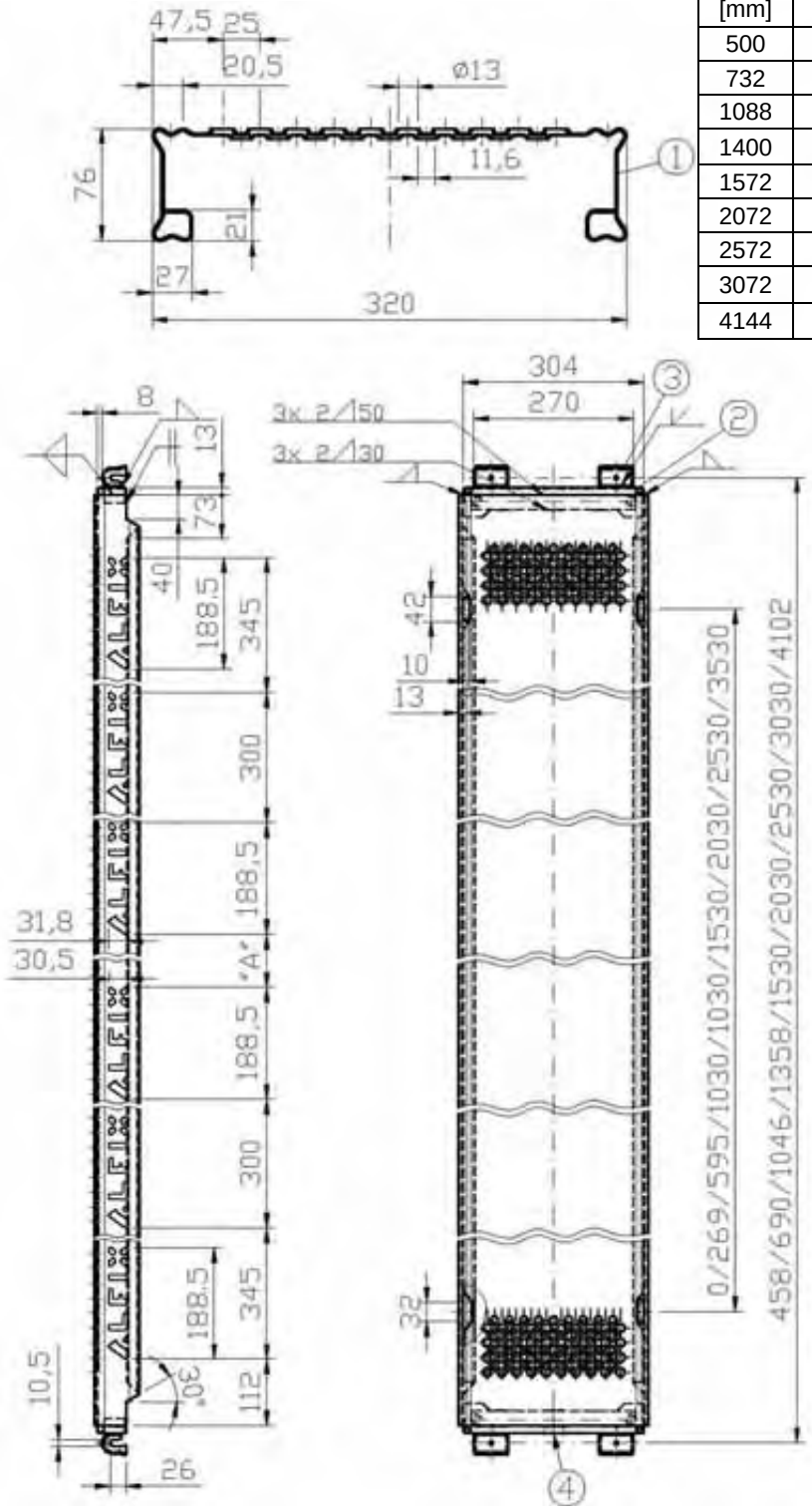
galvanized



(1) Thread rolled on tube Ø38x4.5 S355J2H
(2) Adjusting nut G20Mn5, zinc-plated
(3) Bl t=5mm S235JR
(4) Thread damaged by two dents
(5) Marking

galvanized

Bay length	Number of lettering(s)	Size “A“	Load class
[mm]	[left/right]	[mm]	
500	1/-	-	6
732	1/1	36	6
1088	1/1	392	6
1400	1/1	704	6
1572	1/1	876	6
2072	2/2	686	6
2572	2/2	1186	5
3072	3/3	1086	4
4144	3/3	2203	3



(1) Bd 1.5mm DIN EN 10111-DD11 ReH≥280N/mm² Rm≥360N/mm²
alternatively: DIN EN 10025-2 S235JR ReH≥280N/mm² Rm≥360N/mm²
(2) Bd 1.5mm DIN EN 10111-DD11 ReH≥240N/mm² Rm≥360N/mm²
(3) Bd 4mm DIN EN 10111-DD13 ReH≥240N/mm² Rm≥360N/mm²
(4) Marking

galvanized; all welds a=2mm

ALFIX GmbH
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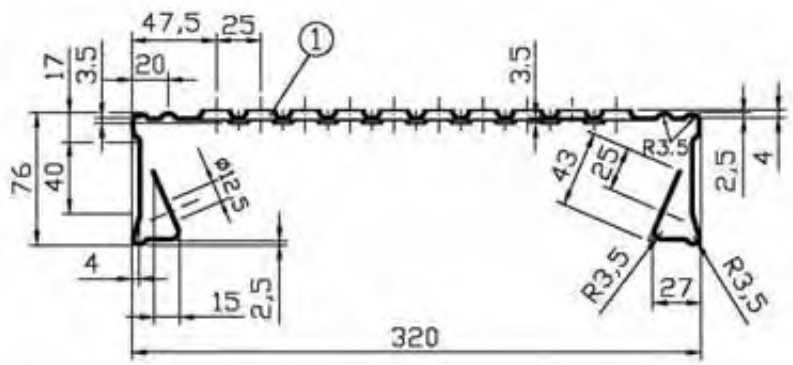
09603 Großschirma

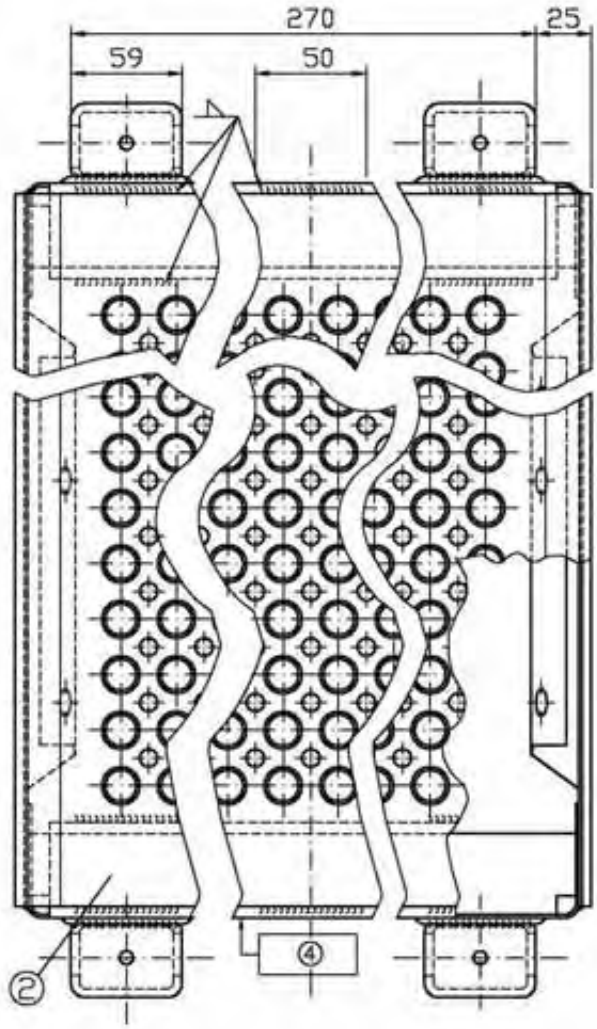
ALFIX MODUL plus II

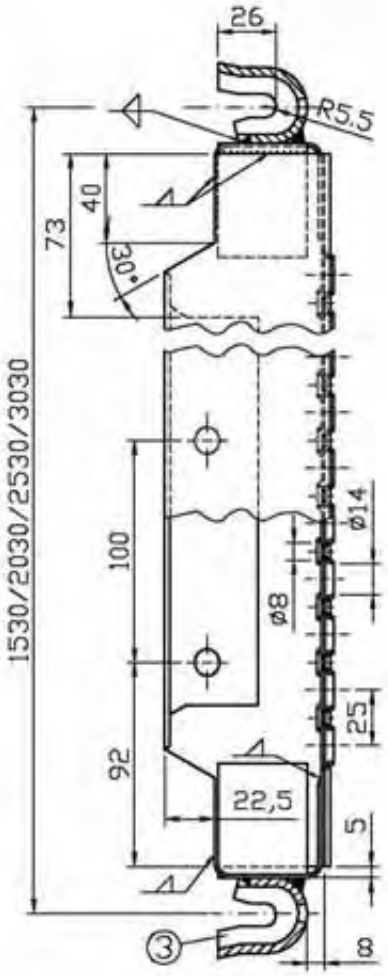
Steel deck AF 0.32m

according to Z-8.1-862

Bay length	Load class
[mm]	
1572	6
2072	6
2572	5
3072	4







(1)	Bd 590x1.5	DIN EN 10111-DD11	ReH≥280N/mm^2
(2)	Bd 120x2; altern. Bd 120x1.5	DIN EN 10111-DD11	ReH≥240N/mm^2
(3)	Bd 70x4	DIN EN 10111-DD13	ReH≥240N/mm^2
(4)	Marking		

galvanized; all welds a=3mm

ALFIX GmbH
63828 Edelbach
09603 Großschirma

ALFIX MODUL plus II

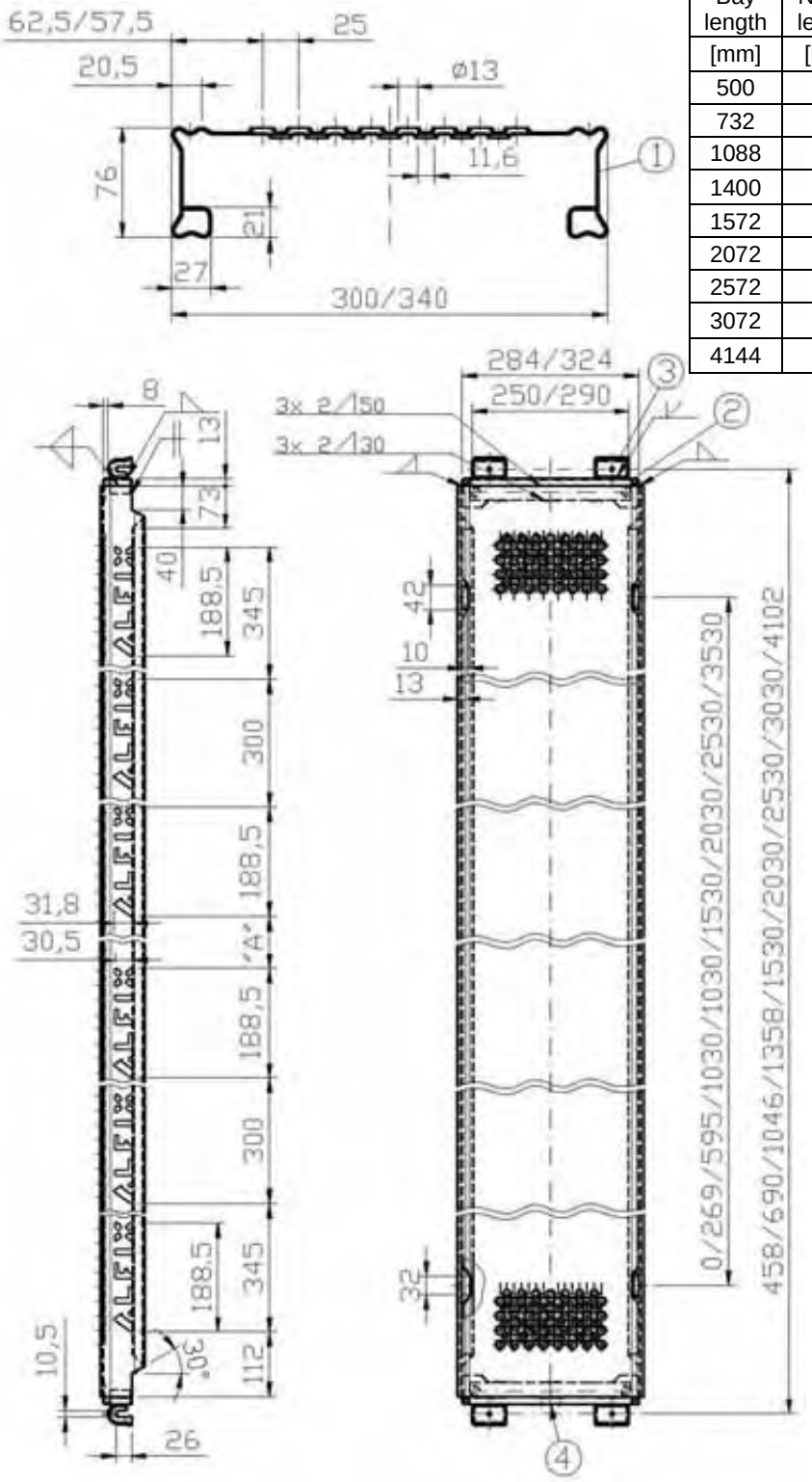
Steel deck

according to Z-8.1-862

Former design

Annex B, page 85 to
the national technical
approval Z-8.22-906
of 13. October 2011
Deutsches Institut für Bautechnik

A705-A007_MPII

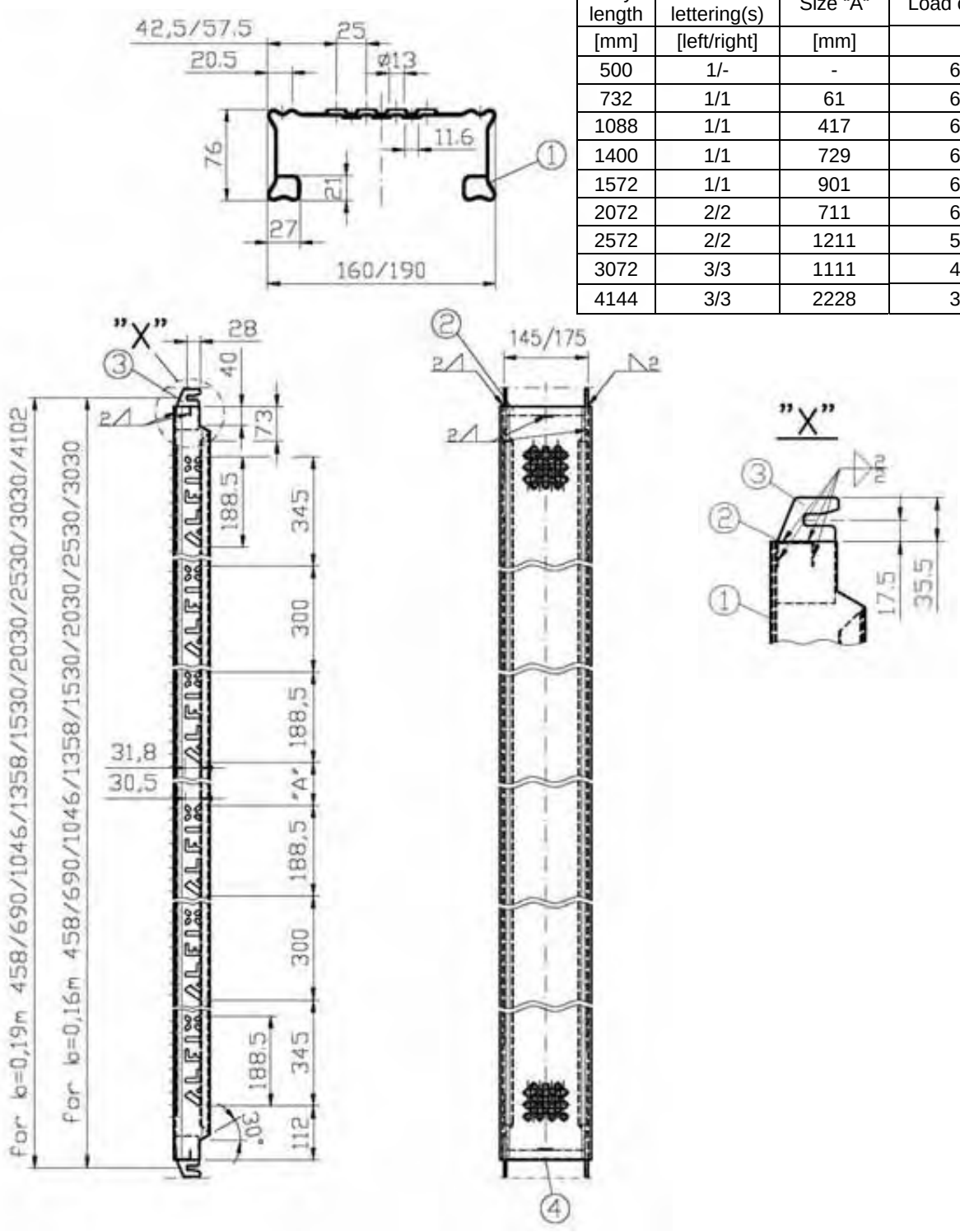


Bay length	Number of lettering(s)	Size "A"	Load class
[mm]	[left/right]	[mm]	
500	1/-	-	6
732	1/1	36	6
1088	1/1	392	6
1400	1/1	704	6
1572	1/1	876	6
2072	2/2	686	6
2572	2/2	1186	5
3072	3/3	1086	4
4144	3/3	2203	3

(1)	Bd 1.5mm	DIN EN 10111-DD11	ReH≥280N/mm^2	Rm≥360N/mm^2
	alternatively:	DIN EN 10025-2 S235JR	ReH≥280N/mm^2	Rm≥360N/mm^2
(2)	Bd 1.5mm	DIN EN 10111-DD11	ReH≥240N/mm^2	Rm≥360N/mm^2
(3)	Bd 4mm	DIN EN 10111-DD13	ReH≥240N/mm^2	Rm≥360N/mm^2
(4)	Marking			

galvanized; all welds a=2mm

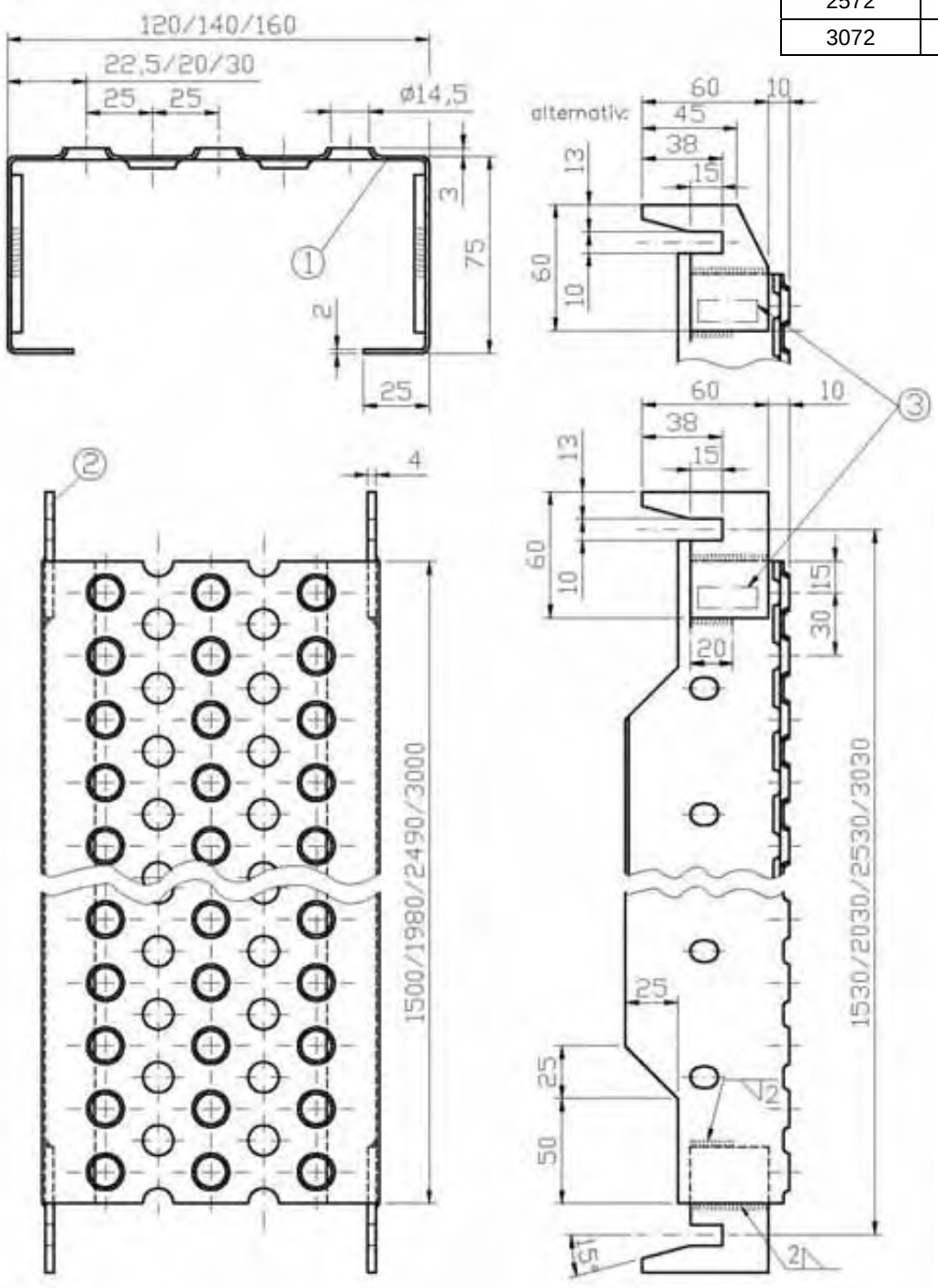
Bay length	Number of lettering(s)	Size “A“	Load class
[mm]	[left/right]	[mm]	
500	1/-	-	6
732	1/1	61	6
1088	1/1	417	6
1400	1/1	729	6
1572	1/1	901	6
2072	2/2	711	6
2572	2/2	1211	5
3072	3/3	1111	4
4144	3/3	2228	3



(1)	Bd 1.5mm	DIN EN 10111-DD11	ReH≥280N/mm^2	Rm≥360N/mm^2
	alternatively:	DIN EN 10025-2 S235JR	ReH≥280N/mm^2	Rm≥360N/mm^2
(2)	U 30x20x1.5	S235JR		
(3)	Fl 50x6	S235JR		
(4)	Marking			

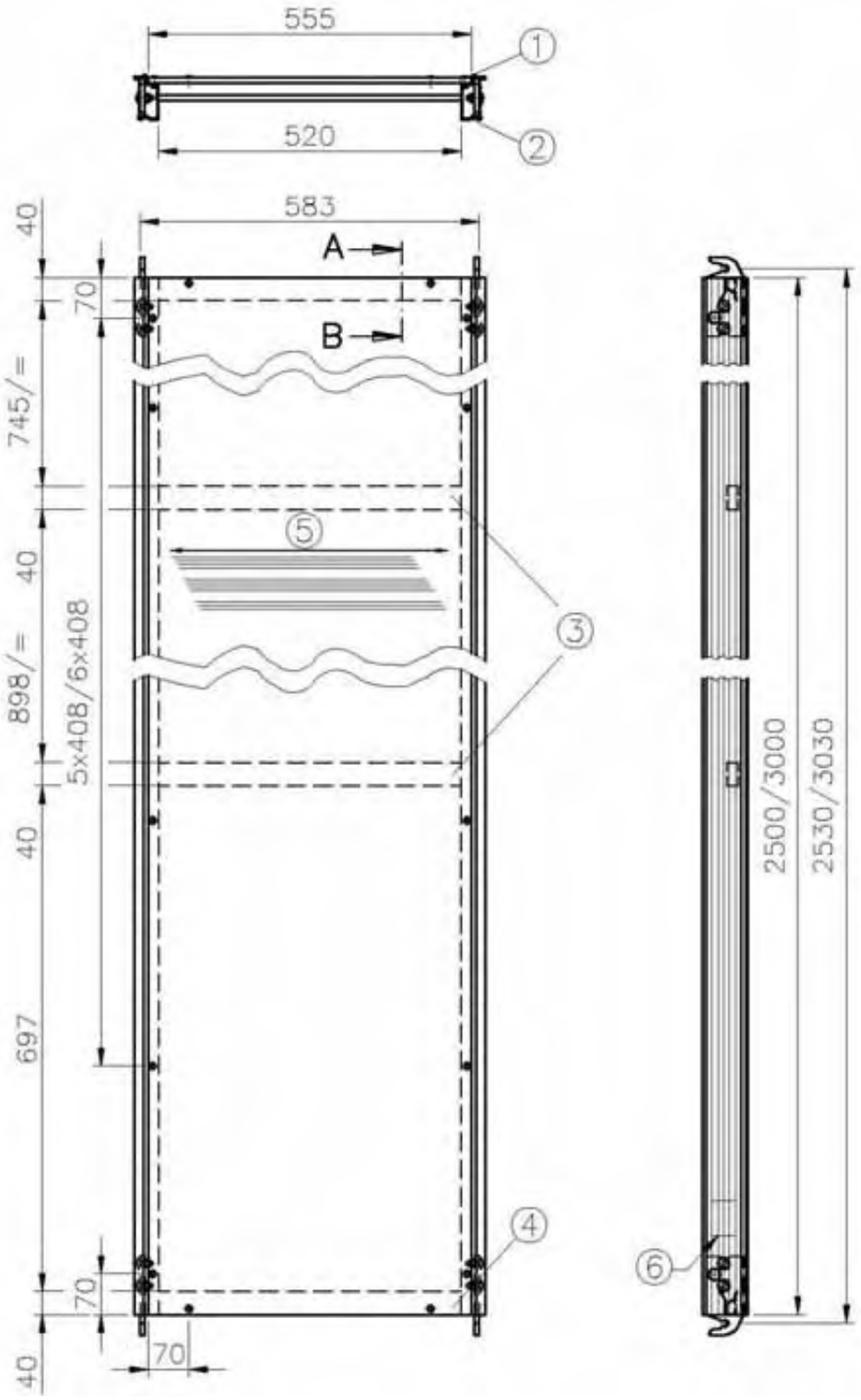
galvanized; all welds a=2mm

Bay length	Load class
[mm]	
1572	6
2072	6
2572	5
3072	4



(1) Profiled safety grating, 2mm round (Graepel) DIN EN 10025-2 S235JR
alternatively: DIN EN 10111-DD11 ReH≥240N/mm² Rm≥360N/mm²
(2) Bl 4x60x60 DIN EN 10025-2 S235JR
(3) Marking

galvanized



(1)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU (construction veneer plywood) 100-G
(2)	Brace profile 78x42	EN AW-6063-T66 (AlMgSi0.5F25)
(3)	RV 40x20x2	EN AW-6063-T66 (AlMgSi0.5F25)
(4)	Gripping profile	EN AW-6063-T66 (AlMgSi0.5F25)
(5)	Fibre direction	
(6)	Marking	

Details, see A705-A011

Load class 3

ALFIX GmbH
63828 Edelbach
09603 Großschirma

ALFIX MODUL plus II

Aluminium deck with plywood

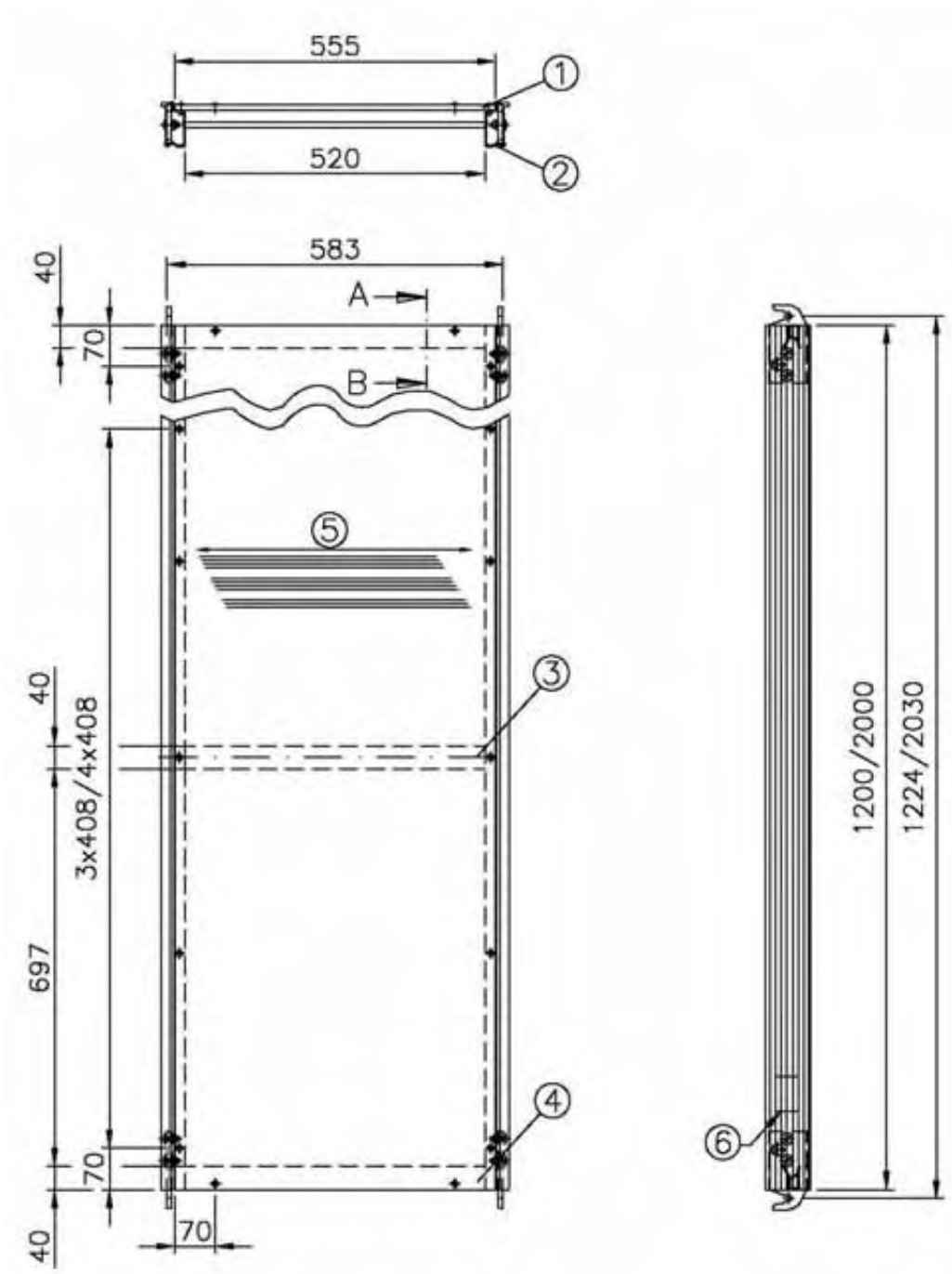
2.57m; 3.07m

according to Z-8.1-862

Former design

Annex B, page 89 to
the national technical
approval Z-8.22-906
of 13. October 2011
Deutsches Institut für Bautechnik

A705-A009_MPII



(1)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU (construction veneer plywood) 100-G
(2)	Brace profile 78x42	EN AW-6063-T66 (AlMgSi0.5F25)
(3)	RV 40x20x2	EN AW-6063-T66 (AlMgSi0.5F25)
(4)	Gripping profile	EN AW-6063-T66 (AlMgSi0.5F25)
(5)	Fibre direction	
(6)	Marking	

Details, see A705-A011

Load class 3

ALFIX GmbH
63828 Edelbach
09603 Großschirma

ALFIX MODUL plus II

Aluminium deck with plywood

1.57m; 2.07m

according to Z-8.1-862

Former design

Annex B, page 90 to
the national technical
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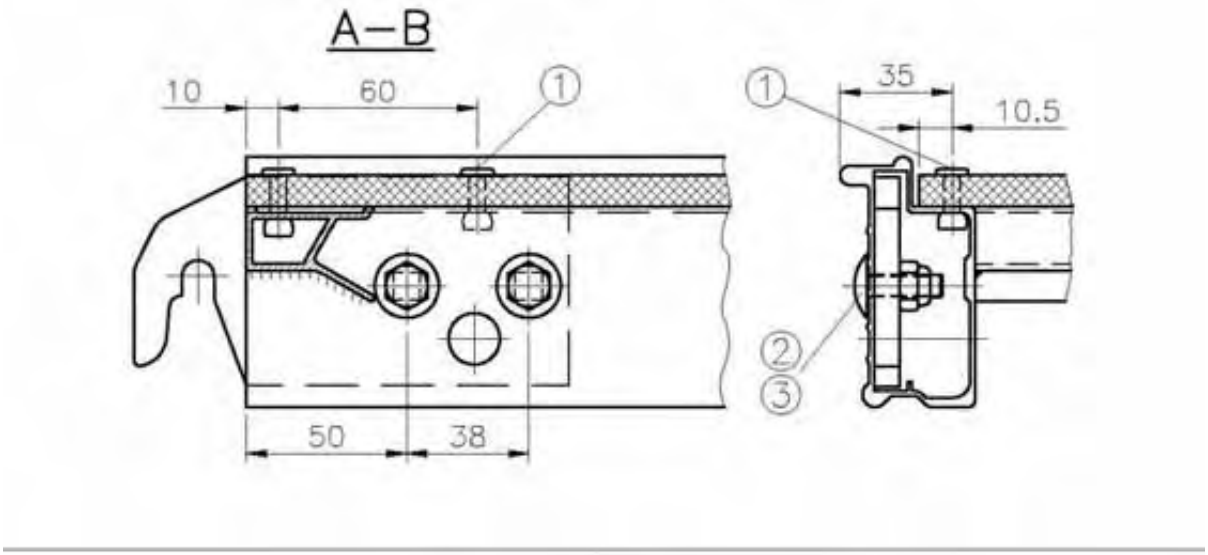
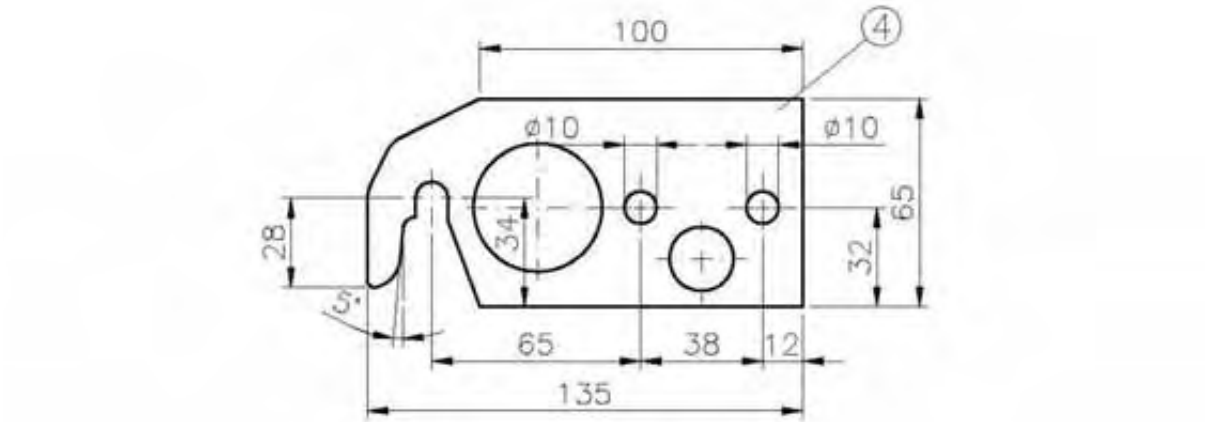
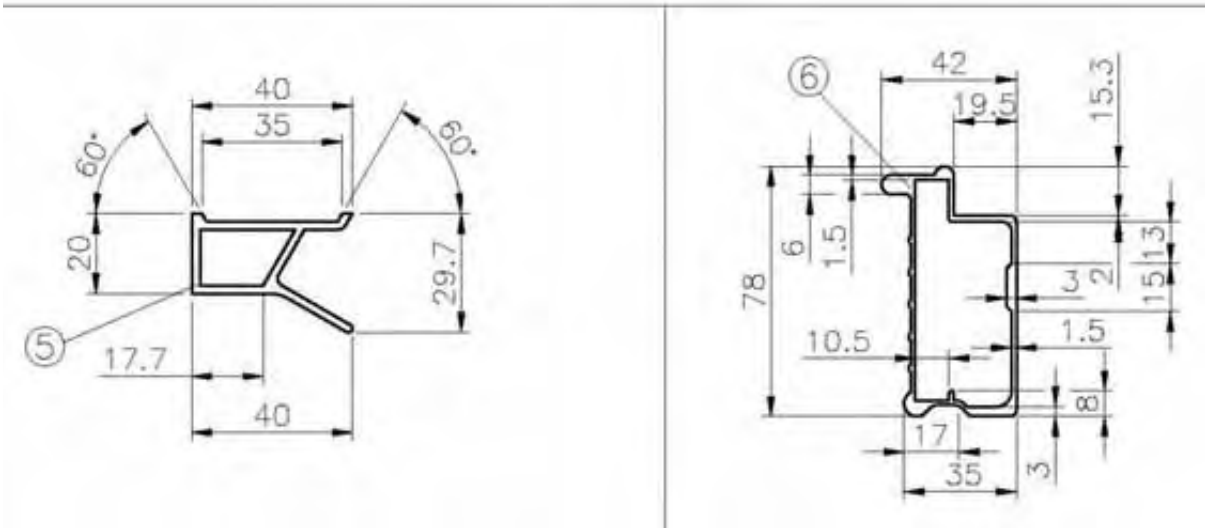
Deutsches Institut für Bautechnik

A705-A010_MPII







(1)	Blind rivet Ø5x20		EN AW-5754 H112 (AlMg3)
(2)	Round-head bolt	M8x20 DIN 603	
(3)	Nut, self-locking	M8 DIN 980	
(4)	Mounting claw	Bl 8	S235JRG2 galvanized
(5)	Gripping profile; web thickness 2mm		EN AW-6063-T66 (AlMgSi0.5F25)
(6)	Aluminium brace profile		EN AW-6063-T66 (AlMgSi0.5F25)

ALFIX GmbH
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ALFIX MODUL plus II

Details

Aluminium deck

according to Z-8.1-862

Former design

Annex B, page 91 to
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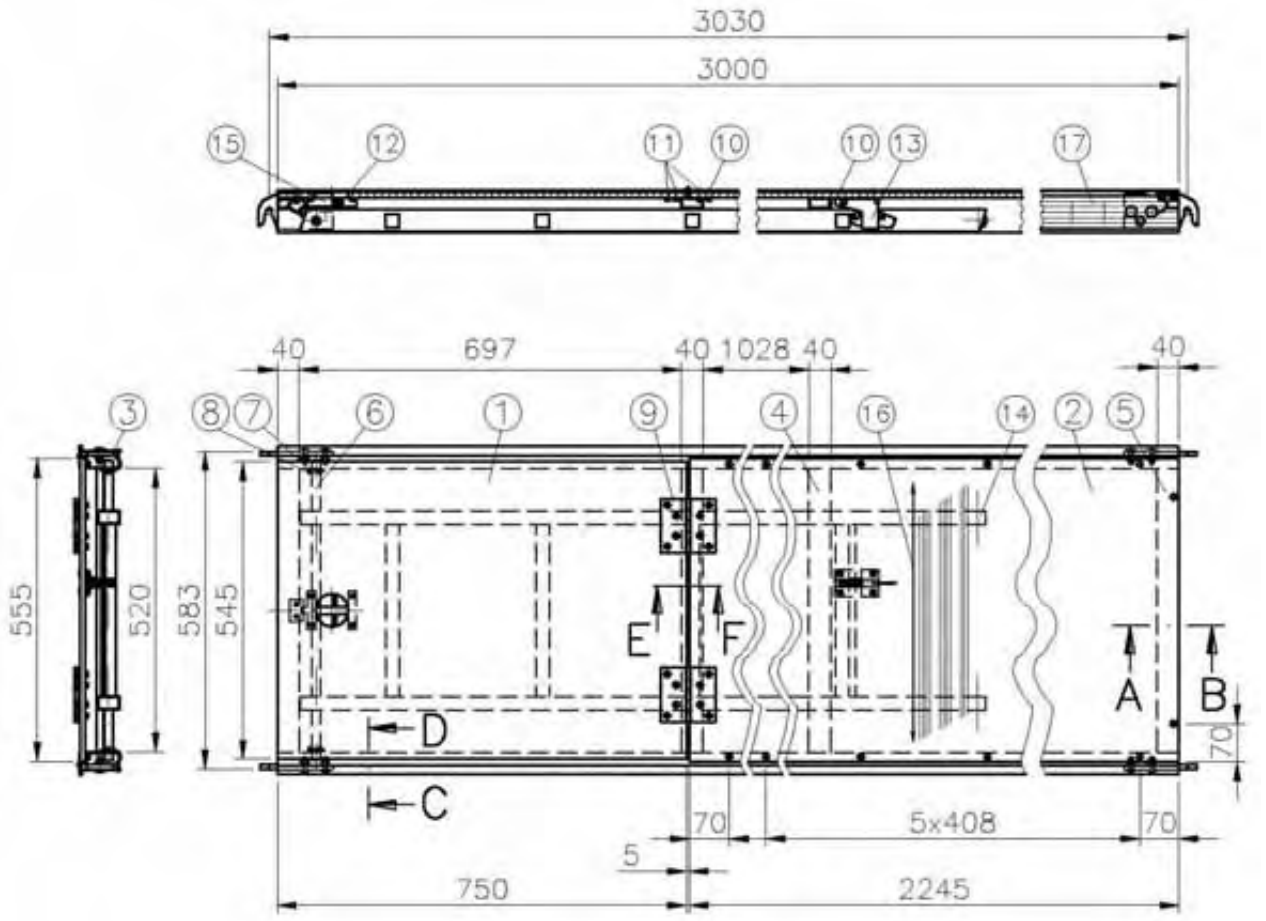
of 13. October 2011
Deutsches Institut für Bautechnik

A705-A011_MPII



(1)	WISA Combi Mirror plywood 10x545 in acc. with Z-9.1-430	BFU (construction veneer plywood) 100-G
(2)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU 100-G
(3)	Brace profile 78x42	EN AW-6063-T66 (AlMgSi0.5F25)
(4)	RV 40x20x2	EN AW-6063-T66 (AlMgSi0.5F25)
(5)	Gripping profile	EN AW-6063-T66 (AlMgSi0.5F25)
(6)	Tube Ø15x2	S235JRH
(7)	Disc Ø17	DIN 125
(8)	Cotter pin Ø4x25	DIN 94
(9)	Hinge 100x100x1.6	
(10)	Blind rivet Ø5x20	EN AW-5754 H112 (AlMg3)
(11)	Blind rivet Ø4.8x18	EN AW-5754 H112 (AlMg3)
(12)	Blind rivet Ø4.8x16	EN AW-5754 H112 (AlMg3)
(13)	Ladder holder	
(14)	Ladder,	see A709-A115
(15)	Ledger	
(16)	Fibre direction	
(17)	Marking	

Details, see A705-A011 and A705-014

Load class 3

ALFIX GmbH
63828 Edelbach
09603 Großschirma

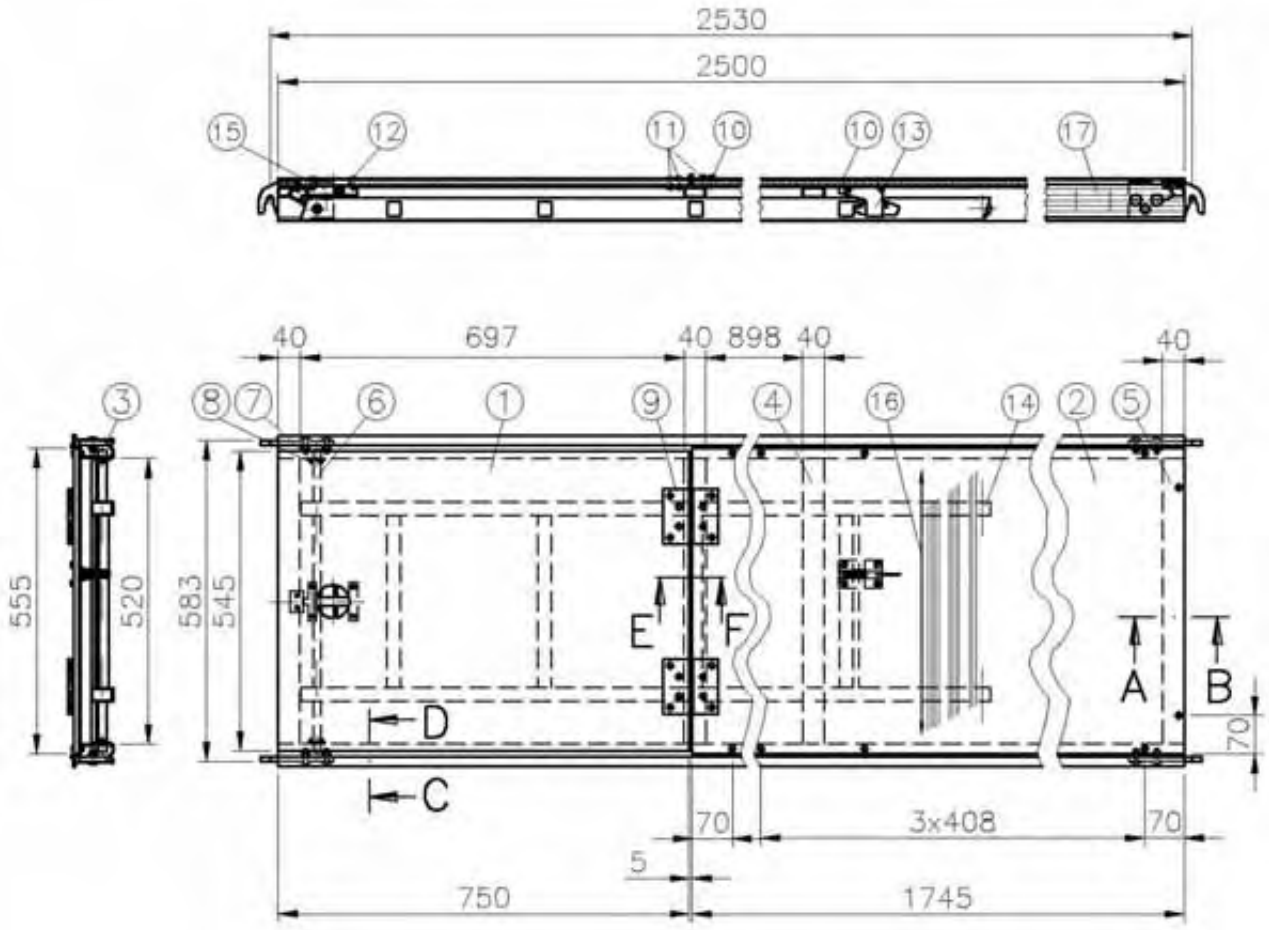
ALFIX MODUL plus II

Aluminium hatch-type access deck 3.07m with ladder

according to Z-8.1-862

Former design

Annex B, page 92 to the national technical approval Z-8.22-906 of 13. October 2011 Deutsches Institut für Bautechnik



(1)	WISA Combi Mirror plywood 10x545 in acc. with Z-9.1-430	BFU (construction veneer plywood) 100-G
(2)	WISA Combi Mirror plywood 10x555 in acc. with Z-9.1-430	BFU 100-G
(3)	Brace profile 78x42	EN AW-6063-T66 (AlMgSi0.5F25)
(4)	RV 40x20x2	EN AW-6063-T66 (AlMgSi0.5F25)
(5)	Gripping profile	EN AW-6063-T66 (AlMgSi0.5F25)
(6)	Tube Ø15x2	S235JRH
(7)	Disc Ø17	DIN 125
(8)	Cotter pin Ø4x25	DIN 94
(9)	Hinge 100x100x1.6	
(10)	Blind rivet Ø5x20	EN AW-5754 H112 (AlMg3)
(11)	Blind rivet Ø4.8x18	EN AW-5754 H112 (AlMg3)
(12)	Blind rivet Ø4.8x16	EN AW-5754 H112 (AlMg3)
(13)	Ladder holder	
(14)	Ladder,	see A709-A115
(15)	Ledger	
(16)	Fibre direction	
(17)	Marking	

Details, see A705-A011 and A705-A014

Load class 3

ALFIX GmbH
63828 Edelbach
09603 Großschirma

ALFIX MODUL plus II

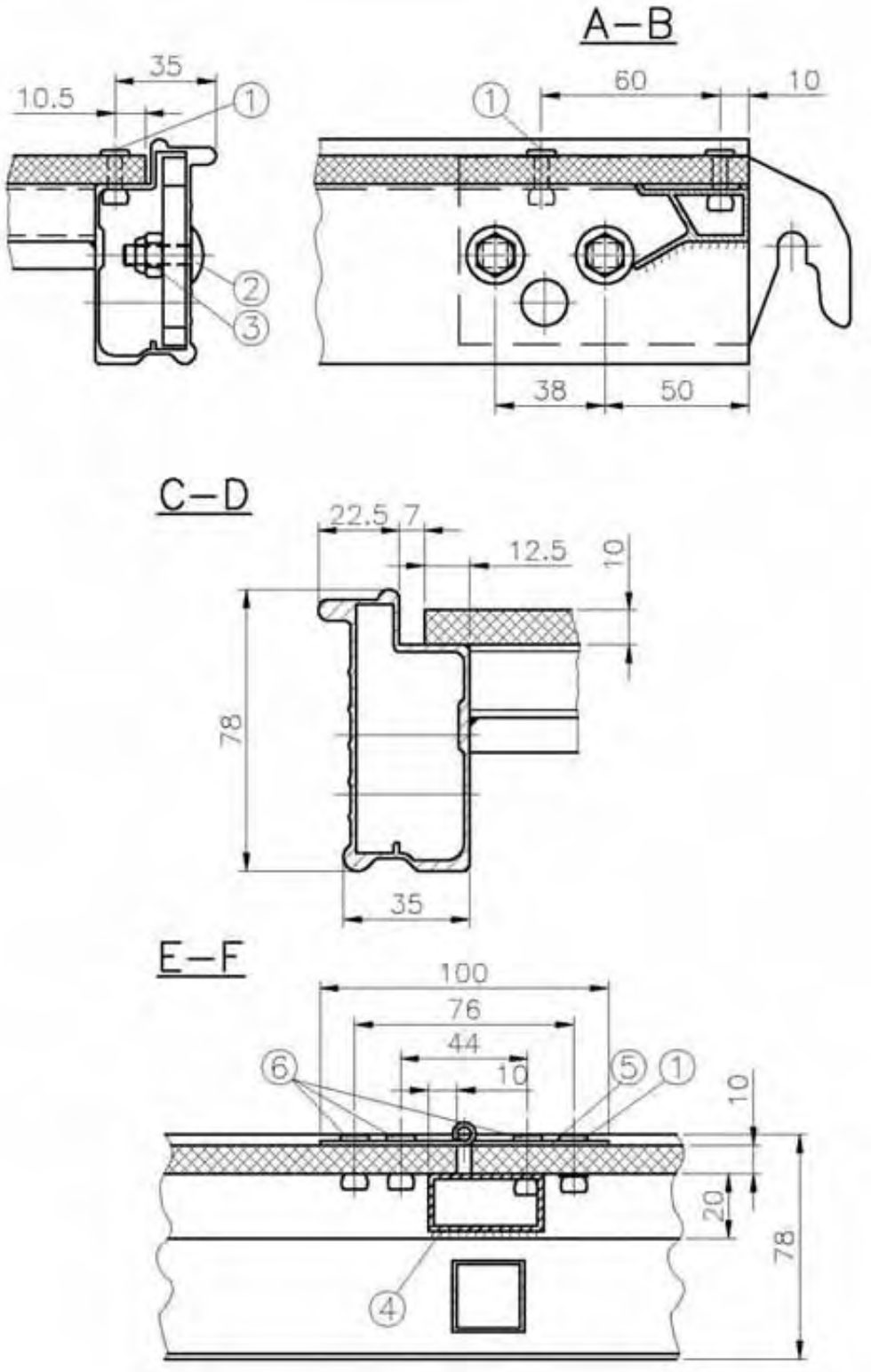
Aluminium hatch-type access deck 2.57m with ladder

according to Z-8.1-862

Former design

Annex B, page 93 to the national technical approval Z-8.22-906 of 13. October 2011 Deutsches Institut für Bautechnik

A705-A013_MPII



(1)	Blind rivet Ø5x20		EN AW-5754 H112 (AlMg3)
(2)	Round-head bolt	M8x20 DIN 603	
(3)	Nut, self-locking	M8 DIN 980	
(4)	Rectangular hollow section	40x20x2	EN AW-6063-T66 (AlMgSi0.5F25)
(5)	Hinge 100x100x1.6		
(6)	Blind rivet Ø4.8x18		EN AW-5754 H112 (AlMg3)

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09603 Großschirma

ALFIX MODUL plus II

Sections

Aluminium hatch-type access deck

according to Z-8.1-862

Former design

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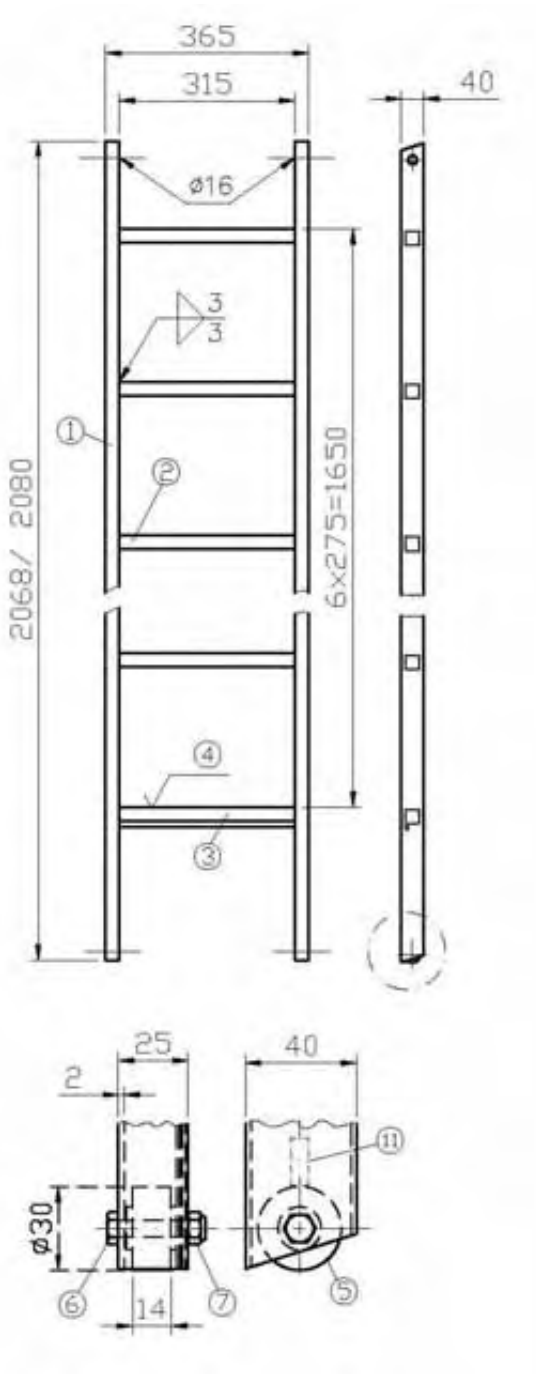
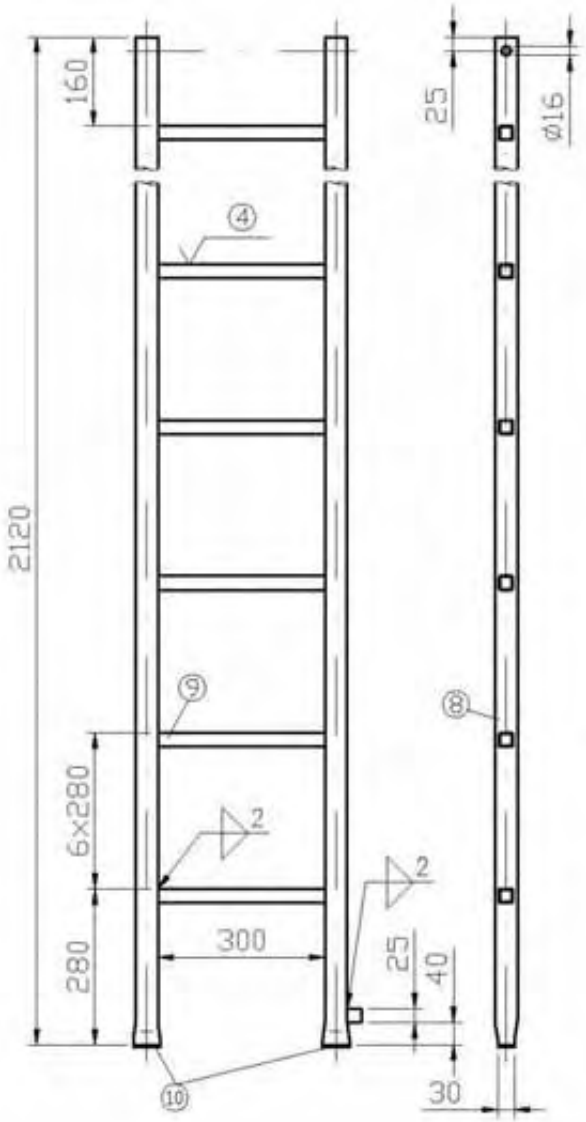
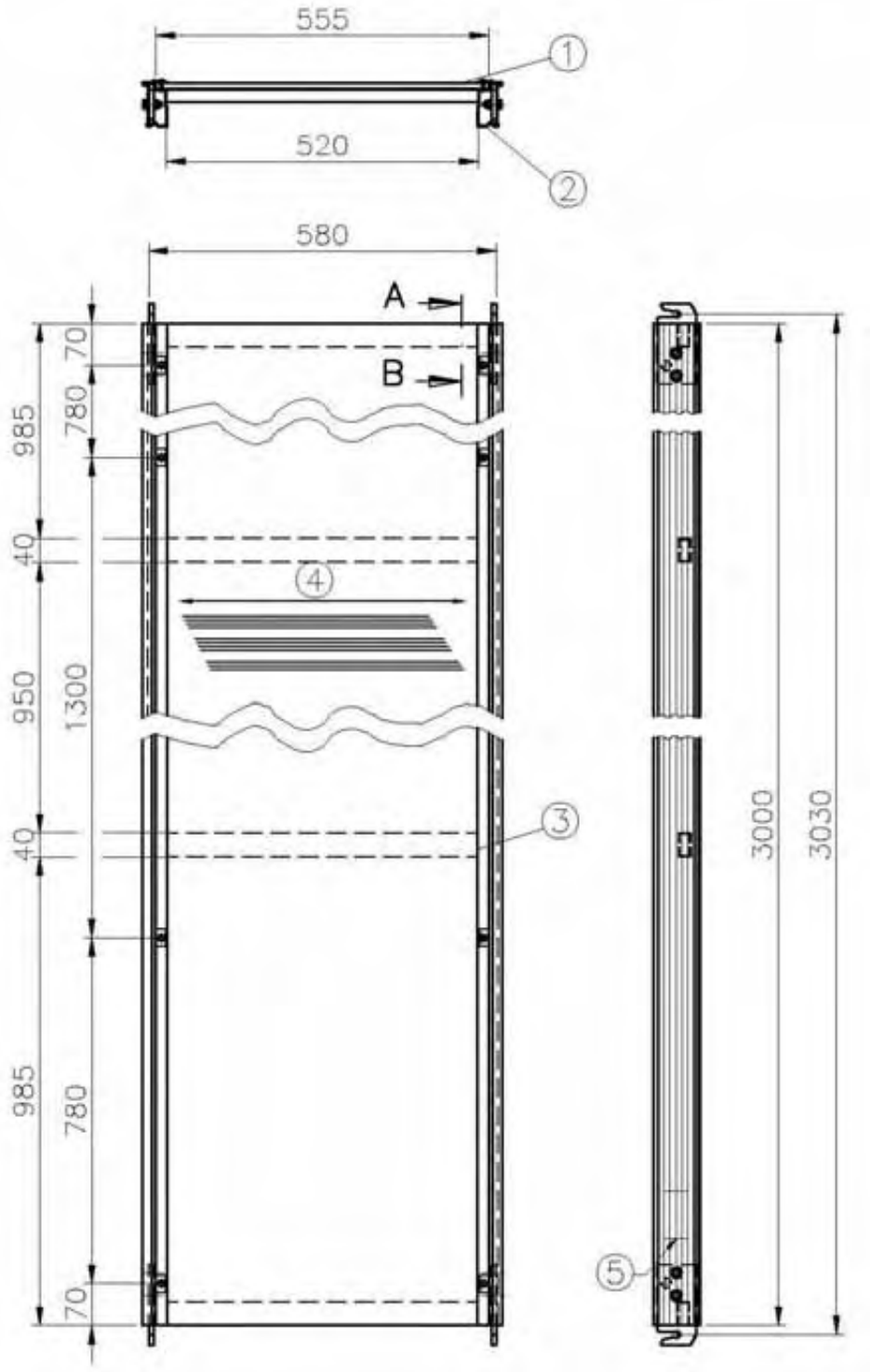
A705-A014_MPII





Former design
-for use only-

(1)	Brace profile 25x40x2	EN AW-6060-T66
(2)	Rung profile 25x25x1.5	EN AW-6060-T66
(3)	Interlocking rung profile 25x25x1.5	EN AW-6060-T66
(4)	Grooving	
(5)	Castor Rd 30x18	130PA/030/011/1/6
(6)	Hexagon screw M6x30-8.8-galvanized	DIN 931
(7)	Hexagon nut, self-locking M6-8-galvanized	DIN 985
(8)	Tube Ø40x2	AlMgSiF28
(9)	Rung profile 25x25x1.5	AlMgSiF28
(10)	Tube shoe PVC	
(11)	Marking	



(1) Screen-printed plywood 10x555 (BFU 100-10 DIN 68705 Bl.3) until ‘97
BFU (construction veneer plywood) 100G-10 DIN 68705 Bl.3
(2) Aluminium brace 78x42(35) Form A AlMgSi0.5F25
(3) K 40x20x2 AlMgSi0.5F25
(4) Fibre direction
(5) Marking

( ) = former design with marking: manufacturer’s mark, year of manufacture, Z-8.1-310, Ü
Details, see A705-A018 Load class 3

ALFIX GmbH
63828 Edelbach
09603 Großschirma

ALFIX MODUL plus II

Aluminium deck with plywood

3.07m

according to Z-8.1-862

Production of component has been terminated
-for use only-

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the national technical
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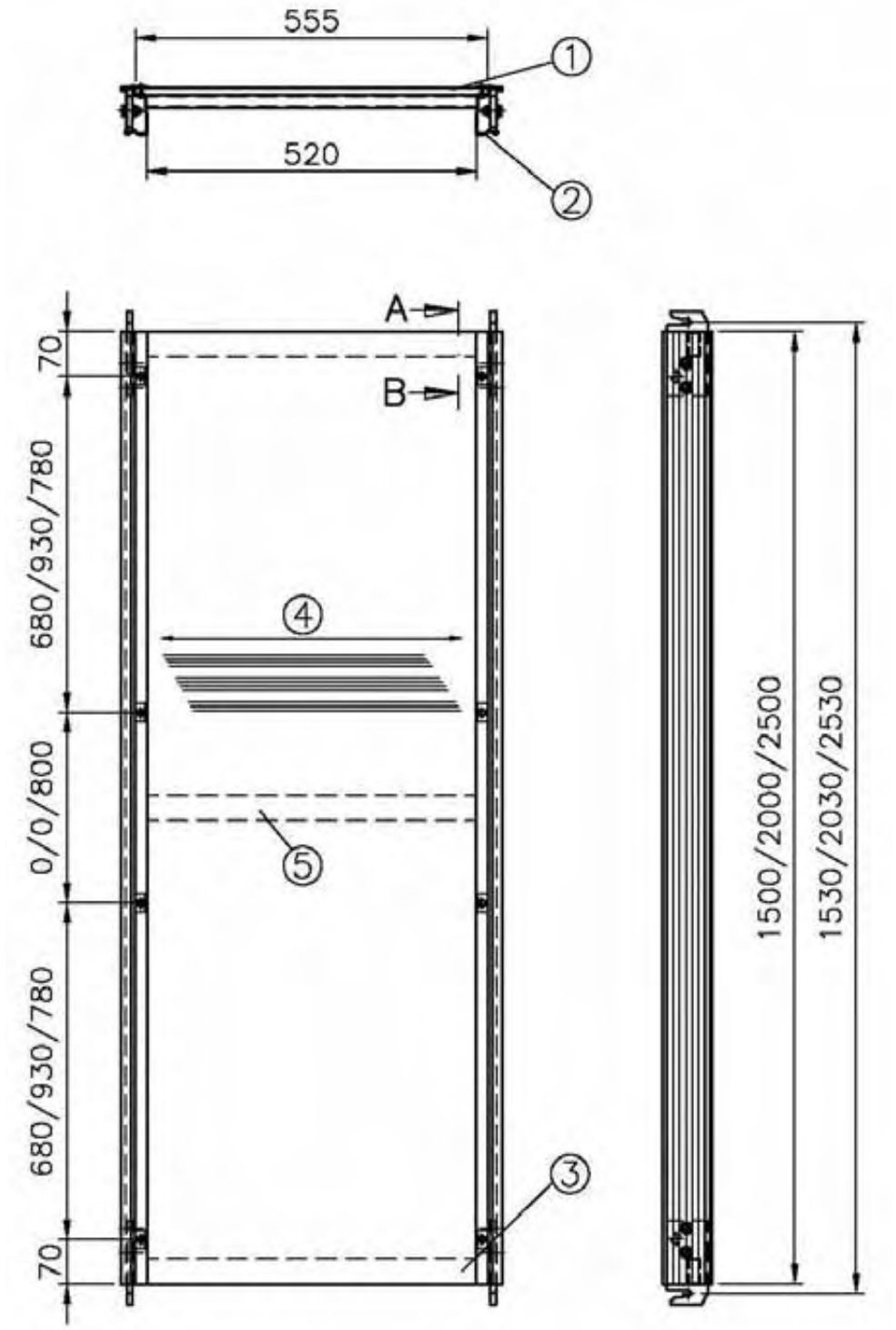
of 13. October 2011
Deutsches Institut für Bautechnik

A705-A016_MPII



(1) Screen-printed plywood 10x555 (BFU 100-10 DIN 68705 Bl.3) until '97
BFU (construction veneer plywood) 100G-10 DIN 68705 Bl.3

(2) Aluminium brace 78x42(35), Form A AlMgSi0.5F25
(3) K 40x20x2 AlMgSi0.5F25
(4) Fibre direction
(5) Bay length 2.5m only

( ) = former design with marking: manufacturer's mark, year of manufacture, Z-8.1-310, Ü
Details, see A705-A018 Load class 3

ALFIX GmbH
63828 Edelbach
09603 Großschirma

ALFIX MODUL plus II

Aluminium deck with plywood

1.57m; 2.07m; 2.57m

according to Z-8.1-862

Production of component has been terminated
-for use only-

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the national technical
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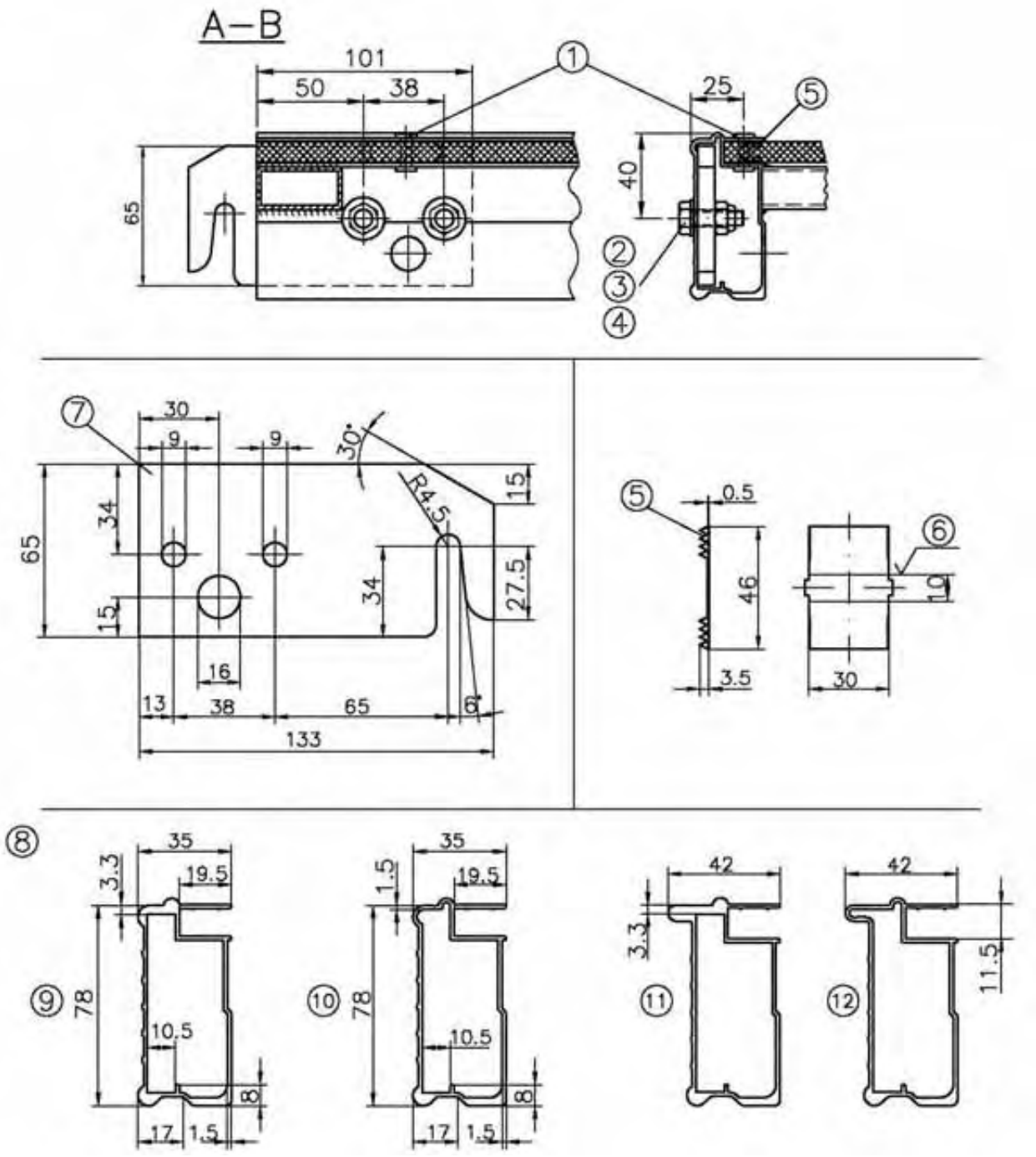
Deutsches Institut für Bautechnik

A705-A017_MPII



(1)	Rivet Ø5x21	AlMg3 DIN 7337
(2)	Screw M8x25	DIN 933
(3)	Disc Ø8.4	DIN 125
(4)	Nut, self-locking M8	DIN 982
(5)	Cramp; Bl. t=0.5; from year of manufacture ‘92	S235JR galvanized
(6)	Embossment for subsequent bending	EN AW-6063-T66 (AlMgSi0.5F25)
(7)	Mounting claw; Bl. t=8	S235JRG2 galvanized
(8)	Aluminium brace	AlMgSi0.5F25
(9)	Form A (former design)	
(10)	Form B (former design)	
(11)	Form A from 01/95	
(12)	Form B from 01/95	

ALFIX GmbH
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09603 Großschirma

ALFIX MODUL plus II

Details

Aluminium deck

according to Z-8.1-862

Production of component has been terminated
-for use only-

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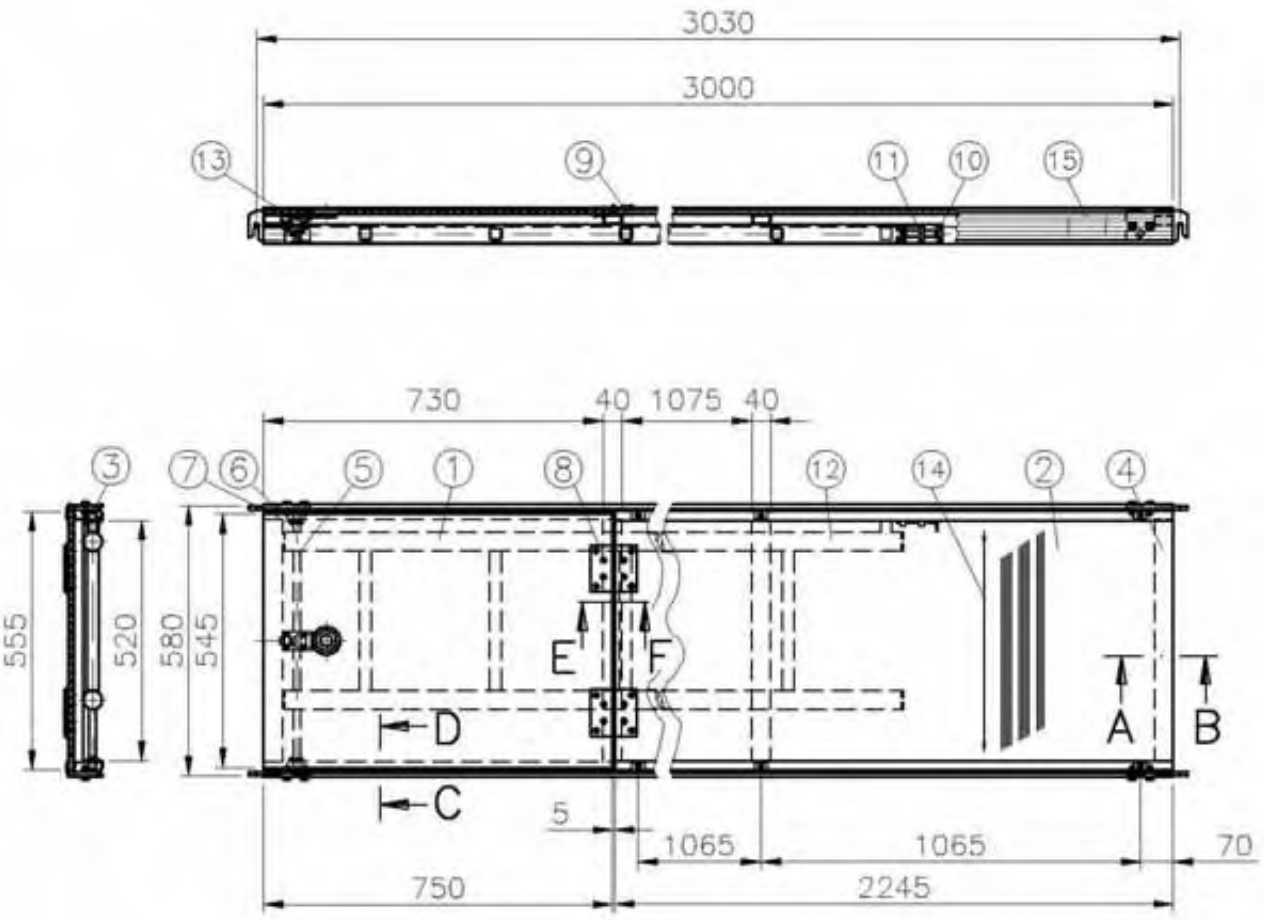
the national technical
approval Z-8.22-906
of 13. October 2011
Deutsches Institut für Bautechnik

A705-A018_MPII



(1)	Screen-printed plywood 10x545	(BFU100-12 DIN 68705 Bl.3) until ‘97 BFU (construction veneer plywood) 100G-12 DIN 68705 Bl.3
(2)	Screen-printed plywood 10x555	(BFU100-10 DIN 68705 Bl. 3) until ‘97 BFU100G-10 DIN 68705 Bl. 3
(3)	Aluminium brace 78x42(35) /A	AlMgSi0.5F25
(4)	K 40x20x2	AlMgSi0.5F25
(5)	(Tube 15x1	AlMgSi0.5F25) until ‘97
	Rd. Ø15	AlMgSi0.5F22
(6)	Disc Ø15	DIN 125
(7)	Cotter pin Ø4x32	DIN 94
(8)	Hinge 100x100x1.6	
(9)	Rivet Ø5x16	DIN 7337
(10)	Rivet Ø5x8	DIN 7337
(11)	Ledger 100mm	
(12)	Ladder,	see A709-A115
(13)	Ledger, cranked, with ring 100mm	
(14)	Fibre direction	
(15)	Marking	

( ) = former design with marking: manufacturer’s mark, year of manufacture, Z-8.1-310, Ü
Details, see A705-A018 and A705-A021 Load class 3

ALFIX GmbH
63828 Edelbach
09603 Großschirma

ALFIX MODUL plus II

Aluminium hatch-type access deck 3.07m with ladder

according to Z-8.1-862

Production of component has been terminated
-for use only-

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the national technical
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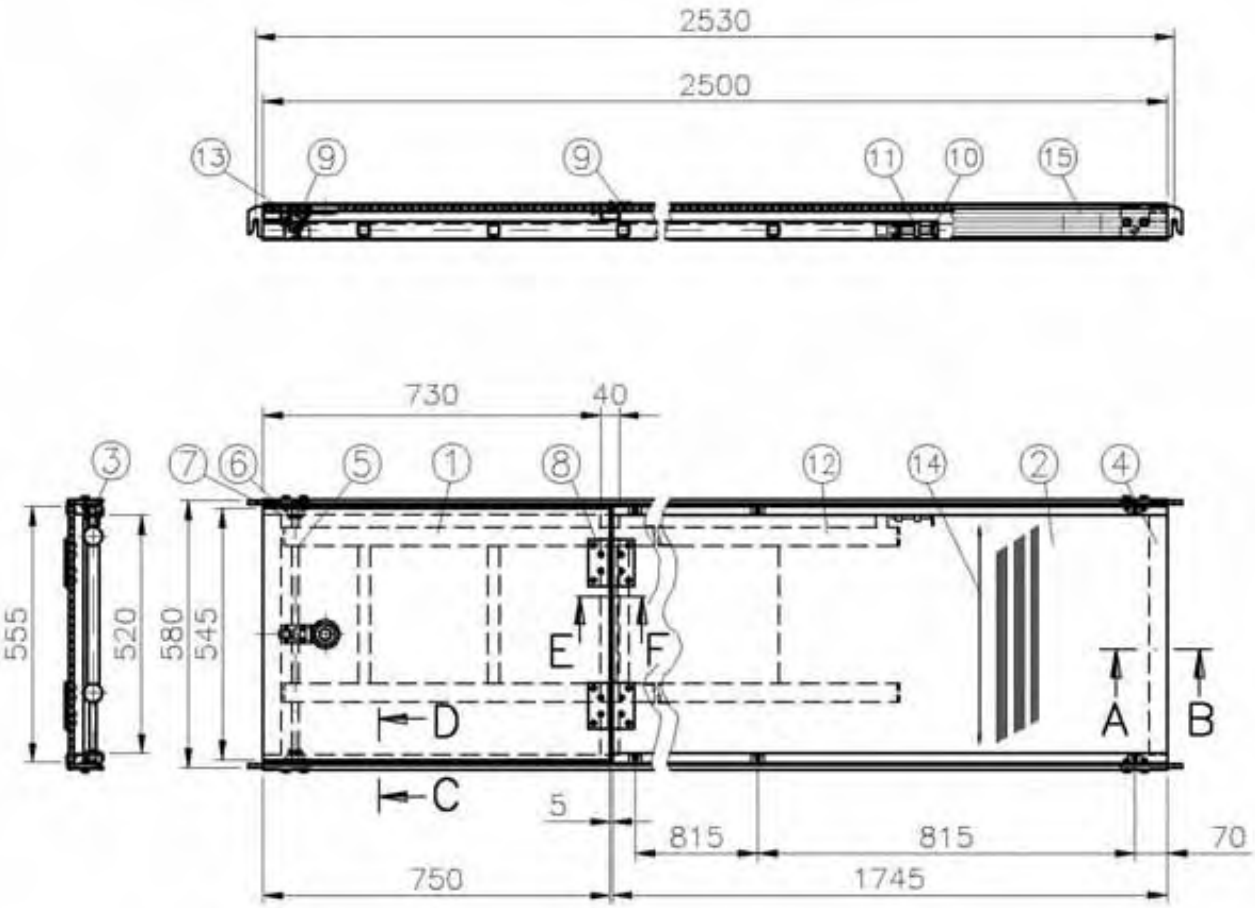
of 13. October 2011
Deutsches Institut für Bautechnik

A705-A019_MPII



(1)	Screen-printed plywood 10x545	(BFU100-12 DIN 68705 Bl.3) until ‘97 BFU (construction veneer plywood) 100G-12 DIN 68705 Bl.3
(2)	Screen-printed plywood 10x555	(BFU100-10 DIN 68705 Bl.3) until ‘97 BFU100G-10 DIN 68705 Bl. 3
(3)	Aluminium brace 78x42(35) /A	AlMgSi0.5F25
(4)	K 40x20x2	AlMgSi0.5F25
(5)	(Tube 15x1	AlMgSi0.5F25) until ‘97
	Rd. Ø15	AlMgSi0.5F22
(6)	Disc Ø15	DIN 125
(7)	Cotter pin Ø4x32	DIN 94
(8)	Hinge 100x100x1.6	
(9)	Rivet Ø5x16	DIN 7337
(10)	Rivet Ø5x8	DIN 7337
(11)	Ledger 100mm	
(12)	Ladder,	see A709-A115
(13)	Ledger, cranked, with ring 100mm	
(14)	Fibre direction	
(15)	Marking	

( ) = former design with marking: manufacturer’s mark, year of manufacture, Z-8.1-310, Ü
Details, see A705-A018 and A705-A021 Load class 3

ALFIX GmbH
63828 Edelbach
09603 Großschirma

ALFIX MODUL plus II

Aluminium hatch-type access

2.57m with Ladder

according to Z-8.1-862

Production of component has been terminated
-for use only-

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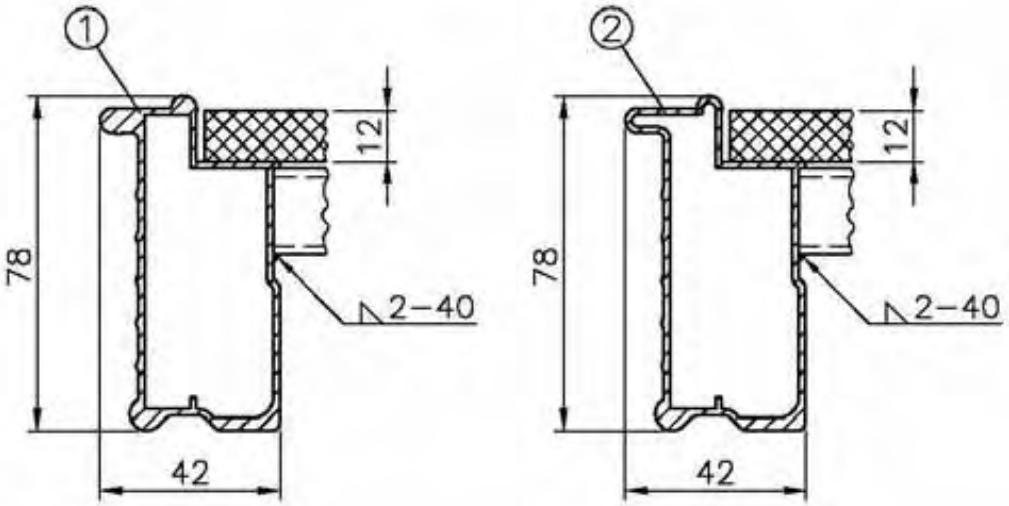
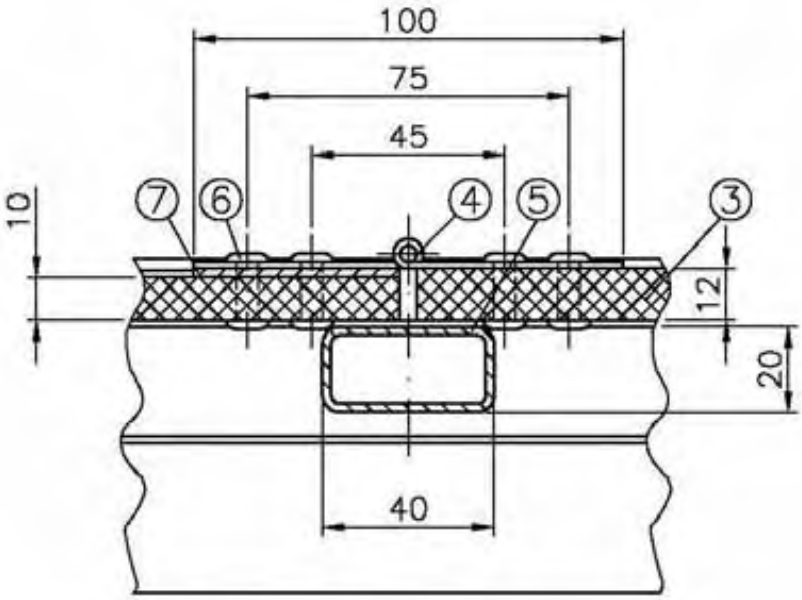
A705-A020_MPII

C–D



E–F



(1) Form A
(2) Form B
(3) Hatch
(4) Hinge 100x100x1.6
(5) K 40x20x2 AlMgSi0.5F25
(6) Aluminium blind rivet Ø5x16 DIN 7340
(7) Thickness levelling

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ALFIX MODUL plus II

Sections

Aluminium hatch-type access deck

according to Z-8.1-862

Production of component has been terminated
-for use only-

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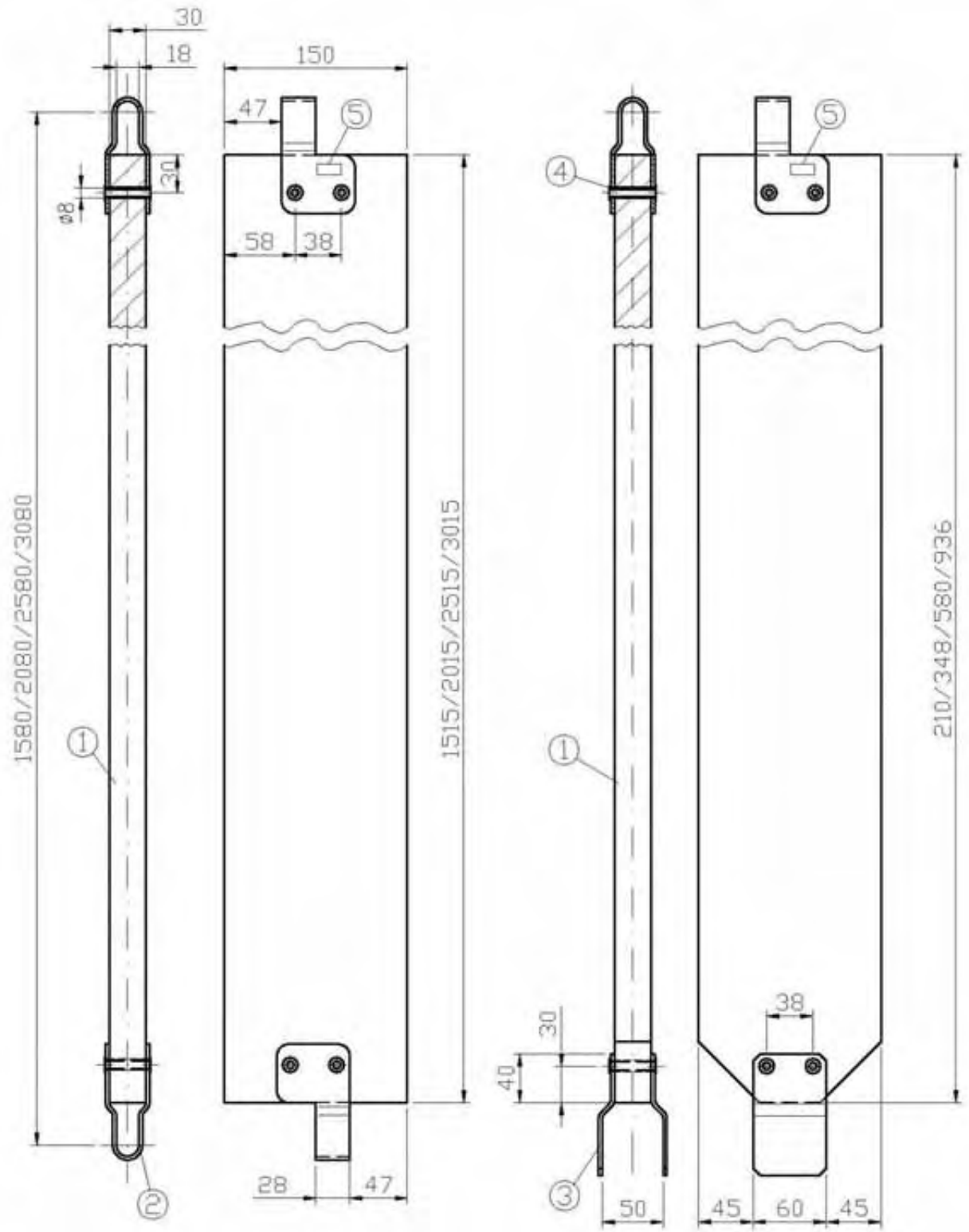
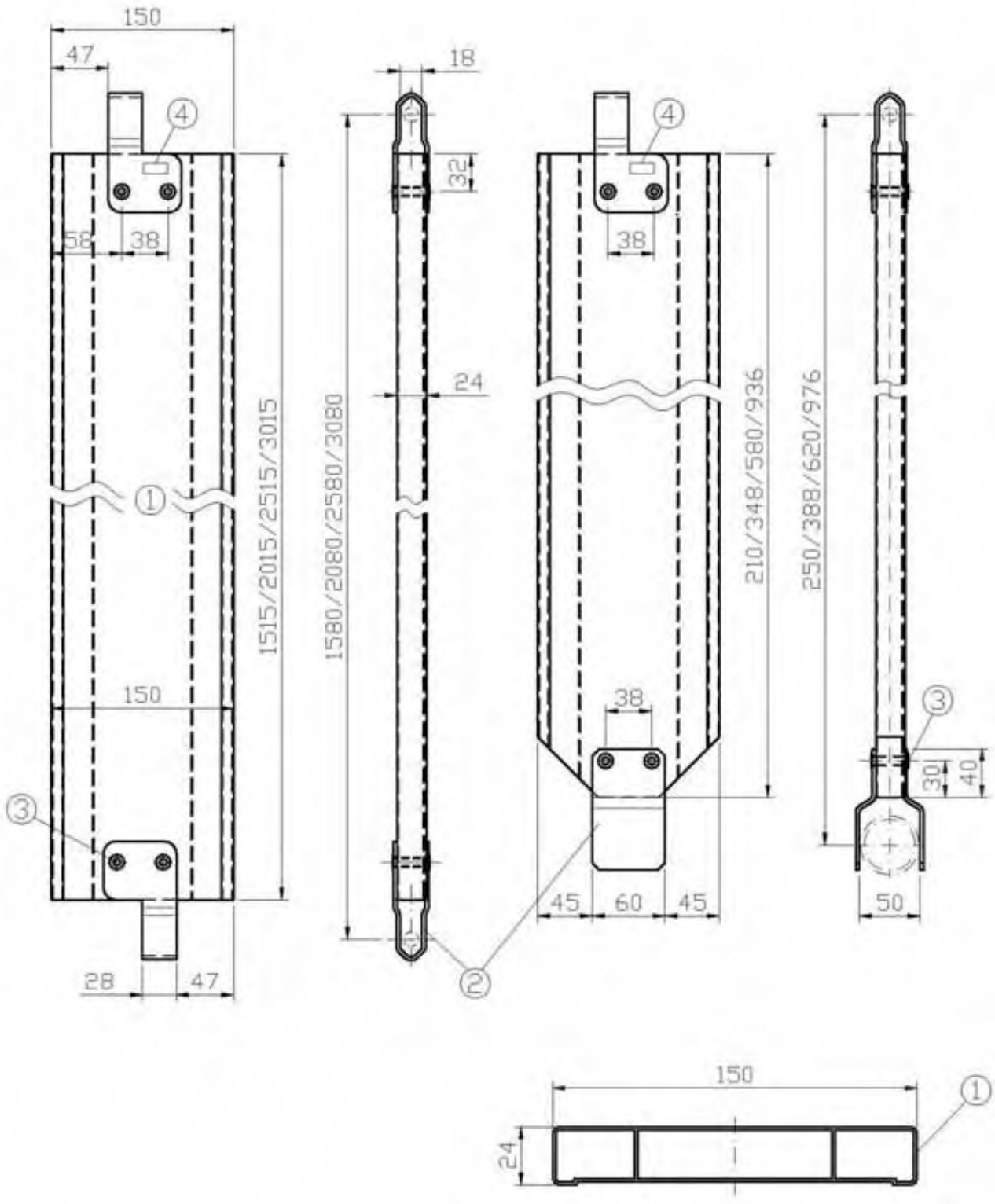
of 13. October 2011
Deutsches Institut für Bautechnik

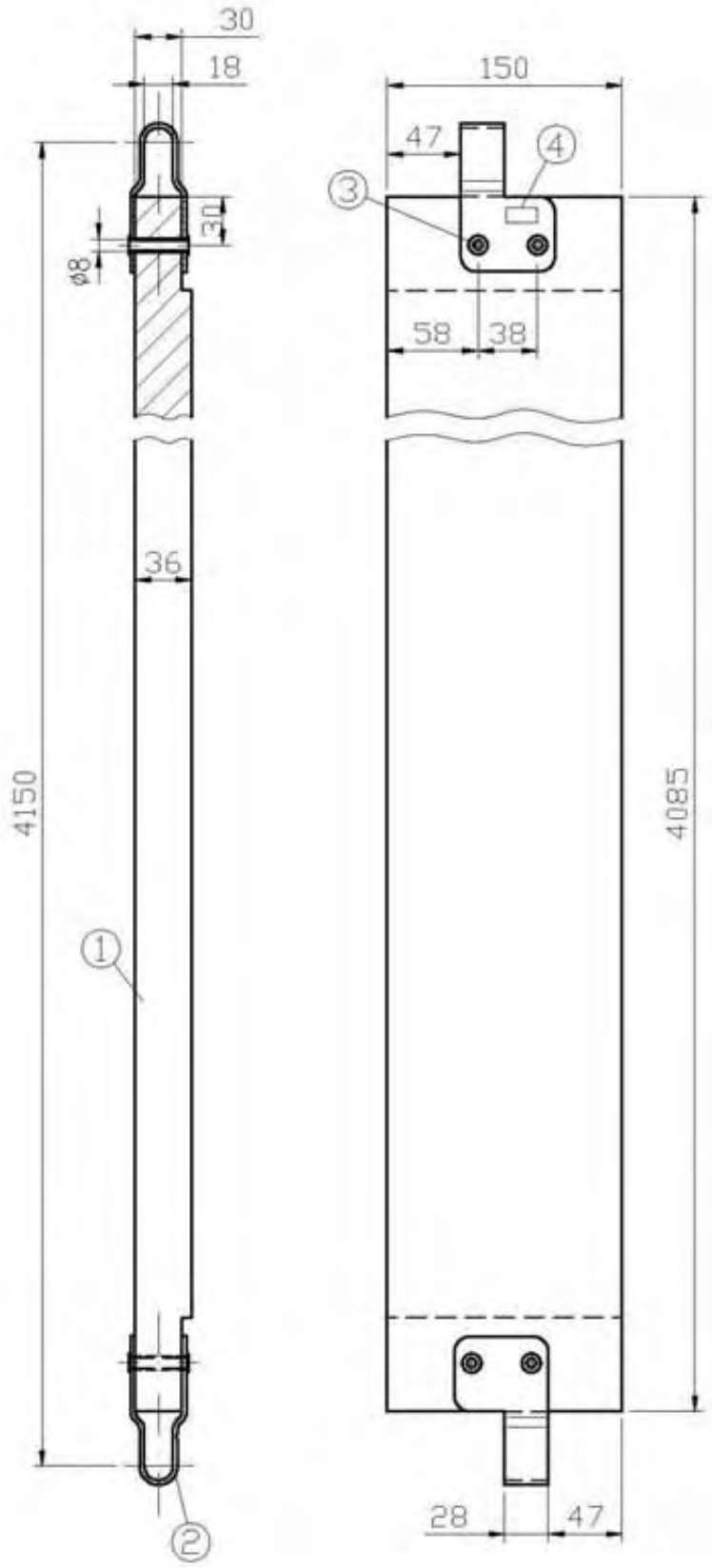
A705-A021_MPII



(1) Softwood quality class S10
(2) Slit strip 60x3 DIN EN 10111-DD11 galvanized
(3) Slit strip 60x3 DIN EN 10111-DD11 galvanized
(4) Tube rivet DIN 7340 – A8x0.75x39-steel, zinc-plated
(5) Marking



(1) Aluminium toeboard profile; s=1.25mm — EN AW-6063-T66
(2) Slit strip 60x3 — DIN EN 10111-DD11 galvanized
(3) Tube rivet — DIN 7340 – A8x0.75x32-steel, zinc-plated
(4) Marking



(1) Softwood quality class S10
(2) Slit strip 60x3 — DIN EN 10111-DD11 galvanized
(3) Tube rivet — DIN 7340 –A8x0.75x39-steel, zinc-plated
(4) Marking

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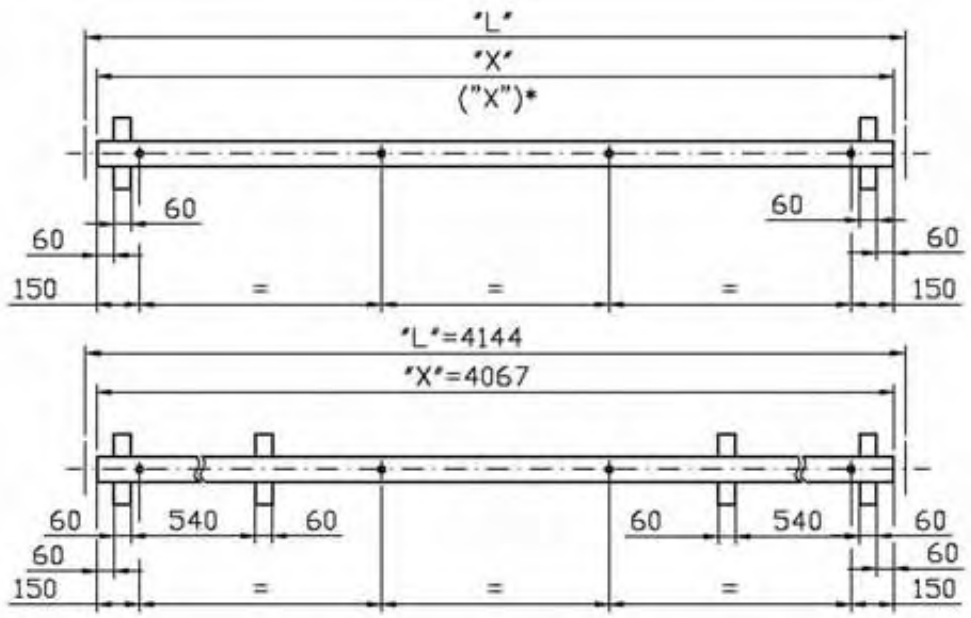
ALFIX MODUL plus II

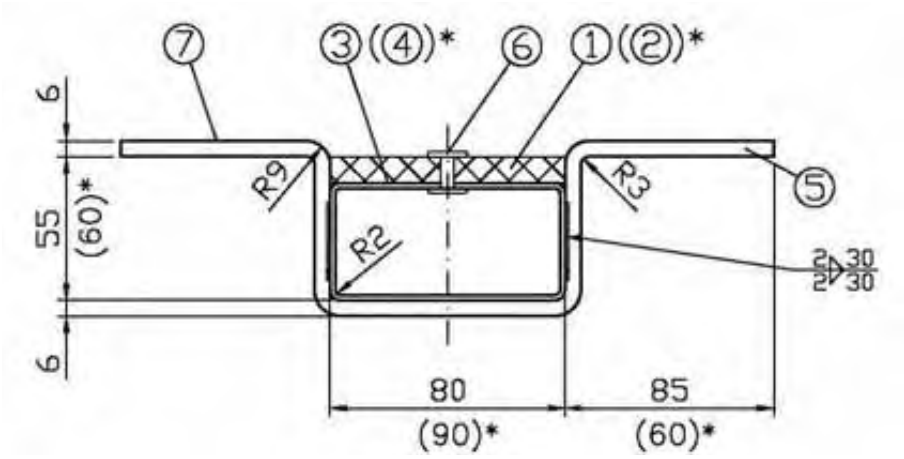
Wooden toeboard 4.14m

according to Z-8.1-862

Bay length "L"	Length "X"	Length ("X")*	Load class
[mm]			
1572	1495	1500	6
2072	1995	2000	6
2572	2495	2500	5
3072	2995	3000	4
4144	4067	-	3



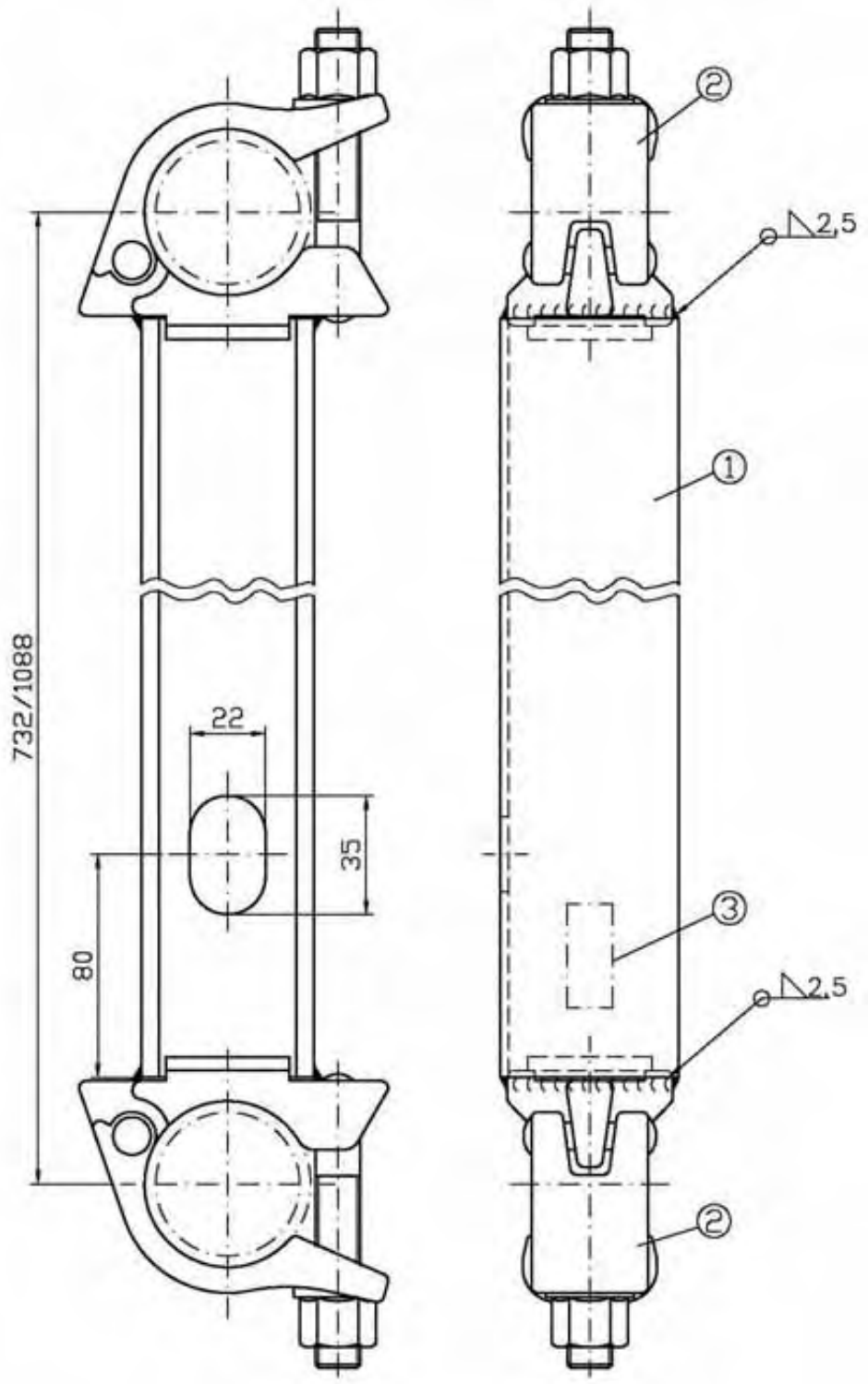
Cross-section



(1)	Screen-printed plywood 10x80	BFU 100G-10	DIN 68705 Bl.3
((2)	Screen-printed plywood 10x90	BFU 100G-10	DIN 68705 Bl.3)*
(3)	Rectangular hollow section 80x40x2	S235JRH	
((4)	Rectangular hollow section 90x45x2	S235JRH	DIN 59411)*
(5)	Bl 60x6	S235JRG2	
(6)	Rivet Ø5x20	AlMg3	DIN 7337
(7)	Marking		

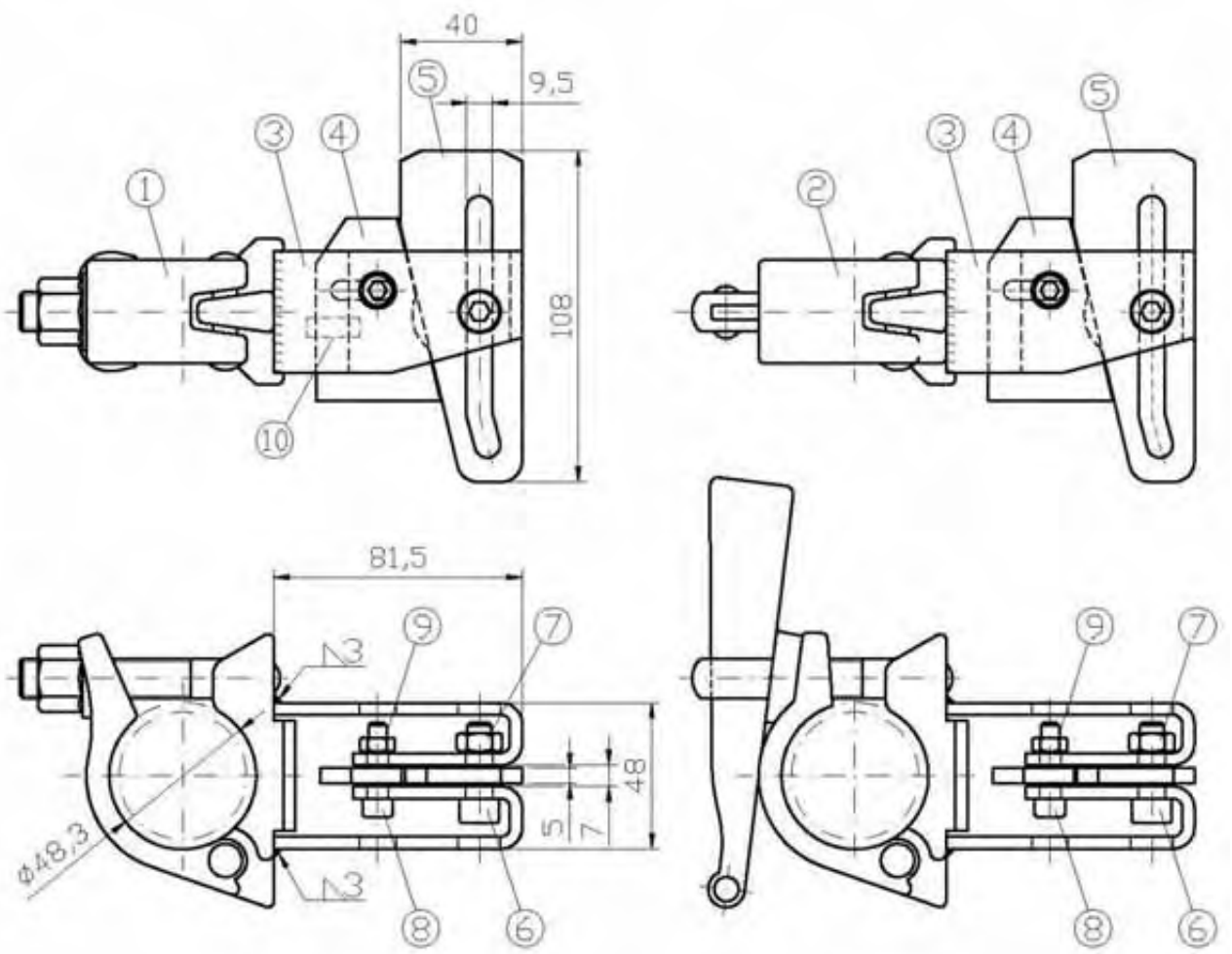
( ) * alternatively

galvanized



(1) U-profile 48x52x2.5 made of Bl 169x2.5 S235JR/
U-profile 48x60x3 made of Bl 196x3 S235JR
(2) Halfcoupler, class B
(3) Marking

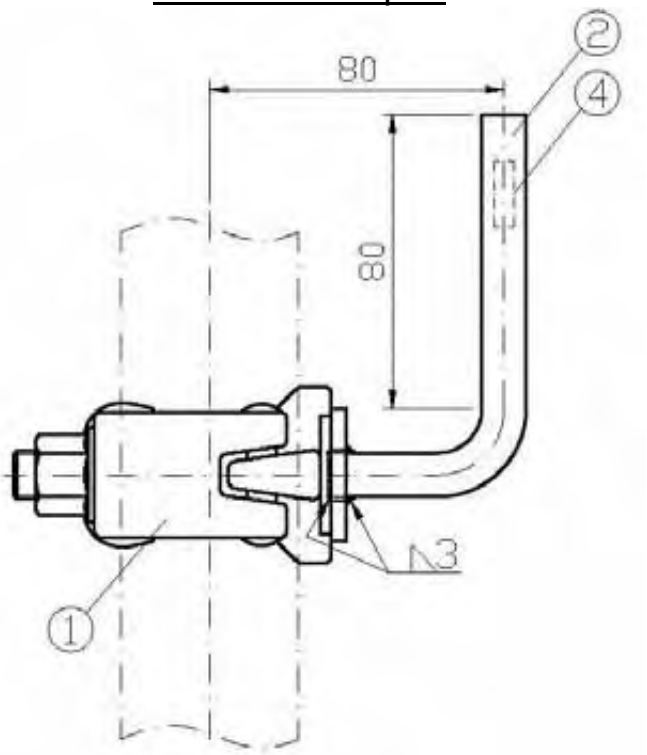
galvanized



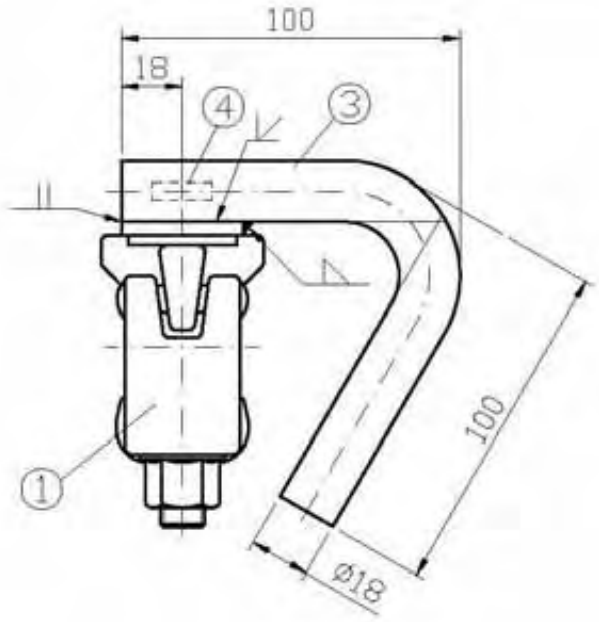
(1)	Halfcoupler, class B	
(2)	<u>alternatively:</u> wedge coupler	
(3)	Fl 40x4	S235JR
(4)	Bd 70x5	S235JR
(5)	Bd 80x5	S235JR
(6)	Hexagon socket head screw	DIN 7984 – M8x25-8.8-galvanized
(7)	Hex nut, self-locking	DIN 985 – M8-8-galvanized
(8)	Hexagon socket head screw	DIN 912 – M6x25-8.8-galvanized
(9)	Hex nut, self-locking	DIN 985 – M6-8-galvanized
(10)	Marking	

galvanized

Toeboard coupler

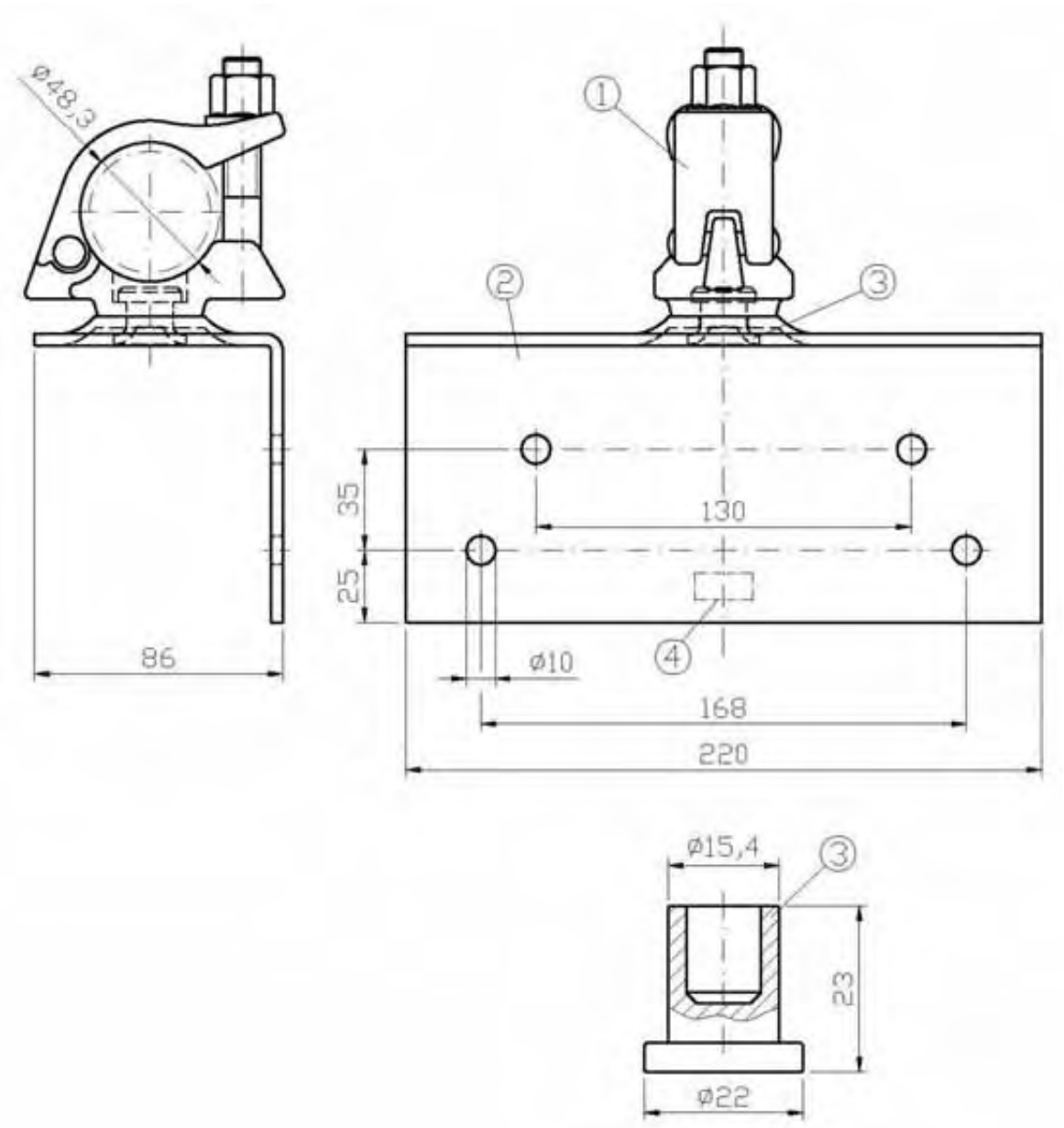


Halfcoupler with hook



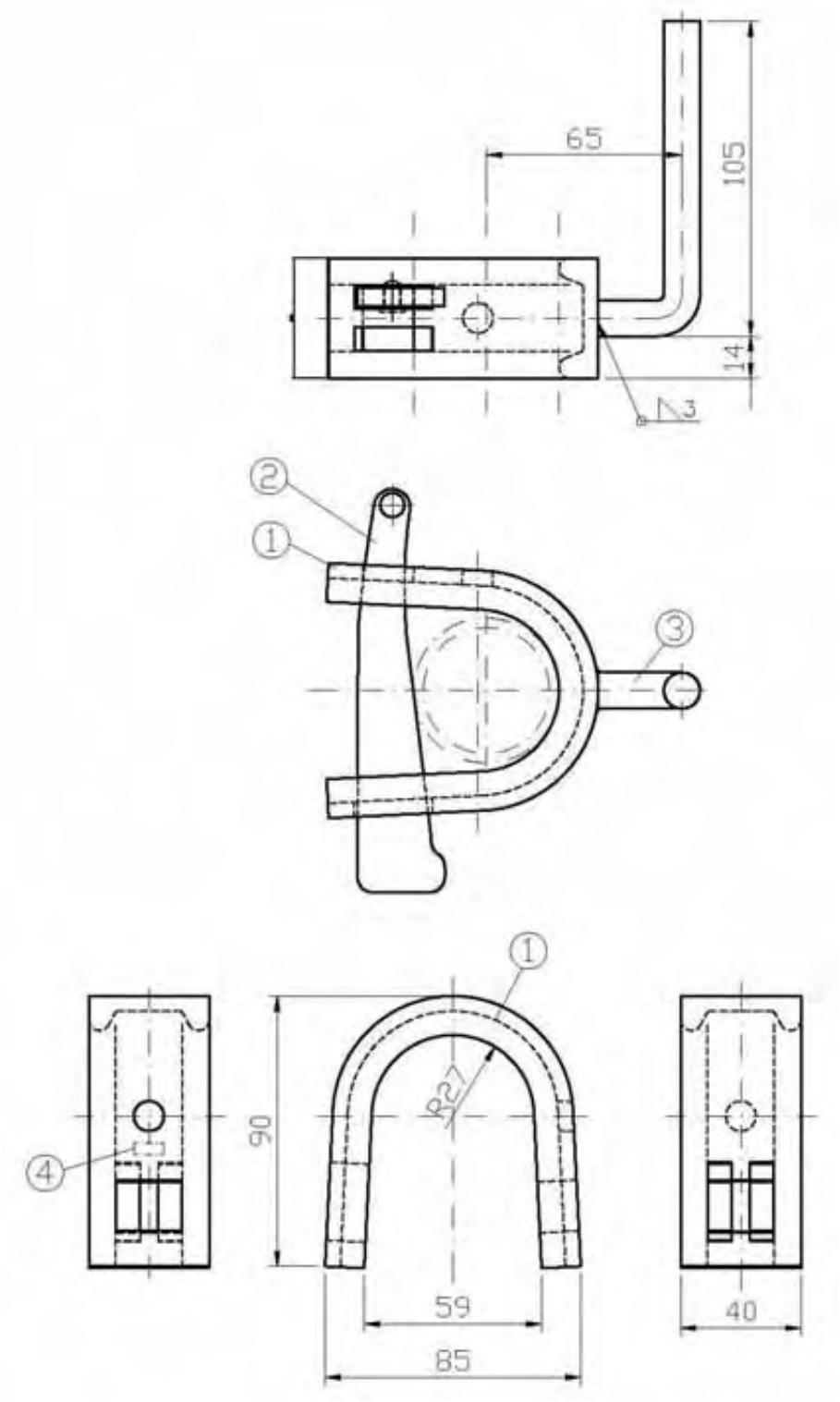
(1) Halfcoupler, class B
(2) Rd 12 S235JR
(3) Rd 18 S235JR
(4) Marking

galvanized



(1) Halfcoupler, class B
(2) Bl 4 S235JR
(3) Rivet, squared timber coupler QST36; blank drawn, zinc-plated
(4) Marking

galvanized



(1) Double bed profile 40x13x5x6.5 S235JR
(2) Wedge 6mm S550MC
(3) Rd 12 S235JR
(4) Marking

galvanized

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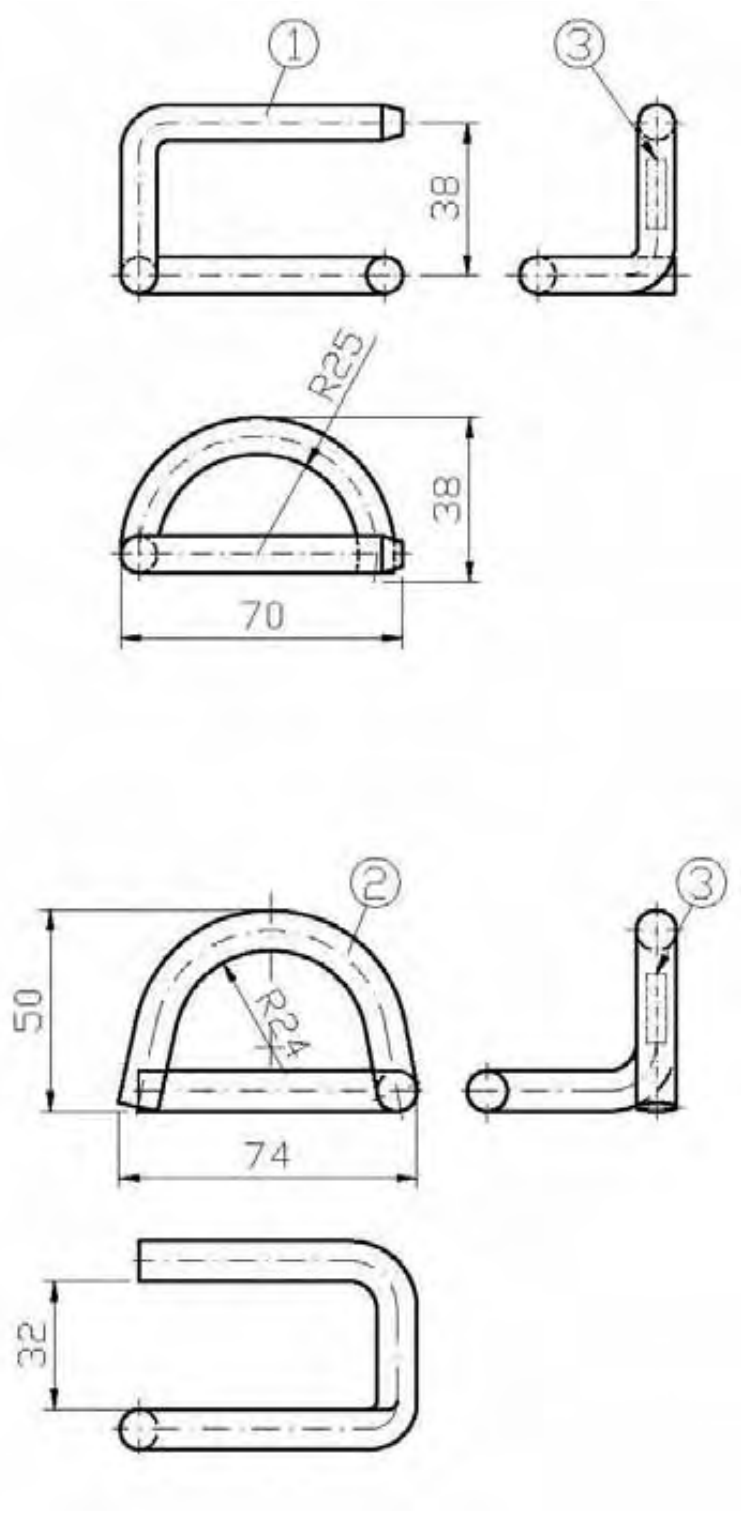
ALFIX MODUL plus II

Toeboard holder

according to Z-8.1-862

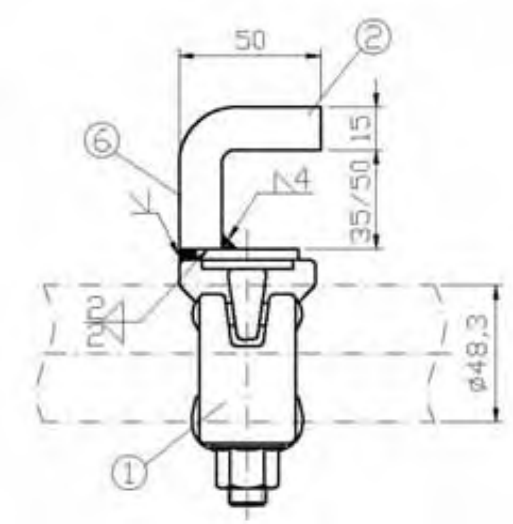


(1) Rd Ø9 S235JR
(2) alternatively: Rd Ø10 S235JR
(3) Marking

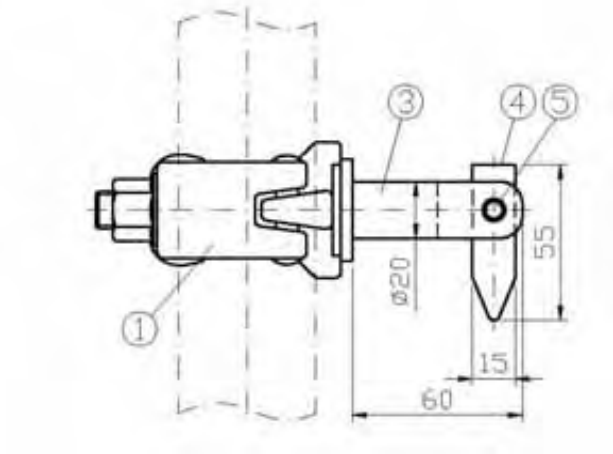
galvanized

ALFIX GmbH 63828 Edelbach 09603 Großschirma	**ALFIX MODUL plus II** **Locking clip** according to Z-8.1-862	Annex B, page 111 to the national technical approval Z-8.22-906 of 13. October 2011 Deutsches Institut für Bautechnik A709-A195_MPII

Claw coupler

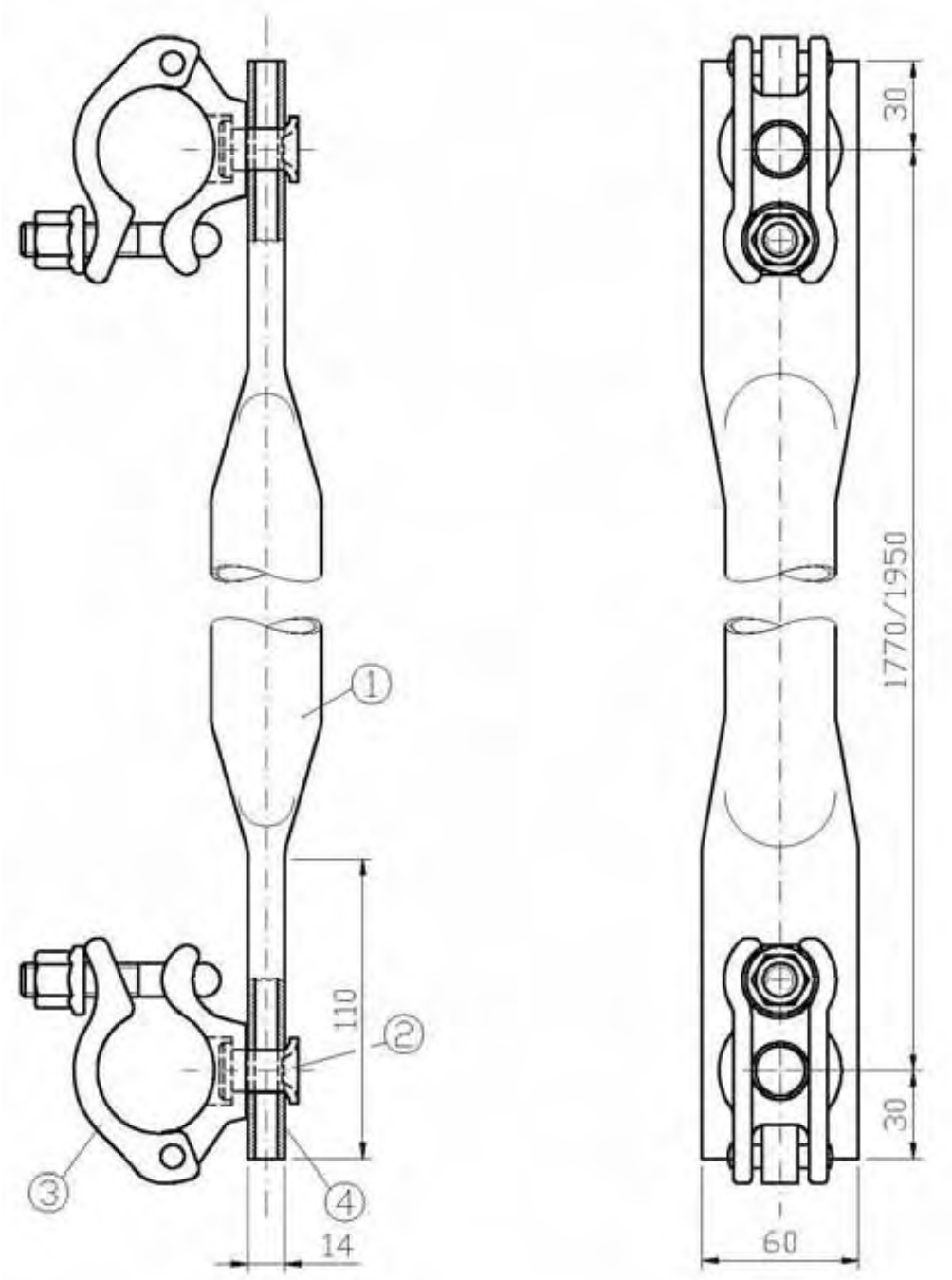


Tilting pin coupler



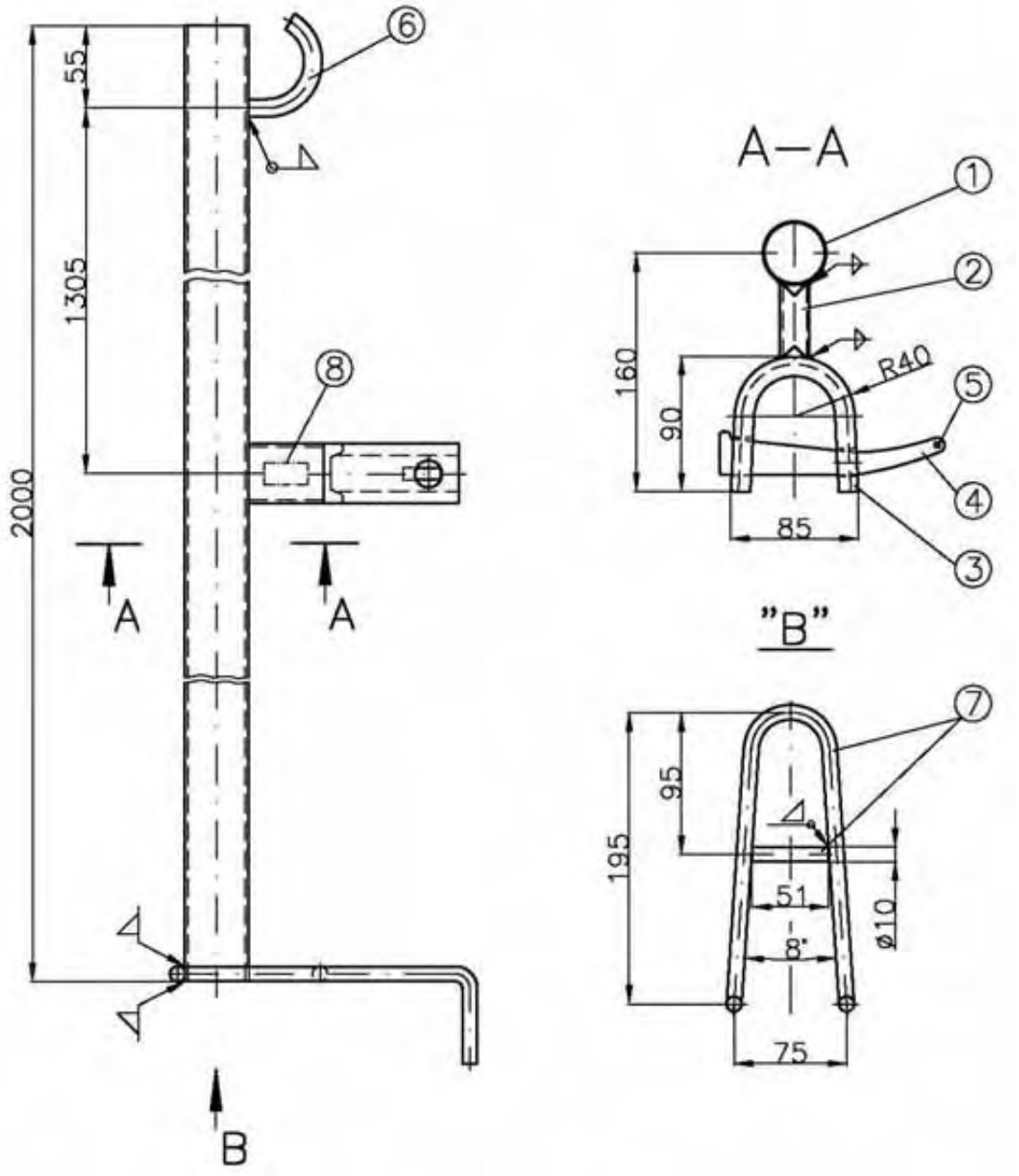
(1)	Halfcoupler, class D	
(2)	Fl 40x15	S235JR
(3)	Tilting pin Ø20x60	S235JR
(4)	Locking lug; s=4mm	S235JR; galvanized
(5)	Clamping sleeve	DIN 1481-6x18-steel, galvanized
(6)	Marking	

galvanized



(1)	Tube Ø42.4x2	S235JRH
(2)	Rivet Ø16x3x25	QSt36
(3)	Halfcoupler, class B	
(4)	Marking	

galvanized



(1)	Tube 42.4x2	S235JRG2	
(2)	K 40x20x2	S235JRH	
(3)	Double bed profile 40x12x5x7	S235JRH	
(4)	Wedge plus II	S550MC	
(5)	Button-head rivet Ø5x10	QSt 32-2	DIN 660, zinc-plated, with rivet head of rivet Ø4
(6)	Rd Ø12	S235JRG2	
(7)	Rd Ø10	S235JRG2	
(8)	Marking		

galvanized; all welds a=2mm

ALFIX GmbH
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09603 Großschirma

ALFIX MODUL plus II

Advanced guardrail post 2.00m

according to Z-8.1-862

Former design

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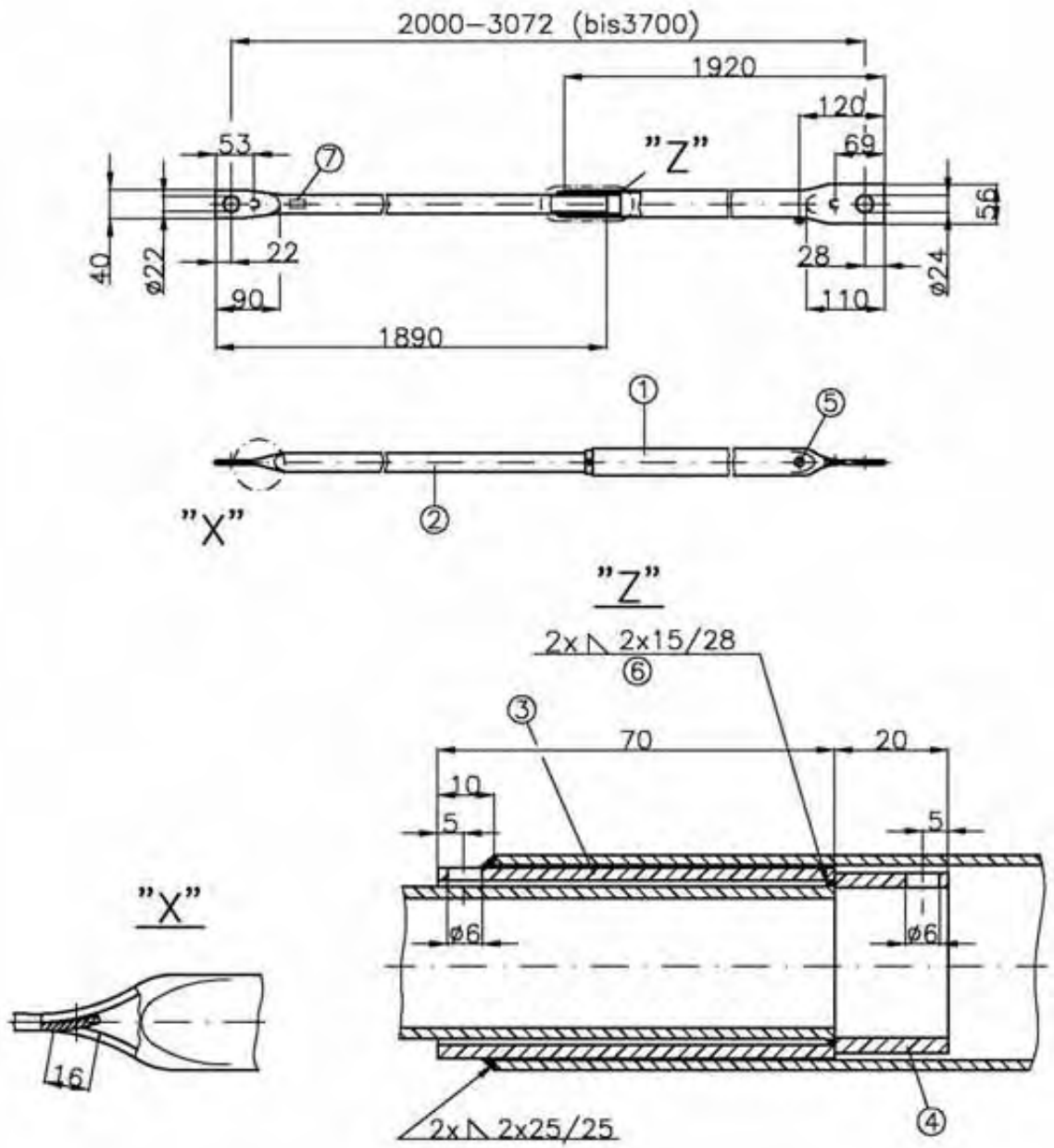
Deutsches Institut für Bautechnik

A705-A035_MPII



(1) R 38x2 S235JRH
(2) R 26.9x2.6 S235JRH
(3) R 33.7x2.3 S235JRH
(4) R 31.8x2.6 S235JRH
(5) Self-tapping screw ST6.3x16 DIN 7504-K-steel, galvanized
(6) Items 2 and 4, grind smooth after welding
(7) Marking

galvanized

ALFIX GmbH
63828 Edelbach
09603 Großschirma

ALFIX MODUL plus II

Telescopic guardrail

2.00m-3.07m

according to Z-8.1-862

Former design

Annex B, page 115 to
the national technical
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A709-A036_MPII

C.1 General

The scaffolding system can be utilized in the standard design as work scaffolding of load classes ≤ 3 with a system width of b = 0.732 m and with bay widths of $\ell \leq 3.07$ m in accordance with DIN EN 12811-1:2004-03, and as safety and roof safety scaffolding in accordance with DIN 4420-1:2004-03.

The uppermost horizontal level (scaffold layer) must not exceed 24 m, including spindle (jack) extension length, above ground level. According to the requirements of DIN EN 12811-1:2004-03, Section 6.2.9.2, in the standard version, the scaffolding system is designed for working operations in one scaffolding layer in front of an "open" façade (percentage of openings = 60 %) and in front of closed façades. When determining wind load, a service life factor of $\chi = 0.7$ presuming a maximum service life of 2 years was taken into account. For the standard version, the sheeting of scaffold using nets or tarpaulins has not been proven.

Without any further proofs, the standard version must only be used if the loads acting within the bays do not exceed the respective live loads according to DIN EN 12811-1:2004-03, Table 3.
For the standard version of "ALFIX Modul plus II" scaffolding system, the following designation according to DIN EN 12810-1:2004-03 shall be used:

Scaffold EN 12810 – 3D – SW06/307 – H2 – A – LA

C.2 Safety scaffolding

In the standard version, the scaffold system may be used as a safety and roof safety scaffold with a safety layer of class FL1, and as roof safety scaffolding with protective walls of calls SWD 1 according to DIN 4420-1:2004-03.

C.3 Components

The scheduled components/parts are provided in Table C.1. Additionally, steel tubes of Ø 48.3 · 3.2 mm and couplings can be used for the horizontal bracing of bridging ledgers and for the connection of scaffold retainers and triangular ties to the standard couplers of posts according to DIN EN 12811-1:2004-03.

C.4 Bracing

For horizontal bracing of scaffold the following components must be continuously built-in at vertical spacings of 2 metres:

tube ledgers 0.73 m and one each
- aluminium frame platform RE; or
- two steel planks RE; or
- two steel planks AF RE

or

U-ledgers 0.73 m and one each
- aluminium frame platform with plywood; or
- aluminium deck with plyywood; or
- two steel decks; or
- two steel planks AF.

At a ladder access, aluminium frame platforms with access hatch RE are to be used instead of planks and decks if tube ledgers are used, or aluminium frame platform with hatch-type access or aluminium hatch-type access decks with integrated ladder if U-ledgers are used.
Platforms, decks and accesses must be secured against unintended lift-off by means of deck retainers.
For bracing the outer vertical level, tube ledgers as guardrail braces (1 m above deck surface) are to be continuously used in every scaffold bay.
Vertical starter pieces are to be built-in immediately above scaffold spindles (jacks). They must be interconnected using longitudinal ledgers within the inner and outer level parallel to the façade, and using transoms right-angled to the façade.

C.5 Anchoring

The anchoring must be carried out using scaffold retainers as per to Annex B, page 81.

The scaffold retainers are to be fixed as an anchoring pair at an angle of 90° (triangular tie) or as "short" scaffold retainers only at the inner vertical frame upright by means of standard couplers. The scaffold connectors, which are anchored using triangular ties, must be connected to the adjacent row of standards through tube ledgers (longitudinal ledgers) within the inner level, depending on the type of erection.

Triangular ties and scaffold retainers must be fixed in close proximity to the connectors (node points) formed by upright tubes and transoms.

The fixtures to be arranged in the structure façades for absorbing the anchor forces must be designed at least for the characteristic values of impacts ($\gamma_F = 1.0$).

Each row of uprights must be anchored at vertical spacings of 8 metres; in doing so, the anchoring of adjacent vertical frame rows is to be arranged vertically offset by half a spacing. The upright rows at the edge of a scaffold are to be anchored at vertical spacings of 4 metres. At the top and the second scaffold layer, each of the upright rows must be anchored.

C.6 Bridging

Bridging girders may be used for bridging gateways or similar at a height of 4 metres if scaffold layers beneath bridging are omitted.

The bridging girders must be anchored at both the supporting area and the centre. Additionally, the girder must be braced through a horizontal latticework of tubes and couplers or through additional anchors (cf. Annex C, pages 6 and 7).

C.7 Ladder passage

For an inner ladder passage, aluminium frame platforms with access hatch RE are to be used if tube ledgers are used, or aluminium frame platforms with hatch-type access or aluminium hatch-type access decks with integrated ladder, if U-ledgers are used.

C.8 Broadening bracket

At the inner side of scaffold, at all scaffold layers brackets of 0.39 m can be used.

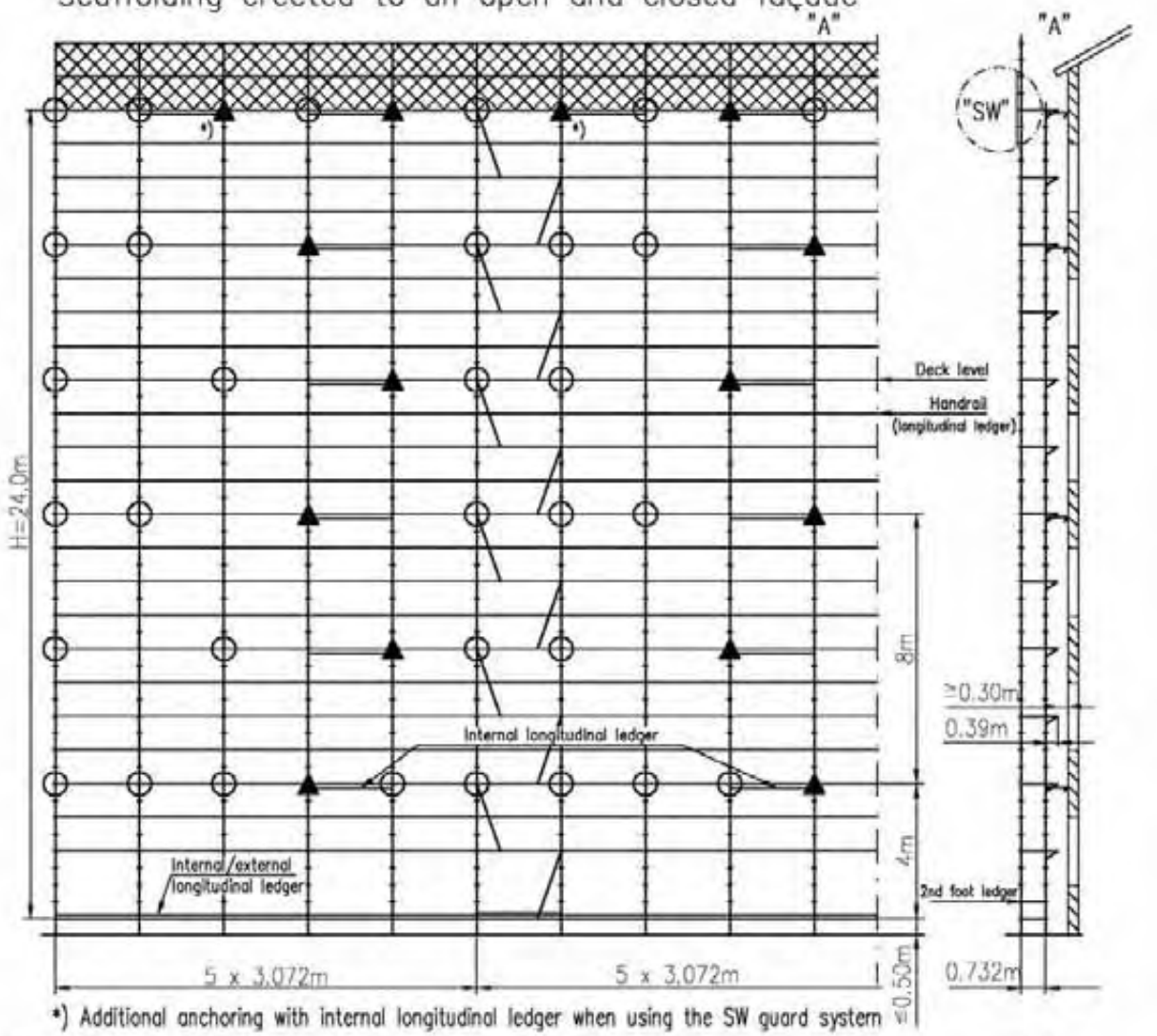
Table C.1: Components of standard design

Designation	Annex B, page
Vertical starter piece	10
Vertical upright with spigot fitting 200	11
Tube ledger $\ell \leq 3.07$ m	13
U transom 0.73 m	15
Aluminium frame platform RE 1.57 m; 2.07 m	17
Aluminium frame platform RE 2.57 m; 3.07 m	18
Aluminium frame platform with access hatch RE 2.57 m	20
Aluminium frame platform with access hatch RE 3.07 m	21
Steel deck AF RE 0.32 m	23
Steel deck RE	26
Modular safety net	28
Wedge head coupler, turnable	29
Modular deck retainer 0.73 m	30
Modular gap cover $\ell \leq 3.07$ m	31
Modular gap cover RE $\ell \leq 3.07$ m	32
Modular lattice girder 6.14 m	33
Modular lattice girder 4.14 m / 5.14 m	34
Modular lattice girder with spigot fitting 6.14 m	35

Table C.1: (continuation)

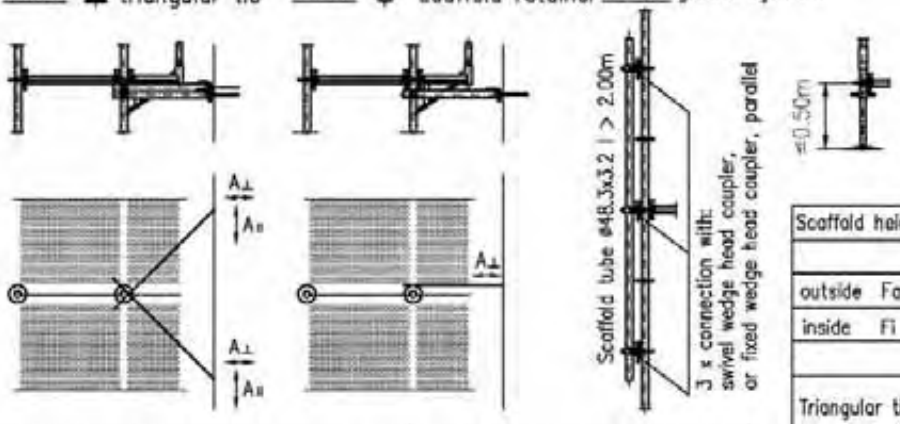
Designation	Annex B, Page
Modular lattice girder with spigot fitting 4.14 m / 5.14 m	36
Modular spigot fitting U	37
U-transom GT 0.73 m	38
Tube transom GT 0.73 m	39
Modular spigot fitting	40
Wedge head coupler, fixed	50
Modular safety door 0.73 m	51
Aluminium frame platform with plywood 1.57 m; 2.07 m	60
Aluminium frame platform with plywood 2.57 m; 3.07 m	61
Aluminium frame platform with hatch-type access 2.57 m	63
Aluminium frame platform with hatch-type access 3.07 m	64
Modular toeboard	67
Bracket 0.39 m RE	68
Modular bracket 0.39 m	69
Modular aluminium toeboard 0.73 m	76
Modular double-end guardrail	80
Scaffold retainer	81
Base jack	83
Steel plank AF 0.32 m	84
Steel deck	85
Aluminium deck with plywood 2.57 m; 3.07 m	89
Aluminium deck with plywood 1.57 m; 2.07 m	90
Aluminium hatch-type access deck 3.07 m with ladder	92
Aluminium hatch-type access deck 2.57 m with ladder	93
Integrated ladder	95
Aluminium deck with plywood 3.07 m	96
Aluminium deck with plywood 1.57 m, 2.07 m, 2.57 m	97
Aluminium hatch-type access deck 3.07 m with ladder	99
Aluminium hatch-type access deck 2.57 m with ladder	100
Toeboard, end toeboard 0.73 m	102
Aluminium toeboard, aluminium end toeboard 0.73 m	103
Gap cover $\ell \leq 3.07$ m	105

Standard design with internal bracket
Scaffolding erected to an open and closed façade



*) Additional anchoring with internal longitudinal ledger when using the SW guard system

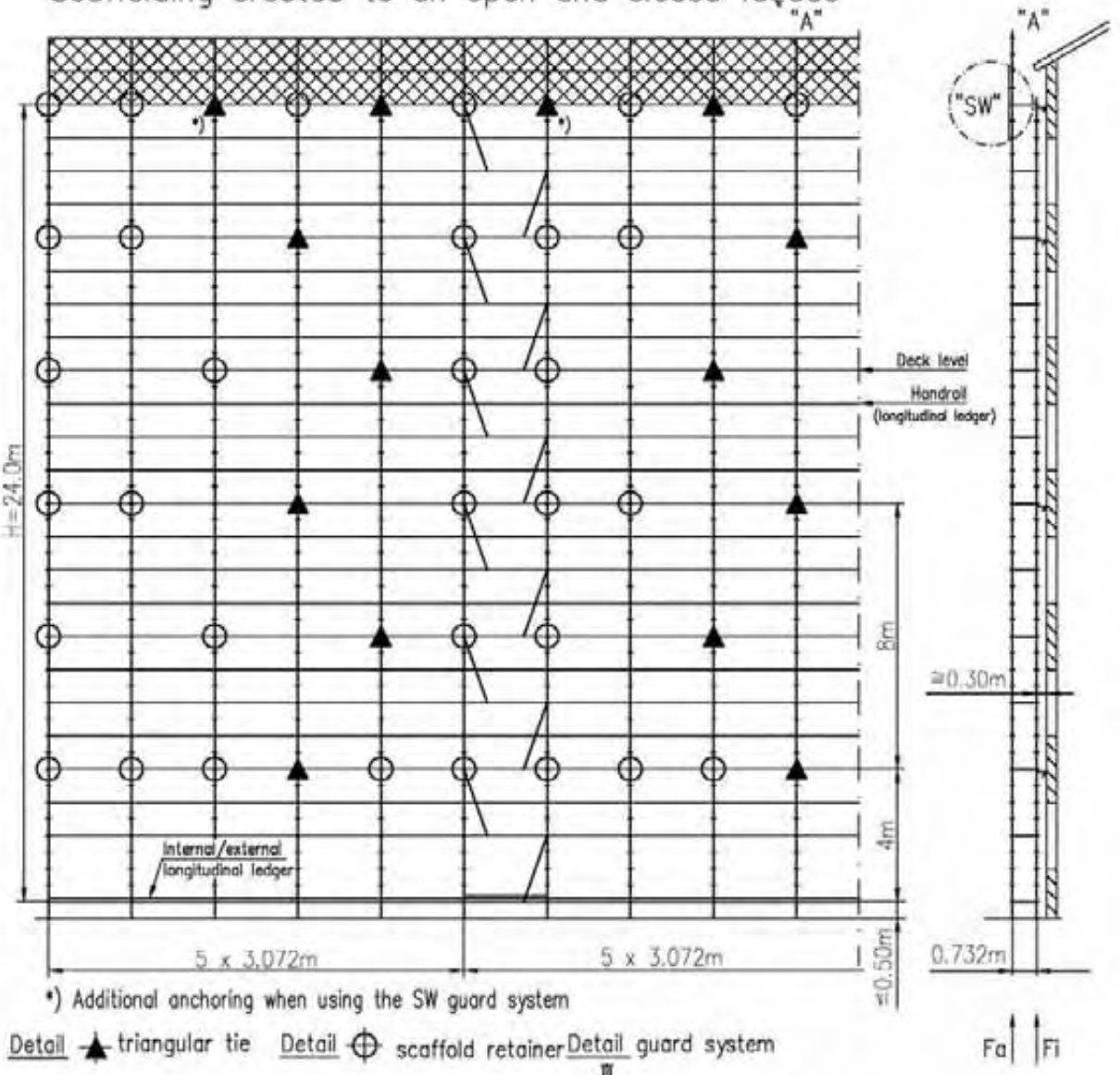
Detail ▲ triangular tie Detail ⊕ scaffold retainer Detail guard system



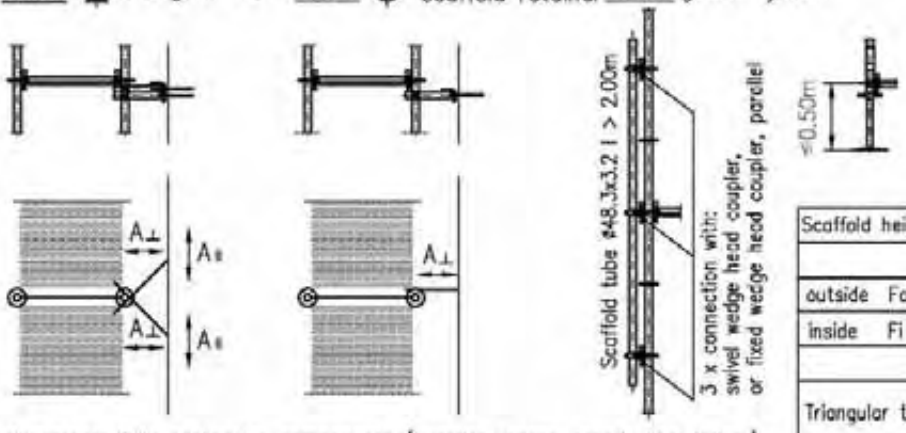
Scaffold height [m]		8	16	24
		Reaction forces [kN]		
outside Fa		6.5	9.2	12.0
inside Fi		10.6	13.9	17.2
		Anchor forces [kN]		
Triangular tie	A⊥	3.0	3.0	
	A∥	3.0	3.0	
Scaffold retainer	A⊥	3.6	3.6	

Comment: Side protection components (guardrail brace, longitudinal ledger) are only featured if statically necessary.

Standard design without internal bracket
Scaffolding erected to an open and closed façade



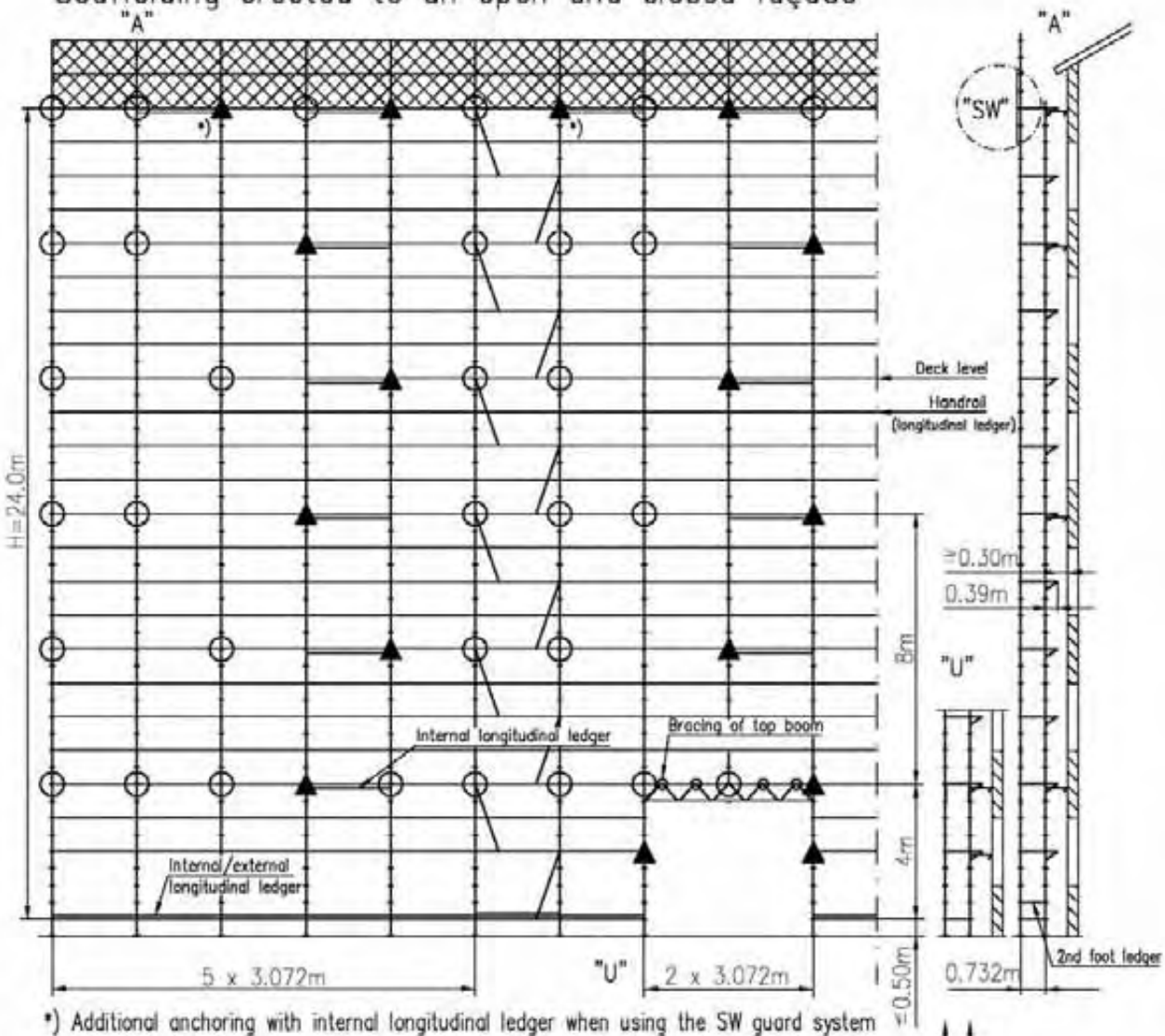
Detail triangular tie Detail scaffold retainer Detail guard system



Scaffold height [m]	8	16	24
	Reaction forces [kN]		
outside Fa	6.5	9.2	12.0
inside Fi	4.8	6.3	7.9
	Anchor forces [kN]		
Triangular tie	A⊥	2.4	2.4
	A∥	2.4	2.4
Scaffold retainer	A⊥	3.6	3.6

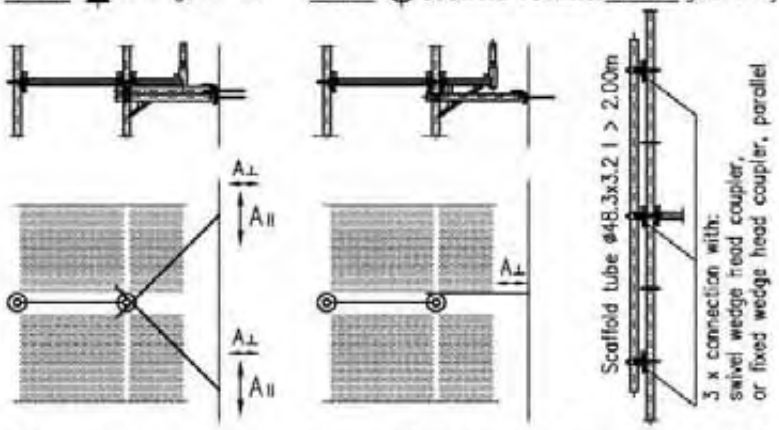
Comment: Side protection components (guardrail brace, longitudinal ledger) are only featured if statically necessary.

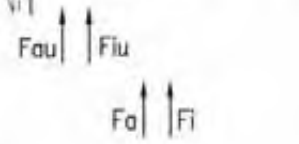
Standard design with internal bracket: bridging of 2x3.072 m
Scaffolding erected to an open and closed façade



*) Additional anchoring with internal longitudinal ledger when using the SW guard system

Detail ▲ triangular tie Detail ⊕ scaffold retainer Detail guard system

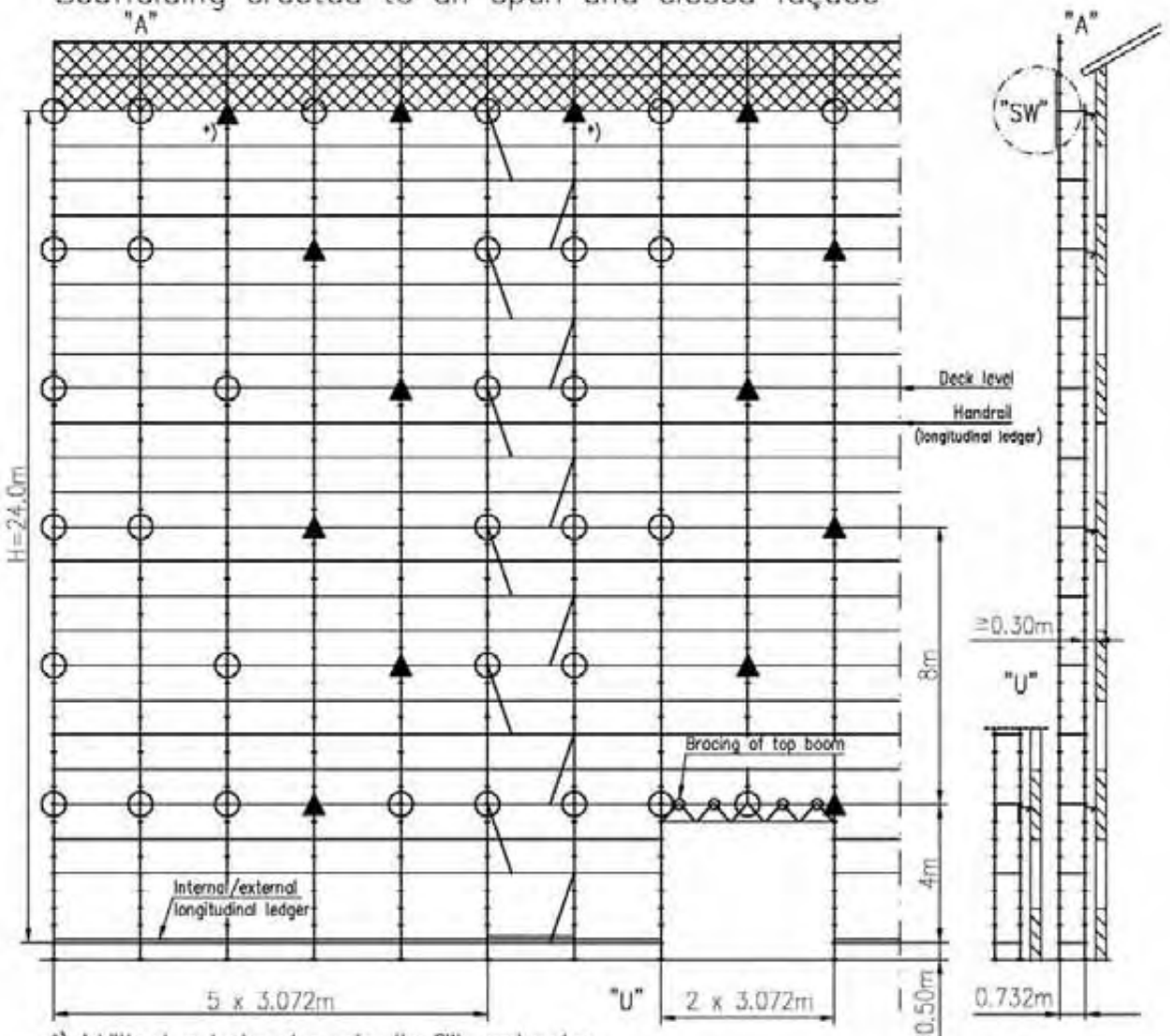




Scaffold height [m]	8	16	24
	Reaction forces [kN]		
outside Fa	6.5	9.2	12.0
inside Fi	10.6	13.9	17.2
Fiu=1,5 x Fi	Fau=1,5 x Fa		
	Anchor forces [kN]		
Triangular tie	A⊥	3.0	3.0
	A∥	3.0	3.0
Scaffold retainer	A⊥	3.6	3.6

Comment: Side protection components (guardrail brace, longitudinal ledger) are only featured if statically necessary.

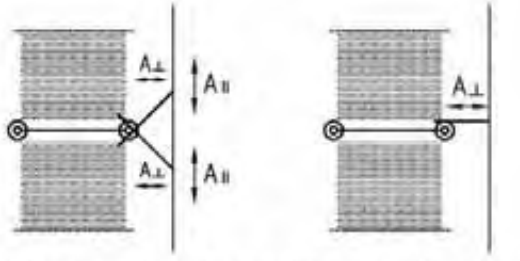
Standard design without internal bracket: bridging of 2x3.072 m
Scaffolding erected to an open and closed façade

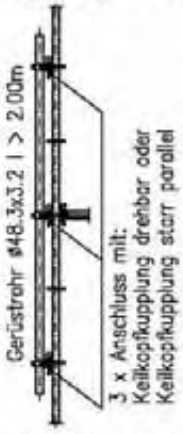


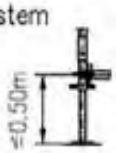
Detail ▲ triangular tie

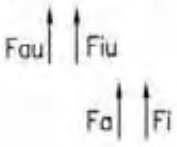
Detail ⊕ scaffold retainer

Detail guard system









Scaffold height [m]	8	16	24
	Reaction forces [kN]		
outside Fa	6.5	9.2	12.0
inside Fi	4.8	6.3	7.9
Fiu=1,5 x Fi	Fau=1,5 x Fa		
	Anchor forces [kN]		
Triangular tie	A⊥	2.4	2.4
	A∥	2.4	2.4
Scaffold retainer	A⊥	3.6	3.6

Comment: Side protection components (guardrail brace, longitudinal ledger) are only featured if statically necessary.

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ALFIX MODUL plus II

Scaffold EN 12810

3D-SW06/307-H2-A-LA

D.1 General

The scaffolding system can be utilized in the standard design as work scaffolding of load classes ≤ 4 with a system width of b = 1.09 m and with bay widths of $\ell \leq 2.57$ m in accordance with DIN EN 12811-1:2004-03, and as safety and roof safety scaffolding in accordance with DIN 4420-1:2004-03.

The uppermost horizontal level (scaffold layer) must not exceed 24 m, including spindle (jack) extension length, above ground level. According to the requirements of DIN EN 12811-1:2004-03, Section 6.2.9.2, in the standard version, the scaffolding system is designed for working operations in one scaffolding layer in front of an "open" façade (percentage of openings = 60 %) and in front of closed façades. When determining wind load, a service life factor of $\chi = 0.7$ presuming a maximum service life of 2 years was taken into account. For the standard version, the sheeting of scaffold using nets or tarpaulins has not been proven.

Without any further proofs, the standard version must only be used if the loads acting within the bays do not exceed the respective live loads according to DIN EN 12811-1:2004-03, Table 3.

For the standard version of "ALFIX MODUL plus II" scaffolding system, the following designation according to DIN EN 12810-1:2004-03 shall be used:

Scaffold EN 12810 – 4D – SW09/257 – H2 – A – LA

D.2 Safety scaffolding

In the standard version, the scaffold system may be used as a safety and roof safety scaffold with a safety layer of class FL1, and as roof safety scaffolding with protective walls of calls SWD 1 according to DIN 4420-1:2004-03.

D.3 Components

The scheduled components/parts are provided in Table D.1. Additionally, steel tubes of Ø 48,3 · 3,2 mm and couplings can be used for the horizontal bracing of bridging ledgers and for the connection of scaffold retainers and triangular ties to the standard couplers of posts according to DIN EN 12811-1:2004-03.

D.4 Bracing

For horizontal bracing of scaffold the following components must be continuously built-in at vertical spacings of 2 metres:

tube ledgers 1.09 m and, in each case,
three steel planks RE; or
three steel planks AF RE

or

U-ledgers 1.09 m and, in each case,
three steel decks; or
three steel planks AF.

Steel decks and steel planks must be secured against unintended lift-off by means of deck retainers.

Depending on the erection variant, for bracing the outer vertical level, vertical braces and tube ledgers as handrail (1 m above deck surface) and as intermediate side protection (0.5 m above deck surface) are to be continuously used in every scaffold bay.

Vertical starter pieces are to be built-in immediately above scaffold spindles (jacks). They must be interconnected using longitudinal ledgers within the inner and outer level parallel to the façade, and using transoms right-angled to the façade. Depending on the erection variant, additional diagonal cross braces are to be installed up to the first scaffold level.

D.5 Anchoring

The anchoring must be carried out using scaffold retainers as per to Annex B, page 81.

The scaffold retainers are to be fixed as an anchoring pair at an angle of 90° (triangular tie) or as "short" scaffold retainers only at the inner vertical frame upright by means of standard couplers. The scaffold connectors, which are anchored using triangular ties, must be connected to the adjacent row of standards through tube ledgers (longitudinal ledgers) within the inner level, depending on the type of erection.

Triangular ties and scaffold retainers must be fixed in close proximity to the connectors (node points) formed by upright tubes and transoms.

The fixtures to be arranged in the structure façades for absorbing the anchor forces must be designed at least for the characteristic values of impacts (γ_F = 1.0) specified in Annex D.

Each row of uprights must be anchored at vertical spacings of 4 metres. The upright rows at the edge of a scaffold are to be anchored at vertical spacings of 4 metres. At the top scaffold layer, each of the upright rows must be anchored.

D.6 Bridging

Bridging girders may be used for bridging gateways or similar at a height of 4 metres if scaffold layers beneath bridging are omitted.

The bridging girders must be anchored at both the supporting area and the centre. Additionally, the girder must be braced through a horizontal latticework of tubes and couplers or through additional anchors (cf. Annex D, page 6).

D.7 Adjoining access bay

If tube ledgers are used for the adjoining access bay, aluminium frame platforms with access hatch RE must be installed or, if U ledgers are used, aluminium frame platforms with access hatch or aluminium hatch-type access decks with ladder are to be used. The adjoining access bay must be supported at a vertical spacing of 4 m by horizontal diagonal braces. For bracing the outer vertical level, vertical braces and tube ledgers as handrail (1 m above deck surface) and as intermediate side protection (0.5 m above deck surface) are to be continuously used in every scaffold bay. In addition, a longitudinal ledger must be arranged on the outer side of the access bay just above the scaffold spindle (cf. Annex D, page 7).

D.8 Broadening bracket

At the inner side of scaffold, at all scaffold layers brackets of 0.39 m can be used.

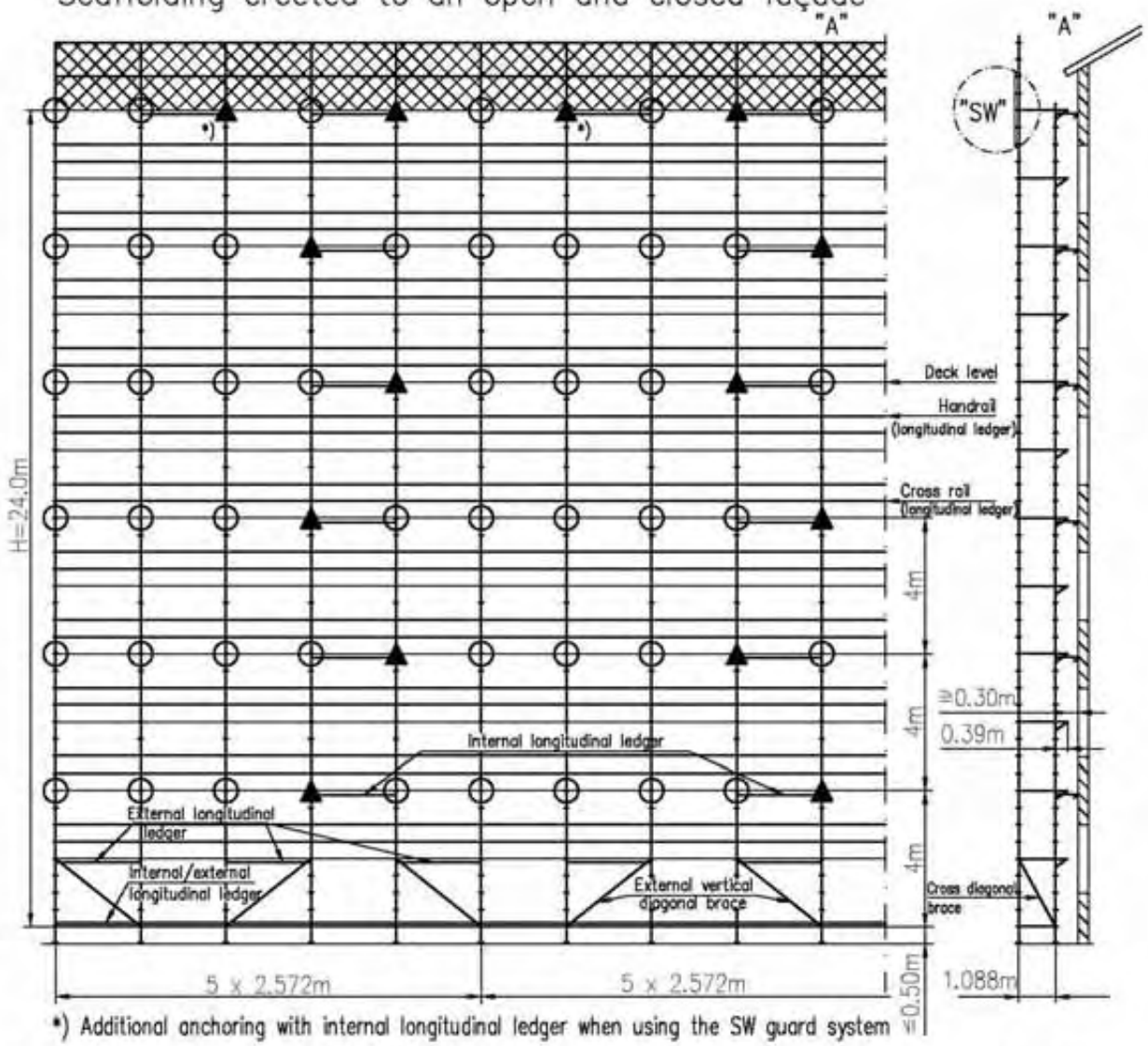
Table D.1: Components of standard design

Designation	Annex B, page
Vertical diagonal braces 0.73m – 2.57 m x 2.00m	8
Horizontal diagonal braces 0.73m - 2.57m x 1.09m	9
Vertical starter piece	10
Vertical upright with spigot fitting 200	11
Tube ledger 0.73 – 2.57m	13
Tube ledger, reinforced 1.09m	14
U transom 0.73 m	15
U transom, reinforced 1.09m	16
Aluminium frame platform with access hatch RE 2.57m	20
Steel deck AF RE 0.32m $\ell \leq$ 2.57m	23
Steel deck RE $\ell \leq$ 2.57m	26
Modular safety net $\ell \leq$ 2.57m	28
Wedge head coupler, turnable	29
Modular deck retainer 0.73m, 1.09m	30
Modular gap cover 0.73m, 1.09m	31
Modular gap cover RE	32
Modular lattice girder 4.14m / 5.14m	34

Table D.1: (continuation)

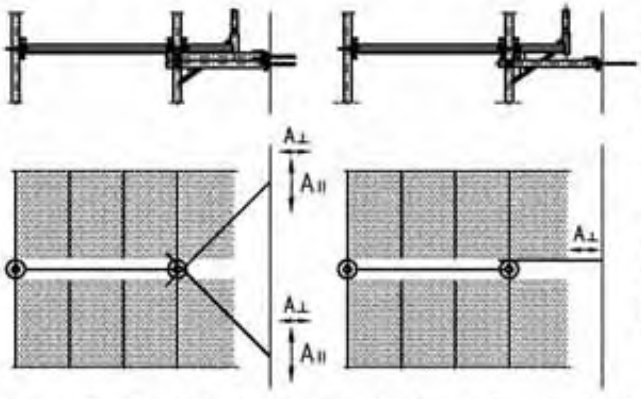
Designation	Annex B, Page
Modular lattice girder with spigot fitting 4.14 m / 5.14 m	36
Modular spigot fitting U	37
U-transom GT 1.09m V	38
Tube transom GT 1.09m V	39
Modular spigot fitting	40
Wedge head coupler, fixed	50
Modular safety door	51
Aluminium frame platform with access hatch 2.57 m	63
Modular toeboard $\ell \leq 2.57$m	67
Bracket 0.39m RE	68
Modular bracket 0.39m	69
Modular aluminium toeboard $\ell \leq 2.57$m	76
Modular double-end guardrail	80
Scaffold retainer	81
Base jack	83
Steel plank AF 0.32m $\ell \leq 2.57$m	84
Steel deck $\ell \leq 2.57$m	85
Aluminium hatch-type access deck 2.57m with ladder	93
Integrated ladder	95
Aluminium hatch-type access deck 2.57m with ladder	100
Toeboard $\ell \leq 2.57$m, end toeboard	102
Aluminium toeboard $\ell \leq 2.57$m, aluminium end toeboard	103
Gap cover $\ell \leq 2.57$ m	105
Diagonal cross brace	113

Standard design with internal bracket
Scaffolding erected to an open and closed façade



*) Additional anchoring with internal longitudinal ledger when using the SW guard system

Detail ▲ triangular tie



Detail ⊕ scaffold retainer

Detail guard system

Add-on access bay, see Annex D07

Comment: Side protection components (guardrail brace, longitudinal ledger) are only featured if statically necessary.

Scaffold height [m]		8	16	24
Reaction forces [kN]				
outside Fa		9.5	12.4	15.3
inside Fi		14.5	17.9	21.3
Anchor forces [kN]				
Triangular tie	A⊥	3.5	3.5	
	A∥	3.5	3.5	
Scaffold retainer	A⊥	1.6	1.6	

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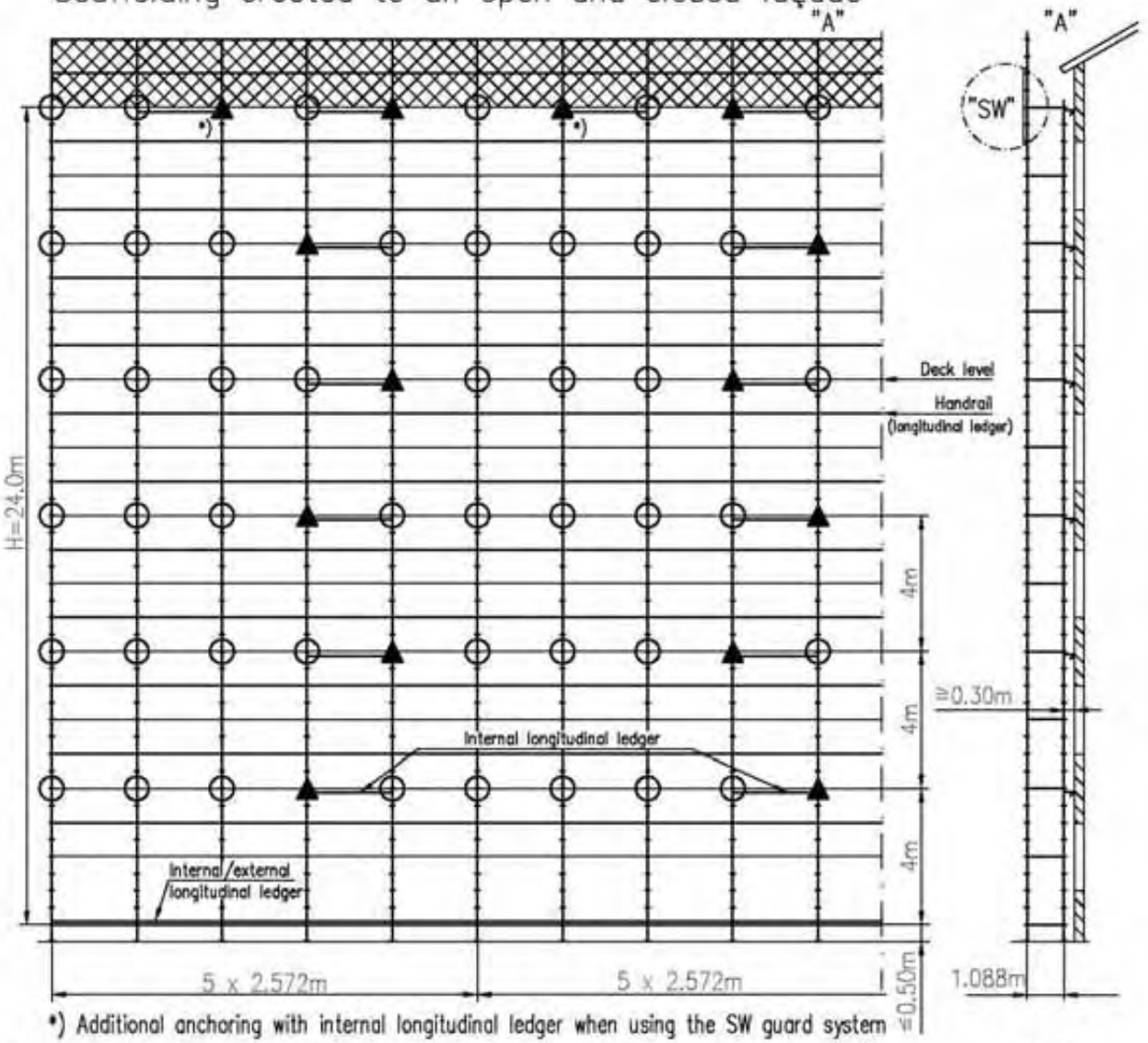
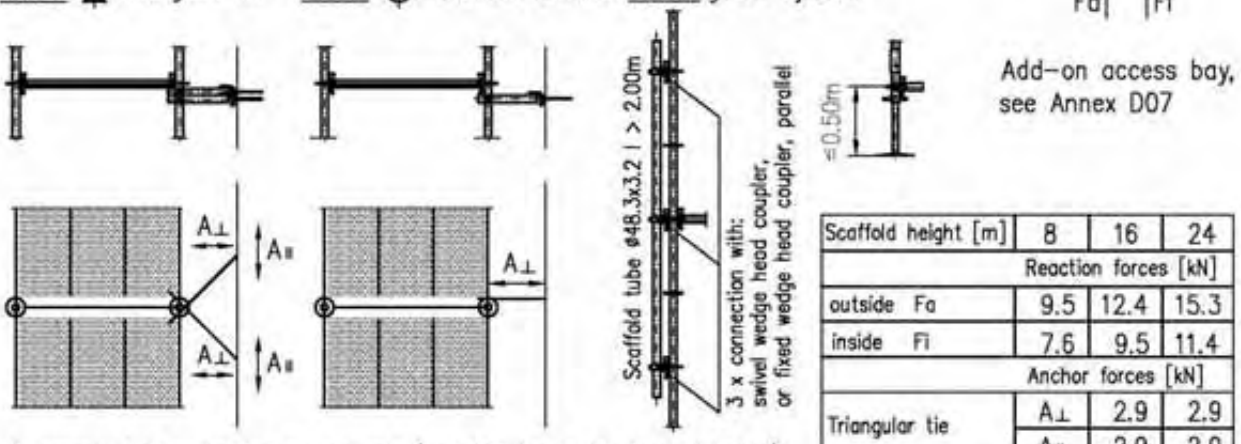
4D-SW09/257-H2-A-LA

Standard design without internal bracket
Scaffolding erected to an open and closed façade



*) Additional anchoring with internal longitudinal ledger when using the SW guard system

Detail ▲ triangular tie Detail ⊕ scaffold retainer Detail guard system



Add-on access bay, see Annex D07

Scaffold height [m]	8	16	24
	Reaction forces [kN]		
outside Fa	9.5	12.4	15.3
inside Fi	7.6	9.5	11.4
	Anchor forces [kN]		
Triangular tie	A⊥	2.9	2.9
	A∥	2.9	2.9
Scaffold retainer	A⊥	1.6	1.6

Comment: Side protection components (guardrail brace, longitudinal ledger) are only featured if statically necessary.

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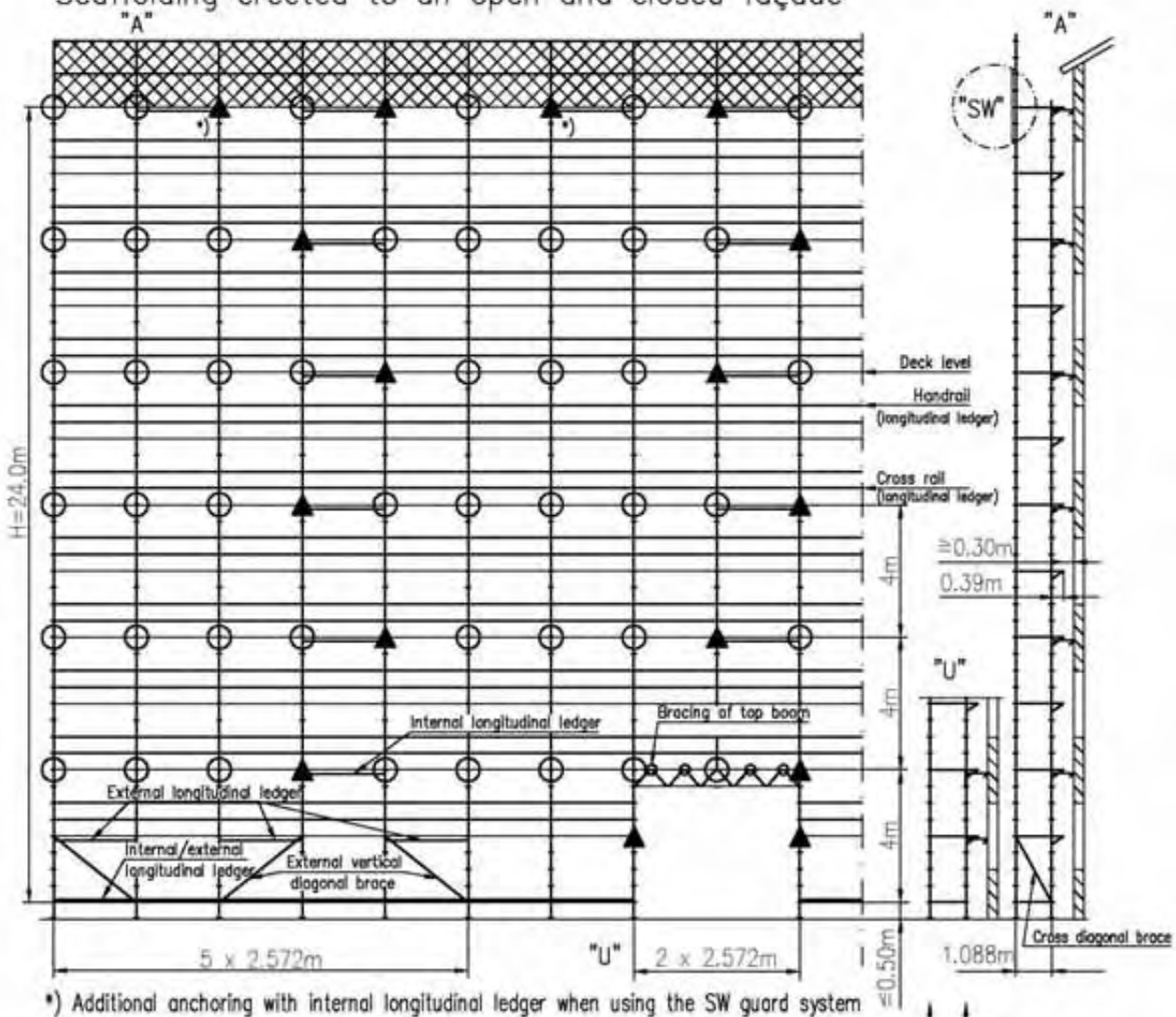
Scaffold EN 12810

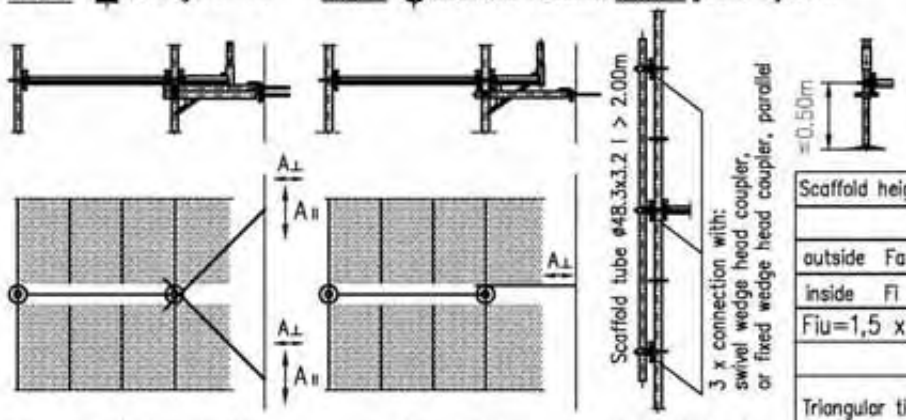
4D-SW09/257-H2-A-LA

Standard design with internal bracket: bridging of 2x2.572 m
Scaffolding erected to an open and closed façade

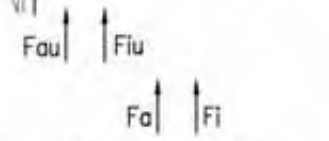


*) Additional anchoring with internal longitudinal ledger when using the SW guard system

Detail ▲ triangular tie Detail ⊕ scaffold retainer Detail guard system



Comment: Side protection components (guardrail brace, longitudinal ledger) are only featured if statically necessary.

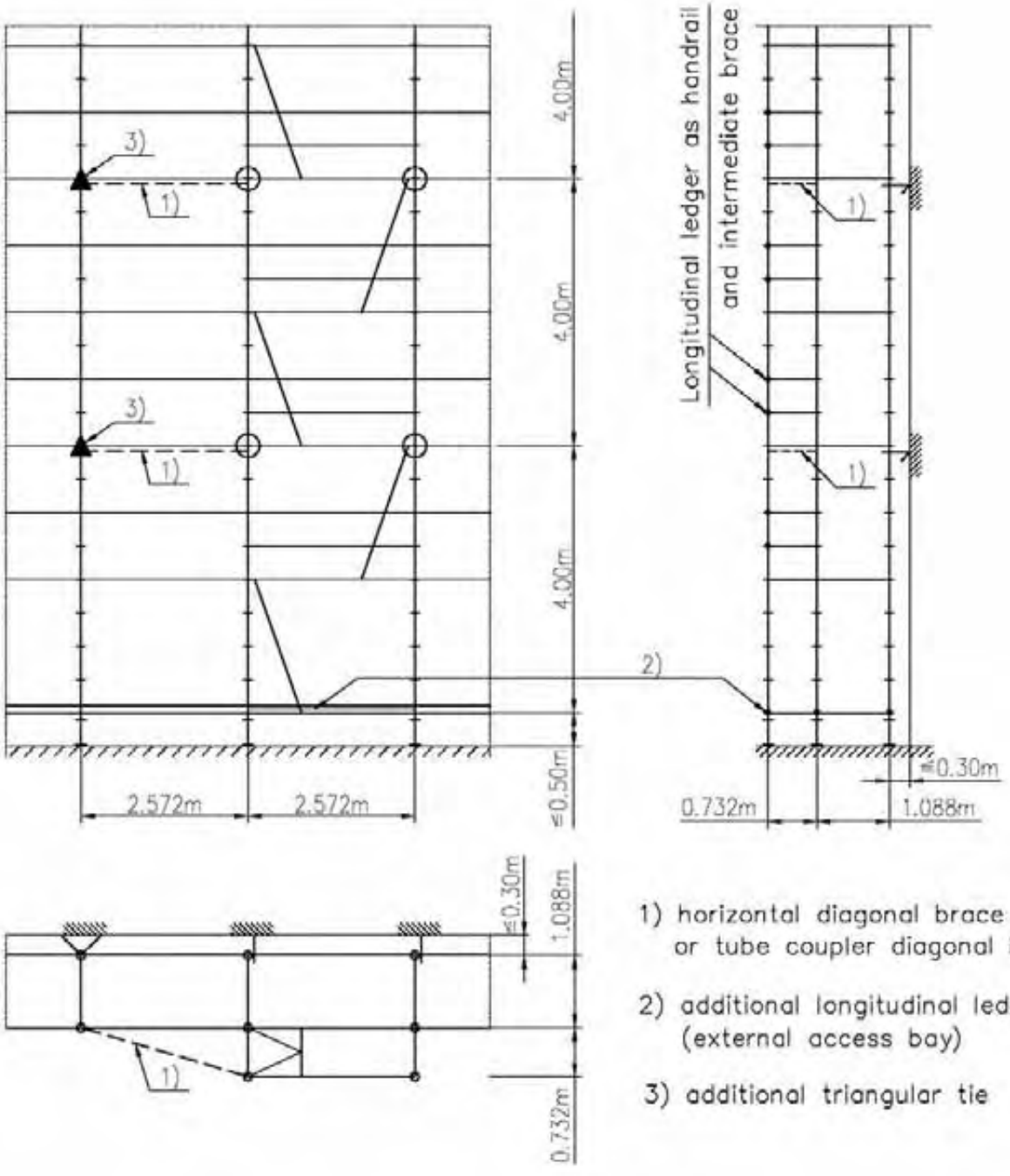


Add-on access bay, see Annex D07

Scaffold height [m]	8	16	24
Reaction forces [kN]			
outside Fa	9.5	12.4	15.3
inside Fi	14,5	17.9	21.3
Fiu=1,5 x Fi	Fau=1.5 x Fa		
Anchor forces [kN]			
Triangular tie	A⊥	3.5	3.5
	A∥	3.5	3.5
Scaffold retainer	A⊥	1.6	1.6

Standard design: add–on access bay

Shown is an add–on access bay erected in front of the façade scaffolding without internal bracket



1) horizontal diagonal brace or tube coupler diagonal brace

2) additional longitudinal ledger (external access bay)

3) additional triangular tie

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