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Authorised and notified according to
Article 29 of the Regulation (EU)
No 305/2011 of the European
Parliament and of the Council of 9
March 2011

MEMBER OF EOTA

European Technical Assessment ETA-13/1063 of 2014/01/16

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:

Gutzeit Post bases

Product family to which the above construction product belongs:

EC PAC 13: Three-dimensional nailing plate (Post bases for the support of timber columns and posts as load-bearing elements)

Manufacturer:

Gutzeit Verbindungssysteme GmbH & Co.
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D-58730 Fröndenberg, Industriegebiet
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Manufacturing plant:

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This European Technical Assessment contains:

41 pages including 2 annexes which form an integral part of the document

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:

Guideline for European Technical Approval (ETAG) No. 015 Three Dimensional Nailing Plates, April 2013, used as European Assessment Document (EAD).

This version replaces:

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product

The post bases are made from 4.0 mm to 8.0 mm thick steel plates in combination with reinforcing bars, threaded rods or steel tubes. The post bases are produced from steel grade S235JR according to EN 10025-2:2005 with minimum characteristic yield strength of $R_e = 235 \text{ N/mm}^2$ and minimum characteristic tensile strength of $R_m = 360 \text{ N/mm}^2$. The reinforcing bars are produced from steel grade B500A according to EN 10080:2005 with minimum characteristic yield strength of $R_{eH} = 500 \text{ N/mm}^2$.

For the connections with metal fasteners nails $\phi 4,0 \times 40$ according to EN 14592, dowels and bolts $\phi 10$, $\phi 12$ mm (S235) and coach screws $\phi 8,0$, $\phi 10,0$ and $\phi 12,0$ mm according to EN 14592 (DIN 571 and thread according to DIN 7998) are used.

Dimensions are shown in Annex A and B.

2 Specification of the intended use in accordance with the applicable EAD

The intended use of the post bases is the support of timber columns and posts as load-bearing elements, where requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 and 4 of Regulation (EU) 305/2011 shall be fulfilled.

The static and kinematical behaviour of the timber members or the supports shall be as described in Annex B.

The timber posts may be of solid timber of strength class C24 or better according to EN 338:2009. Minimum dimensions for the post have to be considered (Annex A).

The post base shall be installed as pictured in the drawings. The cross-section of the timber column shall be positioned centrally and with the end grain plane on the base plate. Post bases type H may have a clearance between the end grain of the timber post and the base plate of the post base due to constructive wood preservation (maximum 10 mm).

The maximum distance between the foundation and the base plate of the post base is given in Annex A, table A.1.

Annex B states the load-carrying capacities of the post bases for solid timber of strength class C24 according to EN 338:2009. The design of the connections shall be in accordance with Eurocode 3 and Eurocode 5 or a similar national code. The anchorage of the post base in the foundation and imperfections exceeding the assumptions in Eurocode 5, 5.4.4 are not part of this ETA.

The post bases are for use in timber structures subject to the service classes 1, 2 and 3 of Eurocode 5 and for connections subject to static or quasi-static loading. The corrosion protection is given by hot-dip zinc coating with a minimum thickness of 55 μm according to EN 1461 or zinc coating Fe/Zn 25c according to EN ISO 2081. The metal fasteners must also have a zinc coating for the intended use in service class 3 of EN 1995-1-1 (zinc coating Fe/Zn 25c according to EN ISO 2081).

The scope of the post bases regarding resistance to corrosion shall be defined according to national provisions that apply at the installation site considering environmental conditions.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the post bases of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

| Characteristic | Assessment of characteristic |
|--|---|
| 3.1 Mechanical resistance and stability*) (BR1) | |
| Characteristic load-carrying capacity | See Annex B |
| Stiffness | No performance determined |
| Ductility in cyclic testing | No performance determined |
| 3.2 Safety in case of fire (BR2) | |
| Reaction to fire | The hold downs are made from steel classified as Euroclass A1 in accordance with EN 1350-1 and EC decision 96/603/EC, amended by EC Decision 2000/605/EC |
| 3.3 Hygiene, health and the environment (BR3) | |
| Influence on air quality | No dangerous materials |
| 3.7 Sustainable use of natural resources (BR7) | |
| | No Performance Determined |
| 3.8 General aspects related to the performance of the product | |
| | The post bases have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service class 1 and 2 |
| Identification | See Annex A |

*) See additional information in section 3.8 – 3.9.

In addition to the specific clauses relating to dangerous substances contained in this European technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.9 Methods of verification

Safety principles and partial factors

The characteristic load-carrying capacities are based on the characteristic values of the connections with metal fasteners, the steel plates and the timber post.

In the case of timber failure or failure of the metal fasteners, the design values shall be calculated according to EN 1995-1-1 by dividing the characteristic values of the load-carrying capacities by different partial factors for the strength properties, and in addition multiplied with the coefficient k_{mod} .

In the case of steel failure, the design value shall be calculated according to EN 1993-1-1 by reducing the characteristic values of the load-carrying capacity with different partial factors.

The design value of the load-carrying capacity is the smaller value of all load-carrying capacities:

$$F_{Rd} = \min \left\{ \frac{k_{mod} \cdot F_{Rk,T}}{\gamma_{M,T}}; \frac{F_{Rk,S}}{\gamma_{Mi,S}} \right\}$$

Therefore, for timber failure or failure of the metal fasteners the load duration class and the service class are included. The different partial factors γ_M for steel or timber failure, respectively, are also correctly taken into account.

3.10 Mechanical resistance and stability

See Annex B for the characteristic load-carrying capacity in the different directions F_1 to F_5 for solid timber of strength class C24 according to EN 338:2009. Using the load-carrying capacities of the post bases, the specifications in Annex A must be fulfilled. The end grain of the timber post must in general be plane on the base plate of the post base. Post bases type H may have a clearance between the end grain of the timber post and the base plate of the post base due to constructive wood preservation (maximum 10 mm).

The characteristic capacities of the post bases are determined by calculation according to Eurocode 3 and Eurocode 5. They should be used for designs in accordance with Eurocode 3 and Eurocode 5 or a similar national code.

No performance has been determined in relation to ductility of a joint under cyclic testing. The contribution to the performance of structures in seismic zones, therefore, has not been assessed.

No performance has been determined in relation to the joint's stiffness properties - to be used for the analysis of the serviceability limit state.

No performance has been determined in relation to the anchorage of the post bases in the foundation. It must be checked by the designer of the structure to ensure it is not less than the post base capacity and, if necessary, the post base capacity reduced accordingly. Therefore the specifications for the lever arms $e_{F2/F3}$ (for load case F_2 / F_3) and $e_{F4/F5}$ (for load case F_4 / F_5) in annex A have to be considered. The lever arm is the distance between the top edge of the foundation and the load.

3.11 Aspects related to the performance of the product

3.11.1 Corrosion protection in service class 1, 2 and 3.

The post bases are produced from steel grade S235JR according to EN 10025-2:2005 with minimum characteristic yield strength of $R_e = 235$ N/mm² and minimum characteristic tensile strength of $R_m = 360$ N/mm². The reinforcing bars are produced from steel grade B500A according to EN 10080:2005 with minimum characteristic yield strength of $R_{eH} = 500$ N/mm²

The corrosion protection is given by hot-dip zinc coating with a minimum thickness of 55 μ m according to EN 1461 or zinc coating Fe/Zn 25c according to EN ISO 2081. The metal fasteners must also have a zinc coating for the intended use in service class 3 of EN 1995-1-1 (zinc coating Fe/Zn 25c according to EN ISO 2081).

3.12 General aspects related to the fitness for use of the product

The hold downs are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation

The nailing pattern used shall be either the maximum or the minimum pattern as defined in Annex A.

The following provisions apply:

The timber post

- shall be restrained against rotation, and supported at the lower and upper end
- shall be strength class C24 according to EN 338:2009 or better, see section 3 of this evaluation report
- shall be free from wane in the post base

- must fulfil the requirements regarding minimum dimensions (see Annex A)
- end grain must in general be plane on the base plate of the post base; post bases type H may have a distance between the end grain of the timber post and the base plate of the post base due to constructive wood preservation (maximum 10 mm)

The post base shall be installed centrally in the cross-section of the timber column.

The actual end bearing capacity of the timber member to be used in conjunction with the post base is checked by the designer of the structure to ensure it is not less than the post base capacity and, if necessary, the post base capacity reduced accordingly.

There are no specific requirements relating to preparation of the timber members.

The anchorage of the post base in the foundation is not part of this ETA. It must be checked by the designer of the structure to ensure it is not less than the post base capacity and, if necessary, the post base capacity reduced accordingly. Therefore the specifications for the lever arms $e_{F2/F3}$ (for load case F2 / F3) and $e_{F4/F5}$ (for load case F4 / F5) in Annex A have to be considered. The lever arm is the distance between the top edge of the foundation and the load.

4 Attestation and verification of constancy of performance (AVCP)

4.1 AVCP system

According to the decision 97/638/EC of the European Commission¹, as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 2+.

5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

5.1 Tasks of the manufacturer

5.1.1 Factory production control

The manufacturer has a factory production control system in the plant and exercises permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the product is in conformity with the European Technical Assessment.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan¹. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Check of materials, such as sheet metal, shall include control of the inspection documents presented by suppliers (comparison with nominal values) by verifying dimension and determining material properties, e.g. chemical composition, mechanical properties.

The manufactured components are checked visually and for dimensions.

The control plan, which is part of the technical documentation of this European Technical Assessment, includes details of the extent, nature and frequency of testing and controls to be performed within the factory production control and has been agreed between the assessment holder and ETA-Danmark.

The results of factory production control are recorded and evaluated. The records include at least the following information:

- Designation of the product, basic material and components;

¹ The control plan has been deposited at ETA-Danmark and is only made available to the approved bodies involved in the AVCP procedure.

- Type of control or testing;
- Date of manufacture of the product and date of testing of the product or basic material and components;
- Result of control and testing and, if appropriate, comparison with requirements;
- Signature of person responsible for factory production control.

The records shall be presented to ETA Danmark on request.

5.1.2 Initial type testing of the product

For initial type-testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary initial type testing has to be agreed between ETA-Danmark and the notified body.

5.2. Tasks of notified bodies

5.2.1 Initial inspection of factory and of factory production control

The Notified body shall ascertain that, in accordance with the control plan, the factory and the factory production control are suitable to ensure continuous and orderly manufacturing of the anchor according to the specifications mentioned in 2.1 as well as to the Annexes to the European Technical Assessment.

5.2.2 Continuous surveillance

The Notified body shall visit the factory at least once a year for regular inspection. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking account of the control plan.

Continuous surveillance and assessment of factory production control have to be performed according to the control plan.

The results of product certification and continuous surveillance shall be made available on demand by the certification body or inspection body, respectively, to ETA-Danmark. In cases where the provisions of the European Technical Assessment and the control plan are no longer fulfilled the conformity certificate shall be withdrawn.

Issued in Charlottenlund on 2014-01-16

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Managing Director, ETA-Danmark

Annex A
Product details and definitions

Table A.1 Specifications of the post bases

| Post base | | Metal Fasteners | | | Post [mm] | | Distances [mm] | | |
|-----------|-------------|-----------------|------------|------------|-----------|--------|----------------|--------------------|--------------------|
| Type | Article No. | Screw (Nail) | Bolt | Dowel | min. b | min. h | max.a | e _{F2/F3} | e _{F4/F5} |
| Type H | 89900 | - | 2 x Ø 10,0 | - | 71 | 100 | 50 | 195 | 50 |
| | 89901 | - | 2 x Ø 10,0 | - | 81 | 100 | 50 | 195 | 50 |
| | 89902 | - | 2 x Ø 10,0 | - | 91 | 100 | 50 | 195 | 50 |
| | 89903 | - | 2 x Ø 10,0 | - | 101 | 100 | 50 | 195 | 50 |
| | 89904 | - | 2 x Ø 10,0 | - | 121 | 100 | 50 | 195 | 50 |
| | 89905 | - | 2 x Ø 10,0 | - | 141 | 100 | 50 | 195 | 50 |
| Type U | 891051 | 8 Nails Ø 4,0 | 1 x Ø 12,0 | - | 80 | 110 | 185 | - | - |
| | 891150 | 8 x Ø 8,0 | 1 x Ø 12,0 | - | 80 | 110 | 155 | - | - |
| | 89940 | 8 x Ø 8,0 | 1 x Ø 12,0 | - | 80 | 110 | 150 | - | - |
| | 89820 | 4 x Ø 10,0 | 1 x Ø 10,0 | - | 71 | 120 | 50 | 135 | 60 |
| | 89821 | 4 x Ø 10,0 | 1 x Ø 10,0 | - | 81 | 120 | 50 | 135 | 60 |
| | 89822 | 4 x Ø 10,0 | 1 x Ø 10,0 | - | 91 | 120 | 50 | 135 | 60 |
| | 89823 | 4 x Ø 10,0 | 1 x Ø 10,0 | - | 101 | 120 | 50 | 135 | 60 |
| | 89824 | 4 x Ø 10,0 | 1 x Ø 10,0 | - | 121 | 120 | 50 | 135 | 60 |
| Type I | 891053 | - | - | 1 x Ø 10,0 | 80 | 80 | 185 | 285 | - |
| | 891127 | - | - | 1 x Ø 10,0 | 100 | 100 | 195 | 295 | - |
| | 891128 | - | - | 1 x Ø 10,0 | 100 | 100 | 245 | 345 | - |
| | 891129 | - | - | 1 x Ø 10,0 | 100 | 100 | 295 | 395 | - |
| | 891130 | - | - | 1 x Ø 10,0 | 100 | 100 | 345 | 445 | - |
| | 891109 | - | - | 1 x Ø 10,0 | 100 | 100 | 315 | 415 | - |
| | 891131 | - | - | 1 x Ø 10,0 | 100 | 100 | 100 | 200 | - |
| | 891132 | - | - | 1 x Ø 10,0 | 100 | 100 | 150 | 250 | - |
| | 891125 | - | - | 1 x Ø 10,0 | 100 | 100 | 200 | 300 | - |
| | 891152 | - | - | 1 x Ø 10,0 | 100 | 100 | 200 | 300 | - |
| | 891153 | - | - | 1 x Ø 10,0 | 100 | 100 | 100 | 200 | - |
| | 891126 | - | - | 1 x Ø 10,0 | 100 | 100 | 100 | 200 | - |
| | 891198 | - | - | 1 x Ø 10,0 | 100 | 100 | 190 | - | - |
| Type T | 891052 | - | - | 4 x Ø 10,0 | 130 | 100 | 190 | 290 | 210 |
| | 89920 | - | - | 4 x Ø 10,0 | 120 | 100 | 155 | 245 | 175 |
| | 89832 | - | - | 4 x Ø 10,0 | 130 | 100 | 150 | 255 | 170 |
| | 89810 | - | - | 4 x Ø 10,0 | 80 | 120 | 100 | 190 | 130 |
| | 89840 | - | - | 4 x Ø 10,0 | 130 | 100 | 150 | 240 | 185 |
| | 89841 | - | - | 4 x Ø 10,0 | 130 | 100 | 200 | 290 | 235 |

Continuation of Table A.1 Specifications of the post bases

| Post base | | Metal Fasteners | | | Post [mm] | | Distances [mm] | | |
|-----------|-------------|-----------------|------|-------|-----------|--------|----------------|--------------------|--------------------|
| Type | Article No. | Screw | Bolt | Dowel | min. b | min. h | max a | e _{F2/F3} | e _{F4/F5} |
| Type P | 891050 | 4 x Ø 12,0 | - | - | 80 | 80 | 185 | - | - |
| | 89850 | 4 x Ø 12,0 | - | - | 100 | 100 | 100 | - | - |
| | 89851 | 4 x Ø 12,0 | - | - | 100 | 100 | 150 | - | - |
| Universal | 89852 | 2 x Ø 10,0 | - | - | 100 | 100 | 300 | - | - |

Table A.2 Specifications of the metal fasteners according to EN 14592

| Fastener type | Size | | | Material | Finish |
|---------------|--------------------|-----------|-----------------|-----------------------------------|-----------------------|
| | Diameter | Length | Threaded length | | |
| Nails | 4,0 mm | min 40 mm | - | $f_{u,k} \geq 600 \text{ N/mm}^2$ | Galvanic zinc coating |
| Screws | 8,0 mm | min 40 mm | min 24 mm | $f_{u,k} \geq 360 \text{ N/mm}^2$ | Galvanic zinc coating |
| Screws | 10,0 mm 12,0 mm | min 60 mm | min 40 mm | $f_{u,k} \geq 360 \text{ N/mm}^2$ | Galvanic zinc coating |
| Bolts | 10,0 mm 12,0 mm | | | $f_{u,k} \geq 360 \text{ N/mm}^2$ | Galvanic zinc coating |
| Dowels | 10,0 mm 12,0 mm | | | $f_{u,k} \geq 360 \text{ N/mm}^2$ | Galvanic zinc coating |

The load-carrying-capacities of the metal fasteners were calculated according to Eurocode 5 for lateral loads. The contribution to the load-carrying capacity due to the rope effect was considered according to Eurocode 5.

Annex B
Characteristic load-carrying capacities

Table B.1 Characteristic load-carrying capacities for post bases [kN]

| Post base | F ₁ (Compression) | | | | F ₁ (Tension) | | | F ₂ /F ₃ | | | | F ₄ /F ₅ | | |
|---------------|------------------------------|----------------|----------------|----------------|--------------------------|----------------|----------------|--------------------------------|----------------|----------------|----------------|--------------------------------|----------------|----------------|
| | Timber | Steel | | | Timber | Steel | | Timber | Steel | | | Timber | Steel | |
| Type H | | | | | | | | | | | | | | |
| 89900 | 25,3 | 112 | 183 | | 25,3 | - | 183 | 6,53 | 22,0 | 12,4 | - | 6,53 | 4,88 | - |
| 89901 | 25,3 | 112 | 183 | | 25,3 | - | 183 | 7,45 | 22,7 | 12,4 | - | 7,27 | 4,88 | - |
| 89902 | 25,3 | 112 | 183 | | 25,3 | - | 183 | 8,37 | 22,8 | 12,4 | - | 7,27 | 4,88 | - |
| 89903 | 25,3 | 112 | 183 | | 25,3 | - | 183 | 9,29 | 22,8 | 12,4 | - | 7,27 | 4,88 | - |
| 89904 | 25,3 | 112 | 183 | | 25,3 | - | 183 | 11,1 | 22,8 | 12,4 | - | 7,27 | 4,88 | - |
| 89905 | 25,3 | 112 | 183 | | 25,3 | - | 183 | 13,0 | 22,8 | 12,4 | - | 7,27 | 4,88 | - |
| | $\gamma_{M,C}$ | $\gamma_{M,1}$ | $\gamma_{M,2}$ | | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ |
| Type U | | | | | | | | | | | | | | |
| 891051 | 40,4 | 9,05 | - | | 5,52 | 1,35 | - | - | - | - | - | - | - | - |
| 891150 | 30,6 | 19,8 | - | | 11,3 | 1,35 | - | - | - | - | - | - | - | - |
| 89940 | 30,6 | 6,17 | - | | 11,3 | 1,35 | - | - | - | - | - | - | - | - |
| 89820 | 68,4 | 42,1 | - | | 8,91 | 5,07 | - | - | 5,94 | 1,78 | 3,42 | 5,86 | 6,35 | - |
| 89821 | 75,7 | 42,1 | - | | 8,91 | 4,17 | - | - | 5,94 | 1,42 | 3,42 | 5,86 | 6,35 | - |
| 89822 | 83,1 | 42,1 | - | | 8,91 | 3,55 | - | - | 5,94 | 1,18 | 3,42 | 5,86 | 6,35 | - |
| 89823 | 90,4 | 42,1 | - | | 8,91 | 3,08 | - | - | 5,94 | 1,16 | 3,42 | 5,86 | 6,35 | - |
| 89824 | 105 | 42,1 | - | | 8,91 | 2,44 | - | - | 5,94 | 1,16 | 3,42 | 5,86 | 6,35 | - |
| 89825 | 120 | 42,1 | - | | 8,91 | 2,02 | - | - | 5,94 | 1,16 | 3,42 | 5,86 | 6,35 | - |
| | $\gamma_{M,T}$ | $\gamma_{M,1}$ | $\gamma_{M,2}$ | | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ |
| Type I | | | | | | | | | | | | | | |
| 891053 | 98,5 | 44,8 | 29,0 | | 4,98 | 5,79 | - | - | 3,90 | 0,66 | 1,07 | - | - | - |
| 891127 | 167 | 85,9 | 50,5 | | 5,58 | 6,46 | - | - | 4,19 | 1,07 | - | - | - | - |
| 891128 | 167 | 85,9 | 40,1 | | 5,58 | 6,46 | - | - | 4,19 | 0,96 | - | - | - | - |
| 891129 | 167 | 85,9 | 31,8 | | 5,58 | 6,46 | - | - | 4,19 | 0,84 | - | - | - | - |
| 891130 | 167 | 85,9 | 25,4 | | 5,58 | 6,46 | - | - | 4,19 | 0,74 | - | - | - | - |
| 891109 | 167 | 85,9 | 29,0 | | 5,58 | 6,46 | - | - | 4,19 | 1,64 | - | - | - | - |
| 891131 | 181 | 108 | 108 | | 5,58 | 10,2 | - | - | 4,19 | 1,68 | - | - | - | - |
| 891132 | 181 | 108 | 108 | | 5,58 | 10,2 | - | - | 4,19 | 1,33 | - | - | - | - |
| 891125 | 95,0 | 69,1 | 56,8 | 58,8 | 5,58 | - | 58,8 | - | 4,19 | 1,01 | - | - | - | - |
| 891152 | 97,8 | 75,9 | - | 58,8 | 5,58 | - | 58,8 | - | 4,19 | 1,75 | - | - | - | - |
| 891153 | 97,8 | 75,9 | - | 58,8 | 5,58 | - | 58,8 | - | 4,19 | 2,60 | - | - | - | - |
| 891126 | 181 | 108 | 108 | | 5,58 | 65,8 | - | - | 4,19 | 5,10 | 8,00 | - | - | - |
| 891198 | 167 | 71,2 | 52,5 | | - | - | - | - | - | - | - | - | - | - |
| | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,1}$ | $\gamma_{M,2}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ |

Continuation of Table B.1 Characteristic load-carrying capacities for post bases [kN]

| Post base | F ₁ (Compression) | | | F ₁ (Tension) | | | F ₂ /F ₃ | | | | F ₄ /F ₅ | | | |
|------------------|------------------------------|----------------|----------------|--------------------------|----------------|----------------|--------------------------------|----------------|----------------|----------------|--------------------------------|----------------|----------------|--|
| | Timber | Steel | | Timber | Steel | | Timber | | Steel | | Timber | Steel | | |
| Type T | | | | | | | | | | | | | | |
| 891052 | 77,7 | 54,2 | 30,58 | 25,1 | 5,79 | - | 18,3 | 13,1 | 0,67 | 1,49 | 2,19 | 0,94 | - | |
| 89920 | 109 | 74,1 | 48,6 | 25,1 | 14,0 | - | 11,6 | 18,1 | 1,13 | 3,14 | 1,86 | 1,76 | - | |
| 89832 | 92,0 | 99,8 | 108 | 25,1 | 10,2 | - | 13,1 | 18,3 | 1,31 | - | 2,43 | 2,48 | - | |
| 89810 | 127 | 75,1 | 109 | 21,8 | - | 65,3 | 17,4 | 16,5 | 3,06 | 4,32 | 1,79 | 4,47 | - | |
| 89840 | 107,0 | 105 | 108 | 25,1 | - | 33,8 | 13,1 | 18,3 | 6,57 | - | 2,85 | - | 2,48 | |
| 89841 | 107 | 105 | 108 | 25,1 | - | 33,8 | 13,1 | 18,3 | 5,42 | - | 2,83 | | 2,55 | |
| | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,1}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | |
| Type P | | | | | | | | | | | | | | |
| 891050 | 71,9 | 59,2 | 34,5 | - | - | - | - | - | - | - | - | - | - | |
| 89850 | 111 | 100 | 108 | - | - | - | - | - | - | - | - | - | - | |
| 89851 | 111 | 100 | 108 | - | - | - | - | - | - | - | - | - | - | |
| | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,1}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | |
| Universal | | | | | | | | | | | | | | |
| 89852 | 132 | 116 | 34,3 | - | - | - | - | - | - | - | - | - | - | |
| | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,1}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,C}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | $\gamma_{M,T}$ | $\gamma_{M,0}$ | $\gamma_{M,2}$ | |

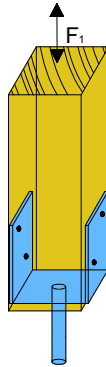
$\gamma_{M,T}$ = partial factor for solid timber according to EN 1995-1-1 and national annex

$\gamma_{M,C}$ = partial factor for connections according to EN 1995-1-1 and national annex

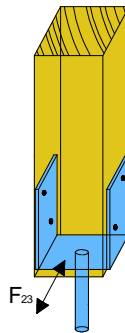
$\gamma_{M,0}$; $\gamma_{M,1}$; $\gamma_{M,2}$ = partial factor according to EN 1993-1-1 and national annex

Definitions of forces, their directions and eccentricity

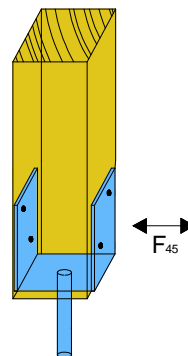
- Force F_1 : tensile or compression load



- Force F_2 / F_3 : horizontal load parallel to the side plates of the post base and perpendicular to the fasteners



- Force F_4 / F_5 : horizontal load perpendicular to the side plates of the post base and parallel to the fasteners



Acting forces

| | |
|-----------------|---|
| F_1 | axial force (tension or compression) acting along the central axis of the joint |
| F_2 and F_3 | horizontal force parallel to the side plates of the post base acting with the lever arm $e_{F2/F3}$ above the foundation |
| F_4 and F_5 | horizontal force perpendicular to the side plates of the post base acting with the lever arm $e_{F4/F5}$ above the foundation |

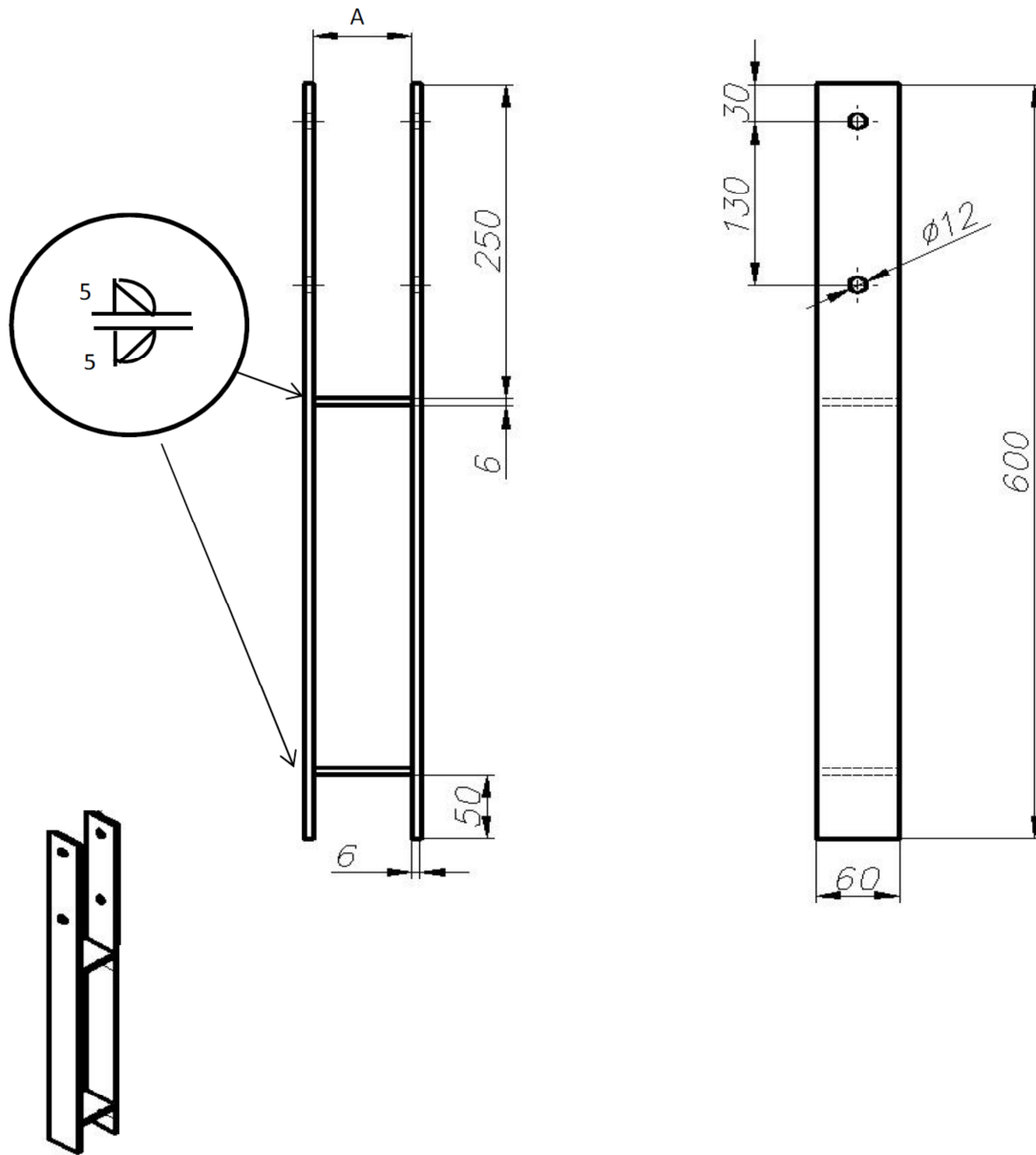
Combined forces

If the forces F_1 and F_2/F_3 or F_4/F_5 act at the same time, the following inequality shall be fulfilled:

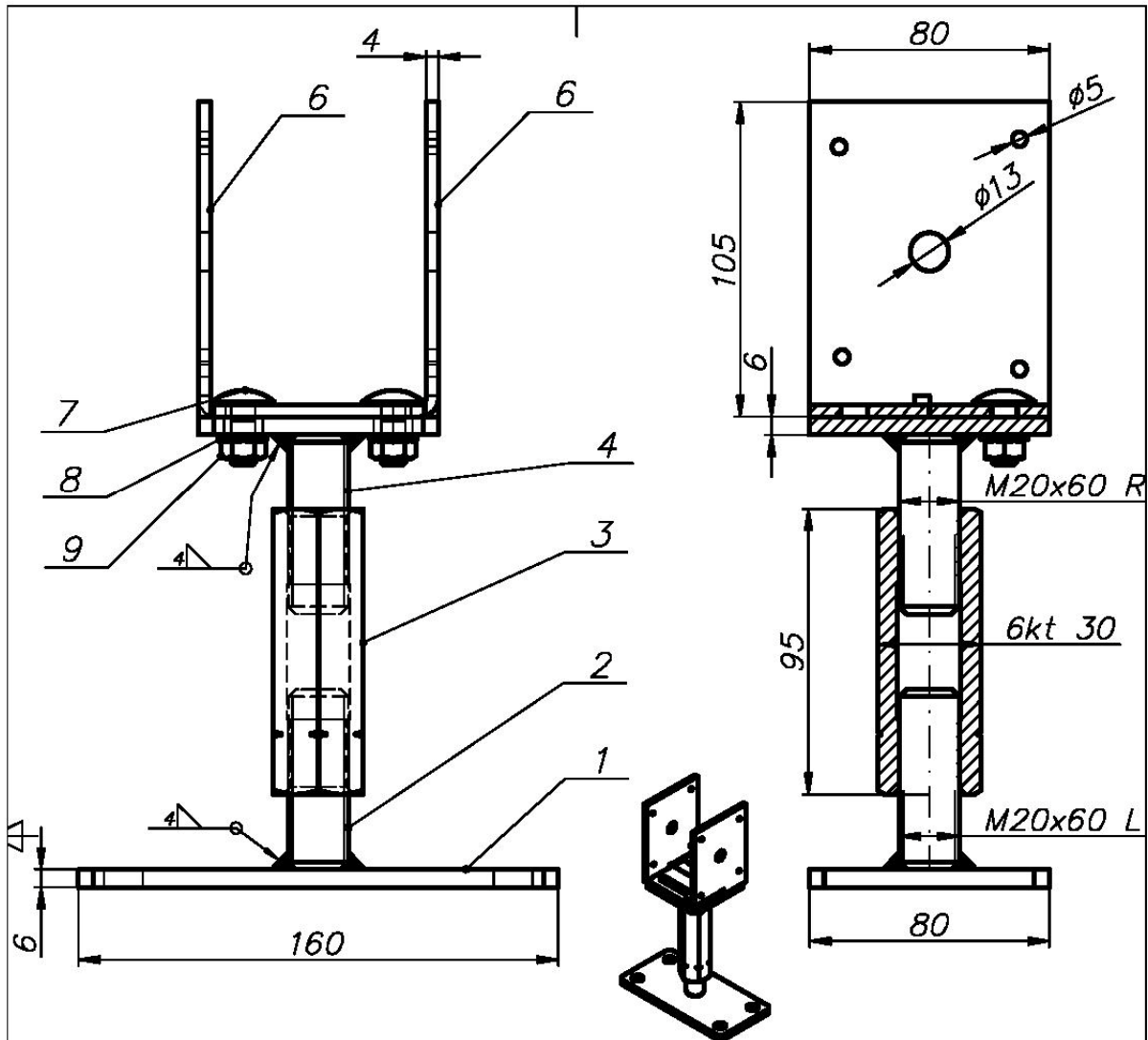
$$\sum \frac{F_{i,d}}{R_{i,d}} \leq 1$$

The forces F_2 and F_3 or F_4 and F_5 are forces with opposite direction. Therefore only one force F_2 or F_3 , and F_4 or F_5 , respectively, is able to act simultaneously with F_1 .

Zeichnung Pfostenträger Typ:H

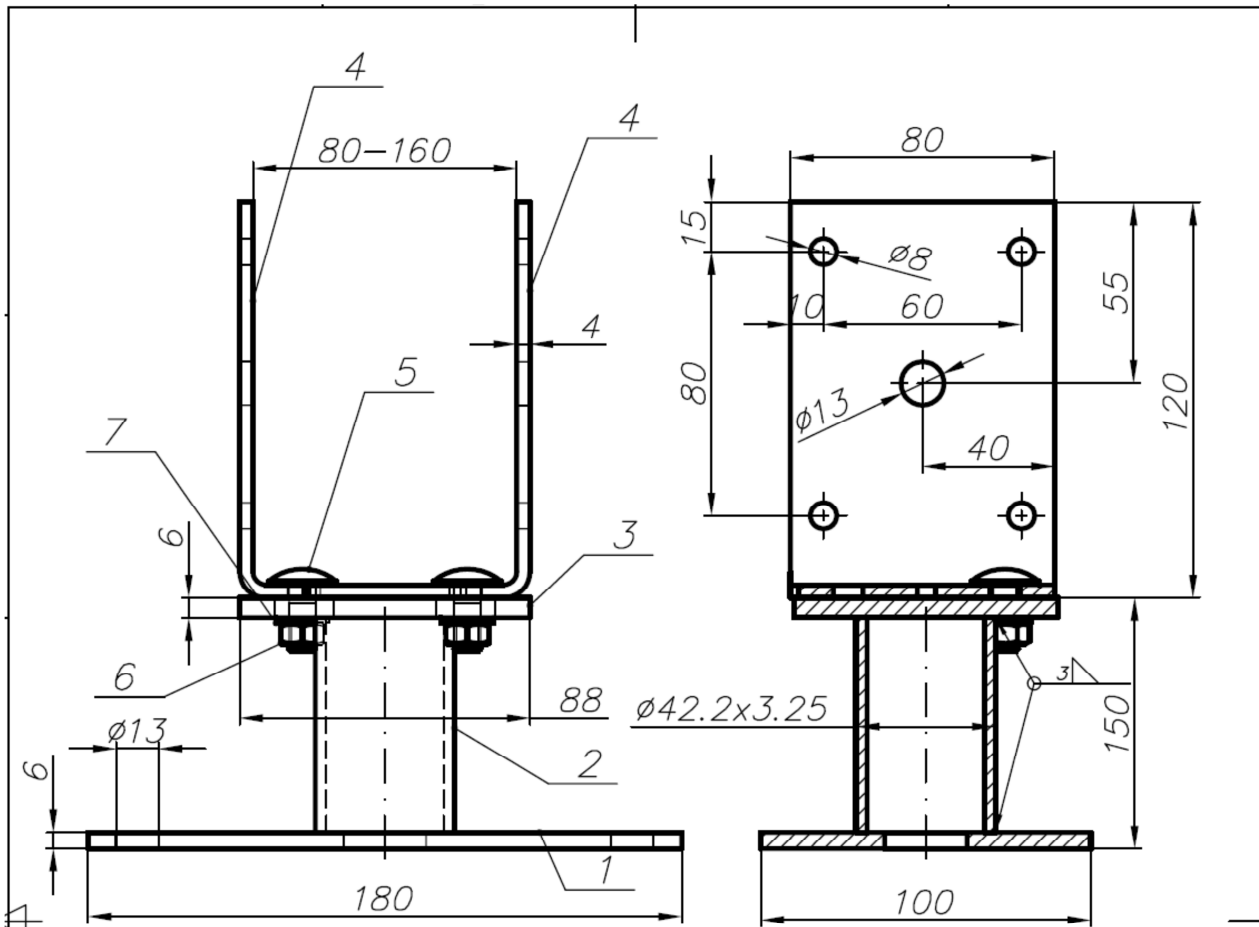


| | | | |
|---------------------------------------|-------|---|-------------------|
| Gutzeit Verbindungssysteme GmbH & Co. | | Zeichnungsnummer: 89900-89905 | |
| Rudolf Diesel Str.1 | | Material: S235JR / EN10025: 2004 | |
| 58730 Fröndenberg | | Korrosionsschutz: 55µm gemäß DIN EN1461 | |
| Tele: 02373-979265 | | Bearbeiter: Hr.Tewes | Datum: 14.06.2013 |
| | 89900 | A = | 71 mm |
| | 89901 | A = | 81 mm |
| | 89902 | A = | 91 mm |
| | 89903 | A = | 101 mm |
| | 89904 | A = | 121 mm |
| | 89905 | A = | 141 mm |



| | | | | | |
|------------------|------|---------------|------------------------|----------------|-------|
| 9 | 2 | DIN 555-5 | Mutter M8 | | |
| 8 | 2 | ISO 7093 | Schraube A8,4 | | |
| 7 | 2 | DIN 603 | Schraube M8x20 | | |
| 6 | 2 | 891051 / 6 | Winkel 105x75x4 | S235JR | |
| 5 | 1 | 891050 / 5 | Trageplatte 6x80x80 | S235JR | |
| 4 | 1 | DIN 976 | Gewindebolzen M20x60-R | S235JR+P+Mo+AR | |
| 3 | 1 | 891050 / 3 | Gewindehuse M20x95 | S235JR | |
| 2 | 1 | DIN 976 | Gewindebolzen M20x60-L | S235JR+P+Mo+AR | |
| 1 | 1 | 891050 / 1 | Grundplatte 6x80x160 | S235JR | |
| Poz. | Szt. | Nr. rys./Ozn. | Nazwa | Materiał | Uwagi |
| Lista elementow | | | | | |

| | | | | | |
|-----------------------------|----------|--------------------|-----------------------|--------------------|---------------|
| Poz. | Ilość: 1 | Materiał: | Ciężar: | | |
| Projektował M. Mielcarek | Zmienił | Zatwierdził - data | Plik GUTZEIT | Data 31/07/2013 | Skala |
| Lakfam | | | 891051 - PF-TU | | |
| | | | 891051 | Edycja 0 | Arkusz 1/1 |

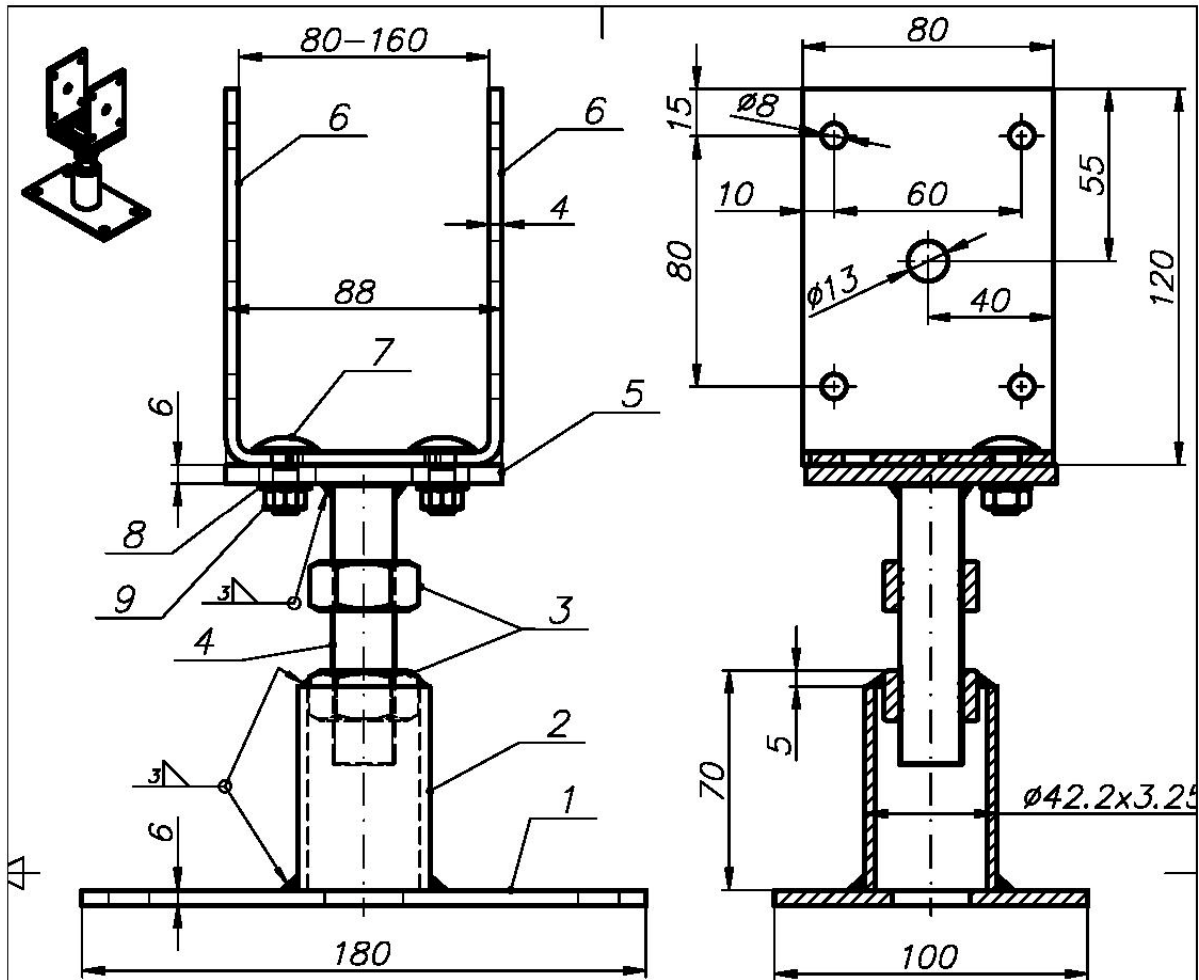


| | | | | | |
|---|---|------------|-----------------------|--------|--|
| 6 | 2 | DIN 555-5 | Mutter M8 | | |
| 7 | 2 | DIN 125 | Scheibe A8,4 | | |
| 5 | 2 | DIN 603 | Schraube M8x20 | | |
| 4 | 2 | 89940 / 6 | Winkel 120x67x4 | S235JR | |
| 3 | 1 | 89940 / 5 | Trageplatte 6x80x8 | S235JR | |
| 2 | 1 | 891150 / 2 | Rohr 42,2x3,25 L=139 | S235JR | |
| 1 | 1 | 89940 / 1 | Grundplatte 6x100x180 | S235JR | |

| Poz. | Szt. | Nr. rys./Ozn. | Nazwa | Materiał | Uwagi |
|------|------|---------------|-------|----------|-------|
|------|------|---------------|-------|----------|-------|

Lista elementow

| | | | | | | |
|-----------------------------|----------|--------------------|--|-----------------|--------------------|---------------|
| Poz. | Ilość: 1 | Materiał: | | | Ciężar: | |
| Projektował M. Mielcarek | Zmienił | Zatwierdził - data | | Plik Gutzeit | Data 31/07/2013 | Skala |
| Lakfam | | | | 891150 | | |
| | | | | 891150 | Edycja 0 | Arkusz 1/1 |

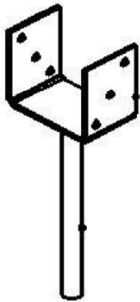
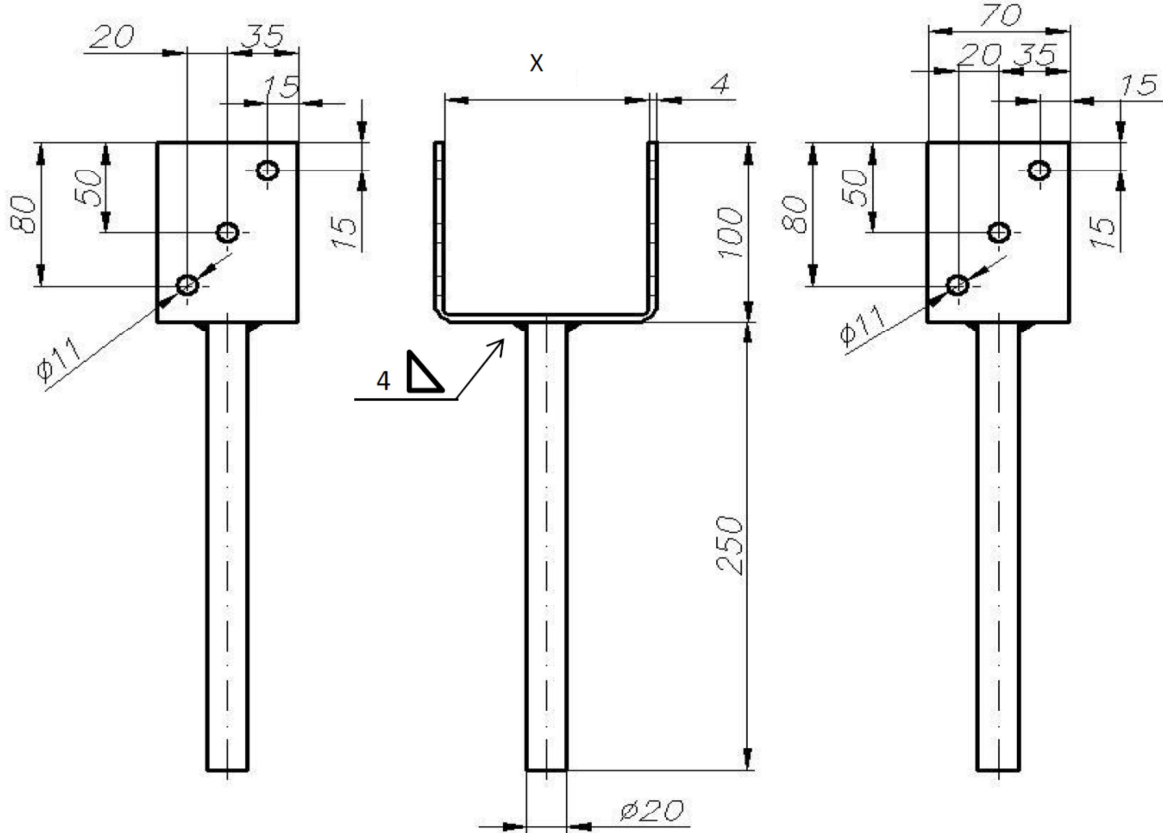


| | | | | | |
|------|------|---------------|-----------------------|----------------|-------|
| 9 | 2 | DIN 555-5 | Mutter M8 | | |
| 8 | 2 | DIN 125 | Schelbe A8,4 | | |
| 7 | 2 | DIN 603 | Schraube M8x20 | | |
| 6 | 2 | 89940 / 6 | Winkel 120x67x4 | S235JR | |
| 5 | 1 | 89940 / 5 | Trageplatte 6x80x88 | S235JR | |
| 4 | 1 | DIN 976 | Gewindebolzen M20x90 | S235JR+P+Mo+AR | |
| 3 | 2 | DIN 555-5 | Mutter M20 | | |
| 2 | 1 | 89940 / 2 | Rohr 42,2x3,25 L=65 | S235JR | |
| 1 | 1 | 89940 / 1 | Grundplatte 6x100x180 | S235JR | |
| Poz. | Szt. | Nr. rys./Ozn. | Nazwa | Materiał | Uwagi |

Lista elementow

| | | | | | |
|-----------------------------|----------|--------------------|-----------------|--------------------|---------------|
| Poz. | Ilość: 1 | Materiał: | Ciężar: | | |
| Projektował M. Mielcarek | Zmienił | Zatwierdził - data | Plik GUTZEIT | Data 31/07/2013 | Skala |
| Lakfam | | | 89940 | | |
| | | | 89940 | Edycja 0 | Arkusz 1/1 |

Zeichnung Pfostenträger Typ:U



Gutzeit Verbindungssysteme GmbH & Co.

Rudolf Diesel Str.1

58730 Fröndenberg

Tele: 02373-979265

Zeichnungsnummer:

89820-89825

Material:

S235JR / EN10025: 2004

Korrosionsschutz: 55µm gemäß DIN EN1461

Bearbeiter: Hr.Tewes

Datum: 14.06.2013

89820

X =

71 mm

89821

X =

81 mm

89822

X =

91 mm

89823

X =

101 mm

89824

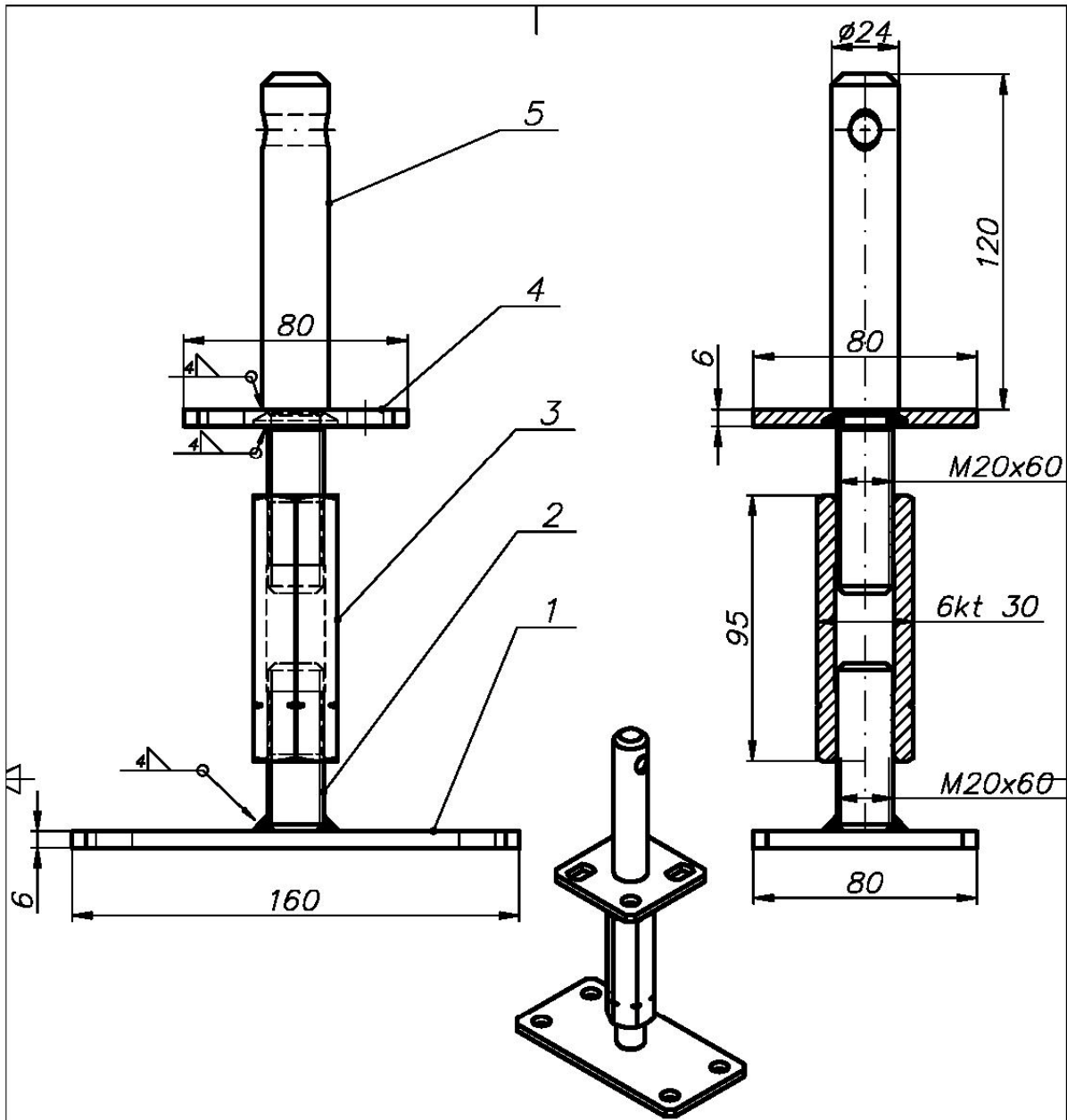
X =

121 mm

89825

X =

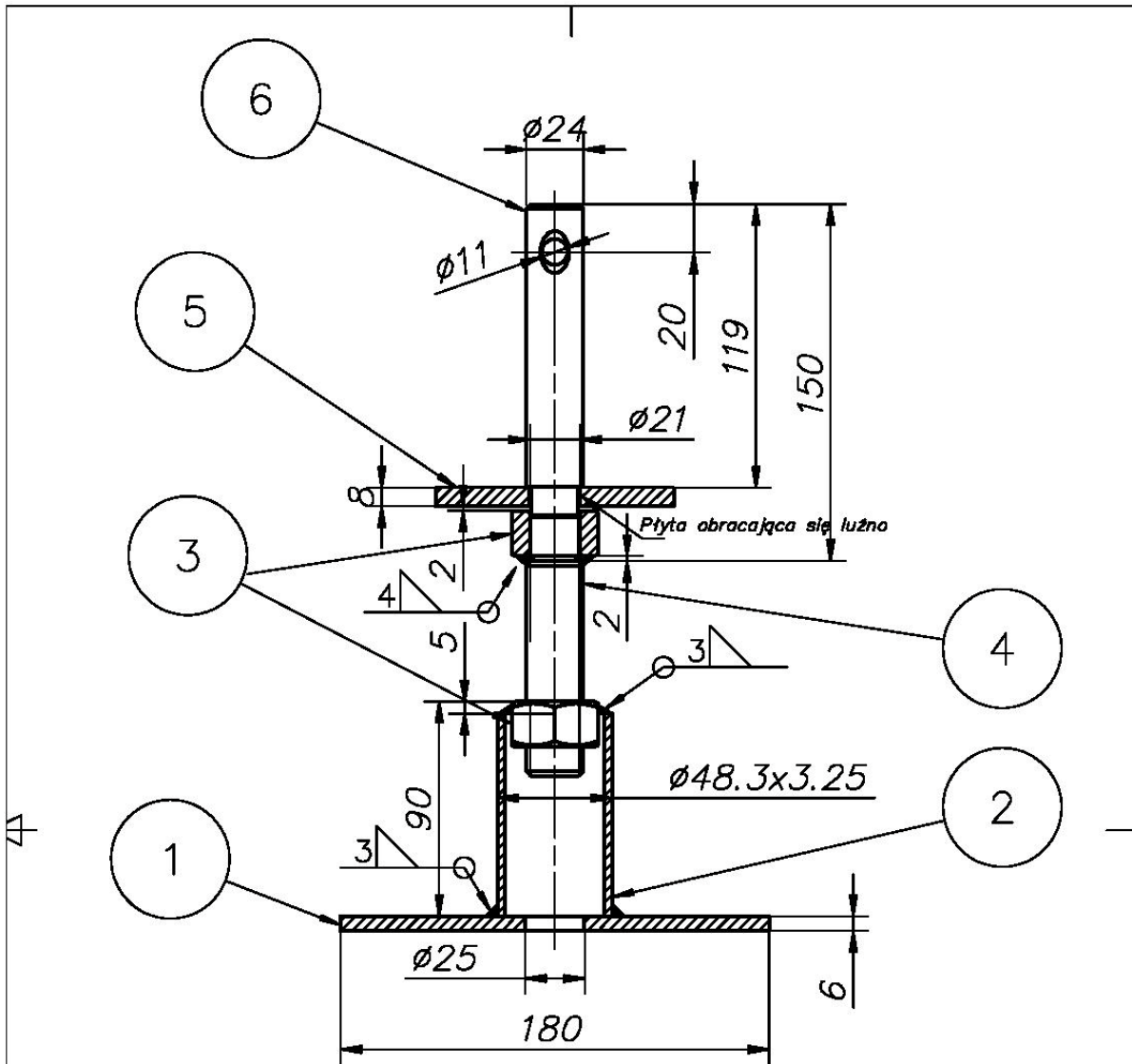
141 mm



| | | | | | |
|------|------|---------------|------------------------|----------------|-------|
| 5 | 1 | 891053 / 5 | Bolzen 24x186 | S235JR | |
| 4 | 1 | 891053 / 4 | Trägerplatte 6x80x80 | S235JR | |
| 3 | 1 | 891050 / 3 | Gewindehülse M20x95 | S235JR | |
| 2 | 1 | DIN 976 | Gewindebolzen M20x60 L | S235JR+P+Mo+AR | |
| 1 | 1 | 891050 / 1 | Grundplatte 6x80x160 | S235JR | |
| Poz. | Szt. | Nr. rys./Ozn. | Nazwa | Materiał | Uwagi |

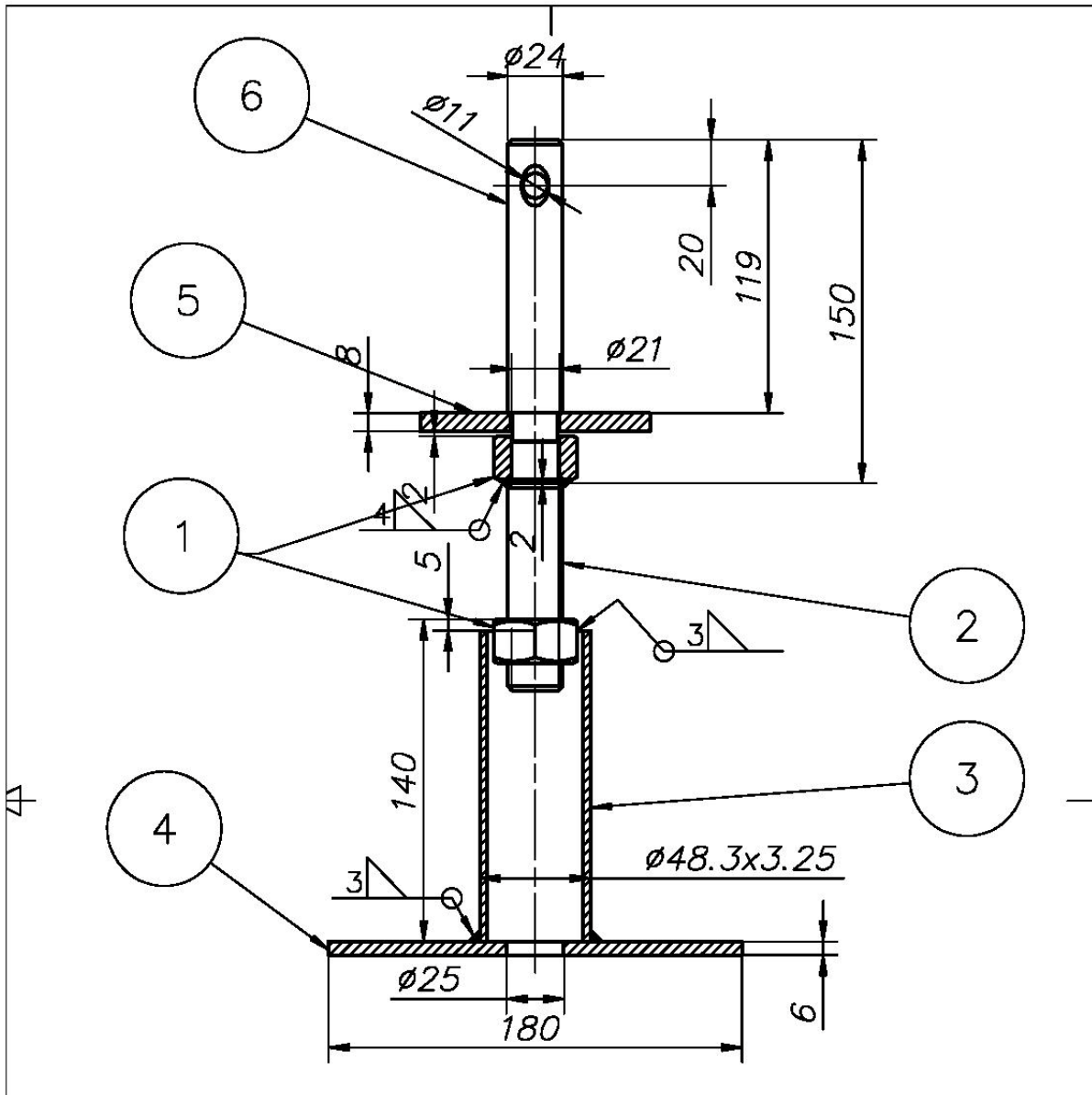
Lista elementów

| Poz. | Ilość / | Materiał: | Ciężar: | | |
|-----------------------------|---------|--------------------|-----------------------|--------------------|---------------|
| Projektował M. Mielcarek | Zmienił | Zatwierdził – data | Plik GUTZEIT | Data 31/07/2013 | Skala |
| Lakfam | | | 891053 – PF-TZ | | |
| | | | 891053 | Edycja 0 | Arkusz 1/1 |



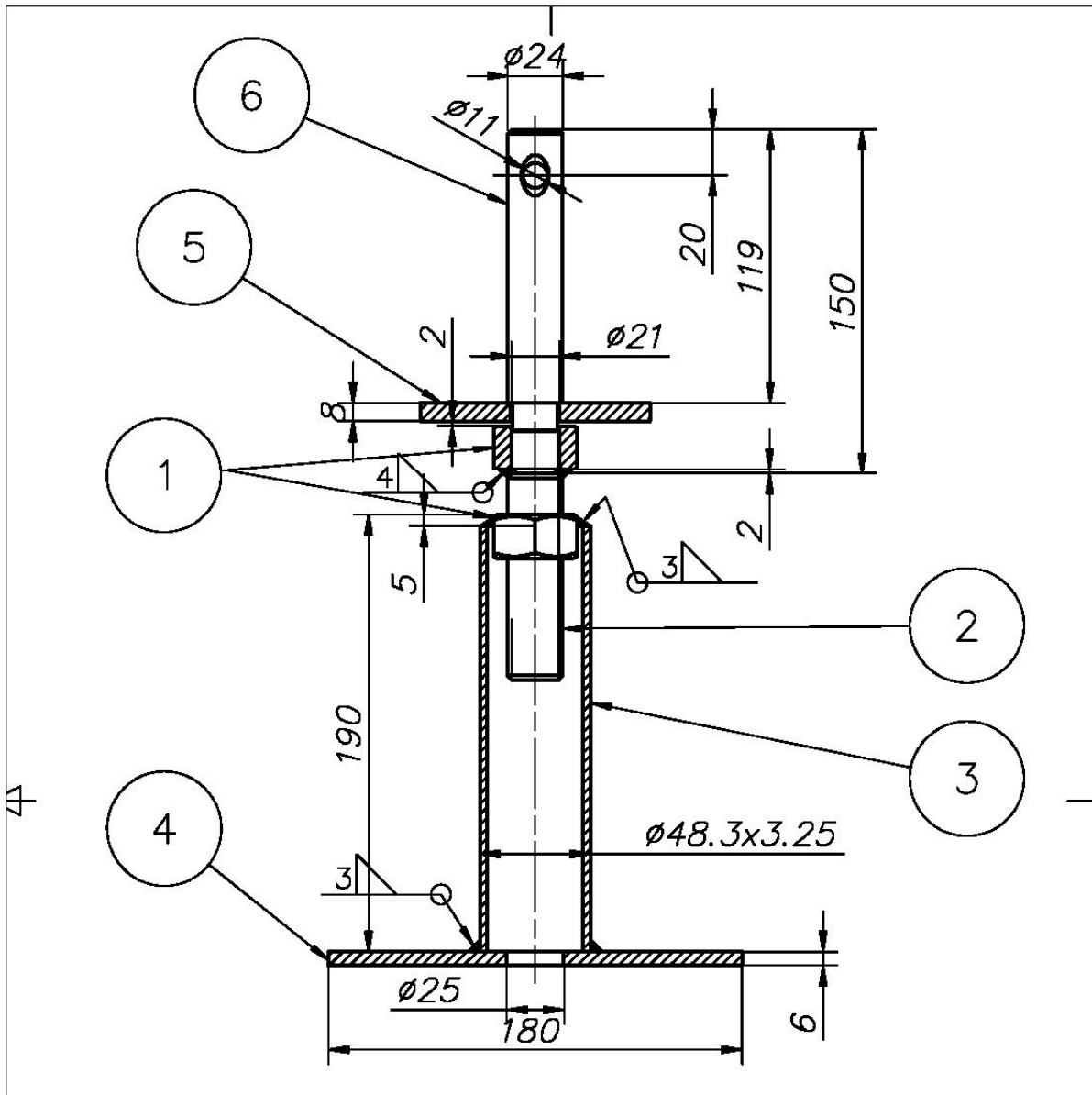
| 6 | 1 | 891127 / 6 | Bolzen 24x150 | S235JR |
|----|-------|------------|-----------------------|----------------|
| 5 | 1 | 891127 / 5 | Trägeplatte 8x100x100 | S235JR |
| 4 | 1 | DIN 976 | Gewindebolzen M24x90 | S235JR+P+Mo+AR |
| 3 | 2 | DIN 934 | Mutter M24 | |
| 2 | 1 | 891127 / 2 | Rohr 48,3x3,25 L=85 | S235JR |
| 1 | 1 | 891127 / 1 | Grundplatte 6x100x180 | S235JR |
| Nr | Ilość | Opis | Norma | Materiał |

| | | | | |
|------------------------------------|---------|--------------------|------------------------|---------------------------|
| Poz. | Ilość: | Materiał: | Ciężar: | |
| Projektował <i>M. Mielcarek</i> | Zmienił | Zatwierdził – data | Plik <i>Gutzeit</i> | Data <i>31/07/2013</i> |
| Lakfam | | | 891127 | |
| | | | 891127 | Edycja <i>0</i> |
| | | | Arkusz <i>1/1</i> | |



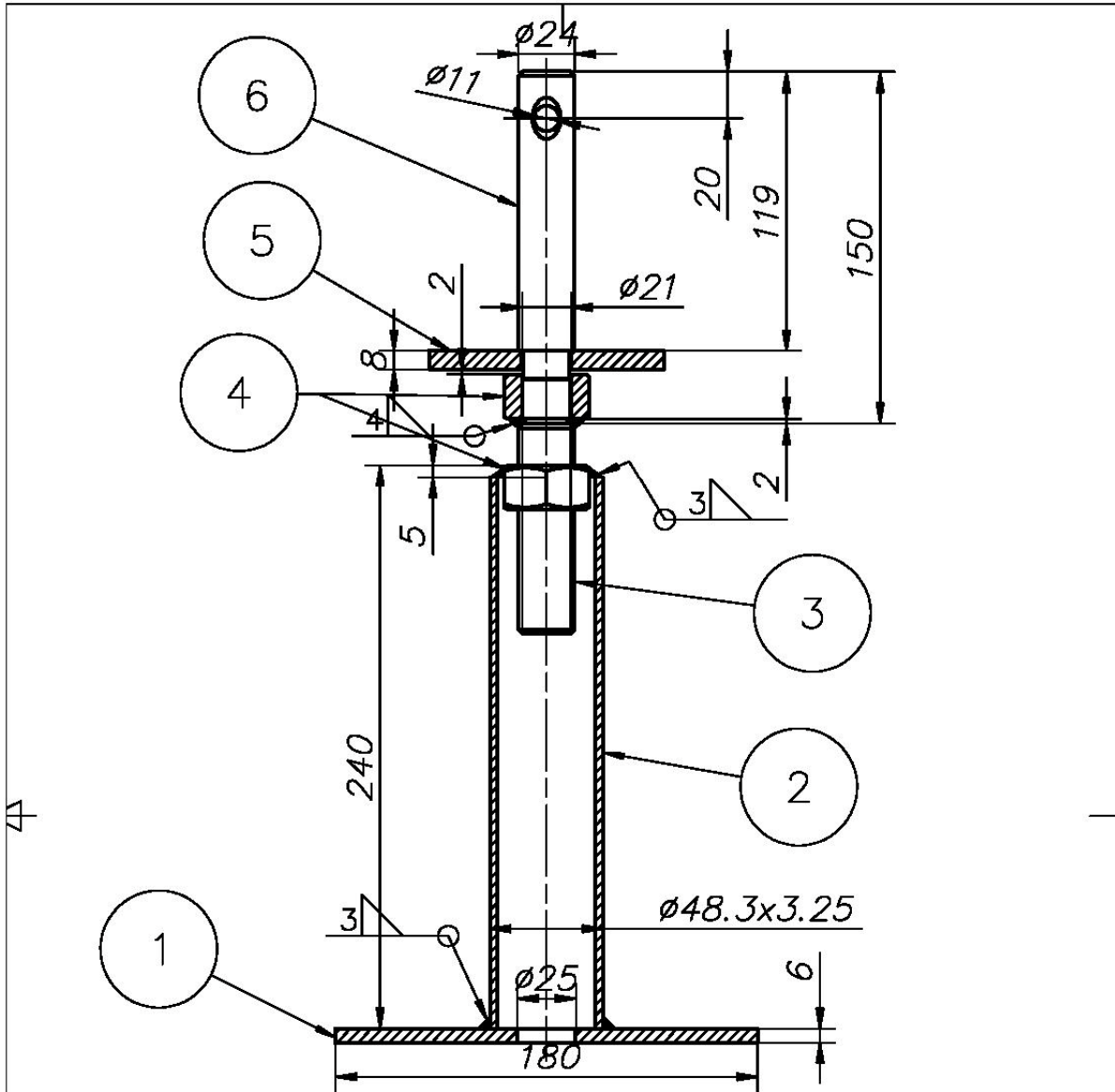
| 6 | 1 | 891127 / 6 | Bolzen 24x150 | S235JR |
|----|-------|------------|-----------------------|----------------|
| 5 | 1 | 891127 / 5 | Trägeplatte 8x100x100 | S235JR |
| 4 | 1 | DIN 976 | Gewindebolzen M24x90 | S235JR+P+Mo+AR |
| 3 | 1 | DIN 934 | Mutter M24 | |
| 2 | 1 | 891128 / 2 | Rohr 48,3x3,25 L=135 | S235JR |
| 1 | 2 | 891127 / 1 | Grundplatte 6x100x180 | S235JR |
| Nr | Ilość | Opis | Norma | Materiał |

| | | | | | |
|----------------------------|---------|--------------------|-----------------|--------------------|---------------|
| Poz. | Ilość: | Materiał: | Ciężar: | | |
| Projektował M.Mielcarek | Zmienił | Zatwierdził – data | Plik GUTZEIT | Data 31/07/2013 | Skala |
| Lakfam | | | 891128 | | |
| | | | 891128 | Edycja 0 | Arkusz 1/1 |



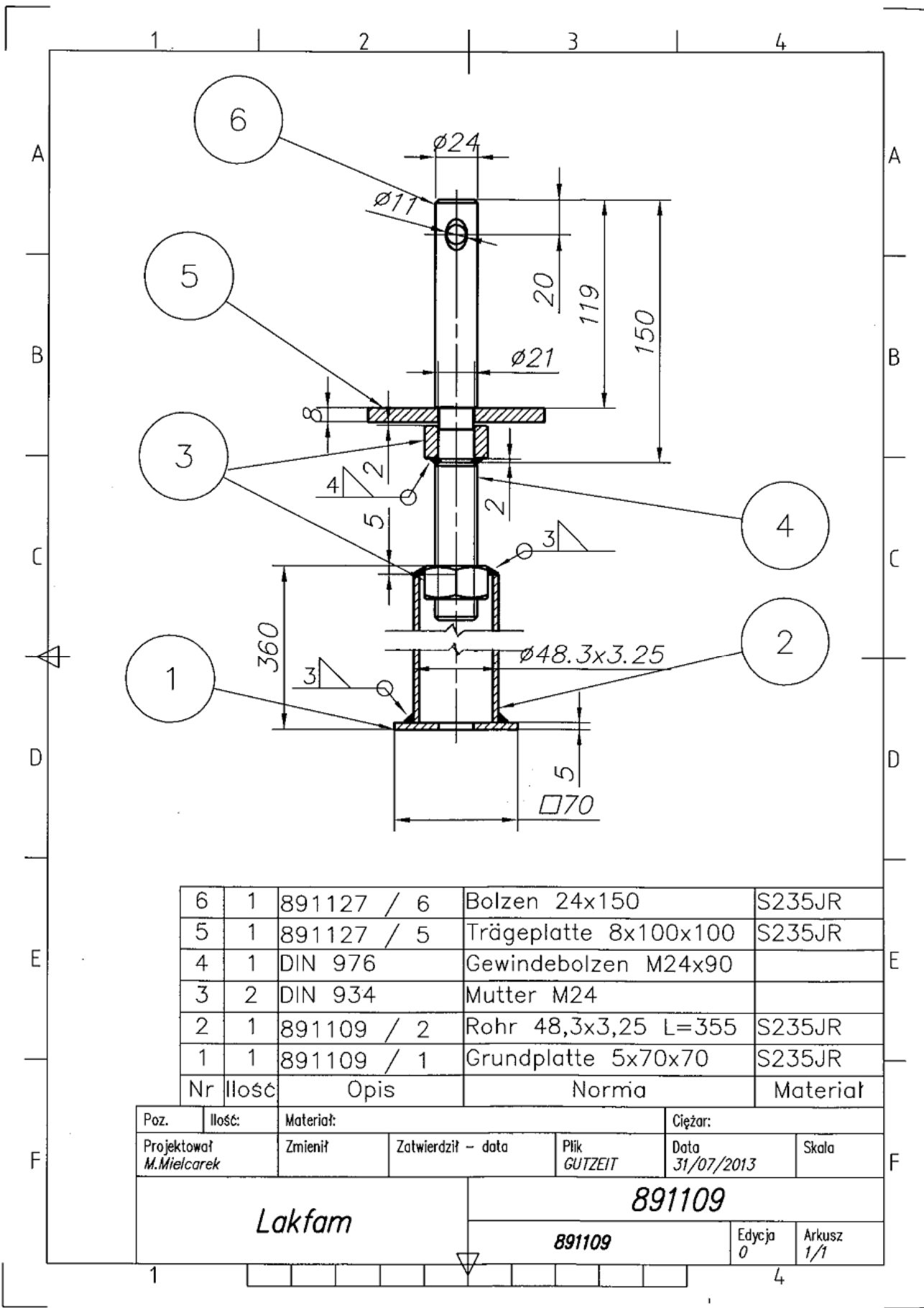
| 6 | 1 | 891127 / 6 | Bolzen 24x150 | S235JR |
|----|-------|------------|------------------------|----------------|
| 5 | 1 | 891127 / 5 | Trägerplatte 8x100x100 | S235JR |
| 4 | 1 | DIN 976 | Gewindebolzen M24x90 | S235JR+P+Mo+AR |
| 3 | 1 | DIN 934 | Mutter M24 | |
| 2 | 1 | 891129 / 2 | Rohr 48,3x3,25 L=185 | S235JR |
| 1 | 2 | 891127 / 1 | Grundplatte 6x100x180 | S235JR |
| Nr | Ilość | Opis | Norma | Materiał |

| | | | | | | | |
|----------------------------|--|---------|--|--------------------|--|-----------------|---------------|
| Poz. | | Ilość: | | Materiał: | | Ciężar: | |
| Projektował M.Mielcarek | | Zmienił | | Zatwierdził – data | | Plik GUTZEIT | |
| | | | | Data 31/07/2013 | | Skala | |
| Lakfam | | | | 891129 | | | |
| | | | | 891129 | | Edycja 0 | Arkusz 1/1 |



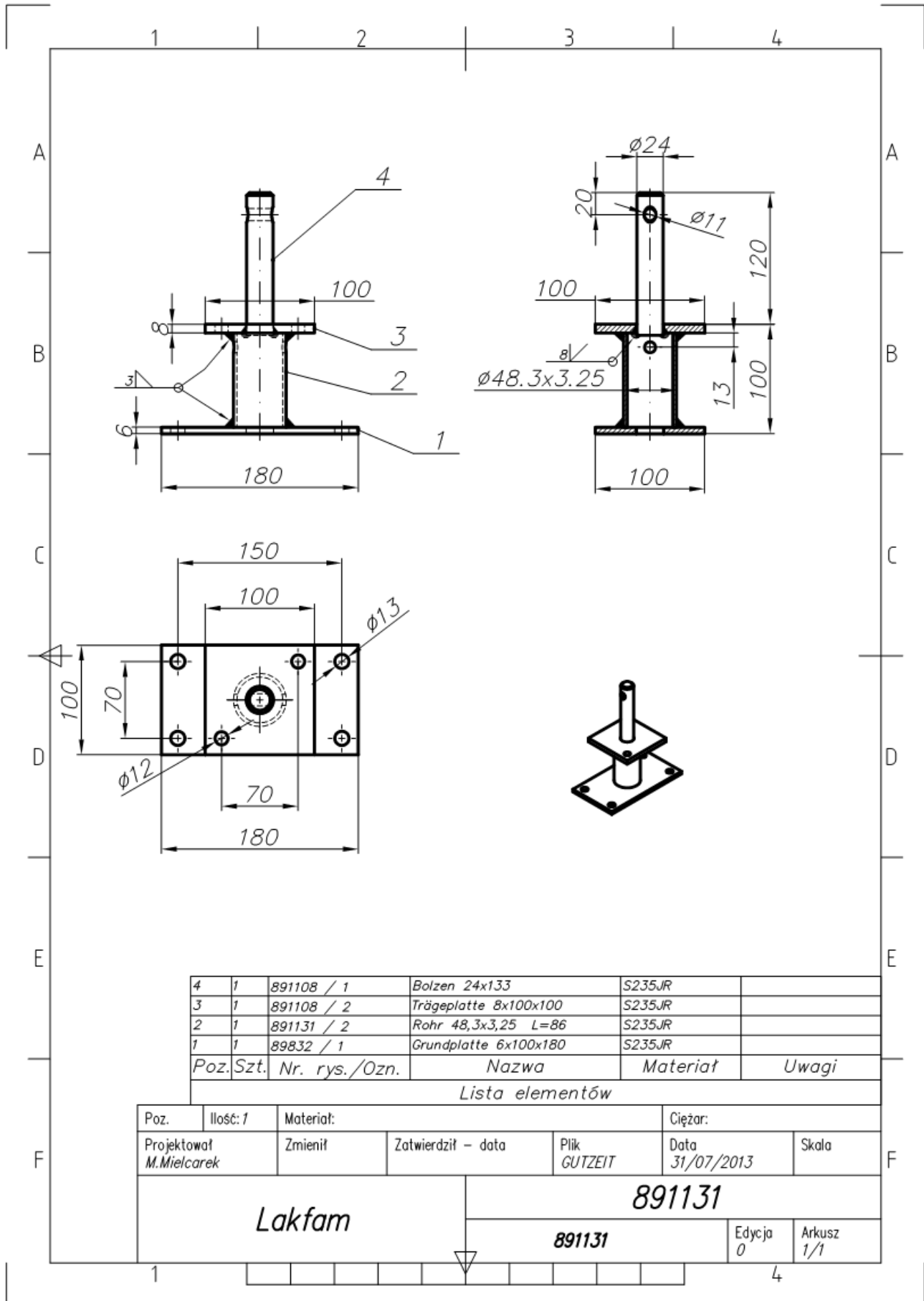
| | | | | |
|----|-------|------------|------------------------|----------|
| 6 | 1 | 891127 / 6 | Bolzen 24x150 | S235JR |
| 5 | 1 | 891127 / 5 | Trägerplatte 8x100x100 | S235JR |
| 4 | 2 | DIN 934 | Mutter M24 | |
| 3 | 1 | DIN 976 | Gewindebolzen M24x90 | S235JR+C |
| 2 | 1 | 891130 / 2 | Rohr 48,3x3,25 L=235 | S235JR |
| 1 | 1 | 891127 / 1 | Grundplatte 6x100x180 | S235JR |
| Nr | Ilość | Opis | Norma | Materiał |

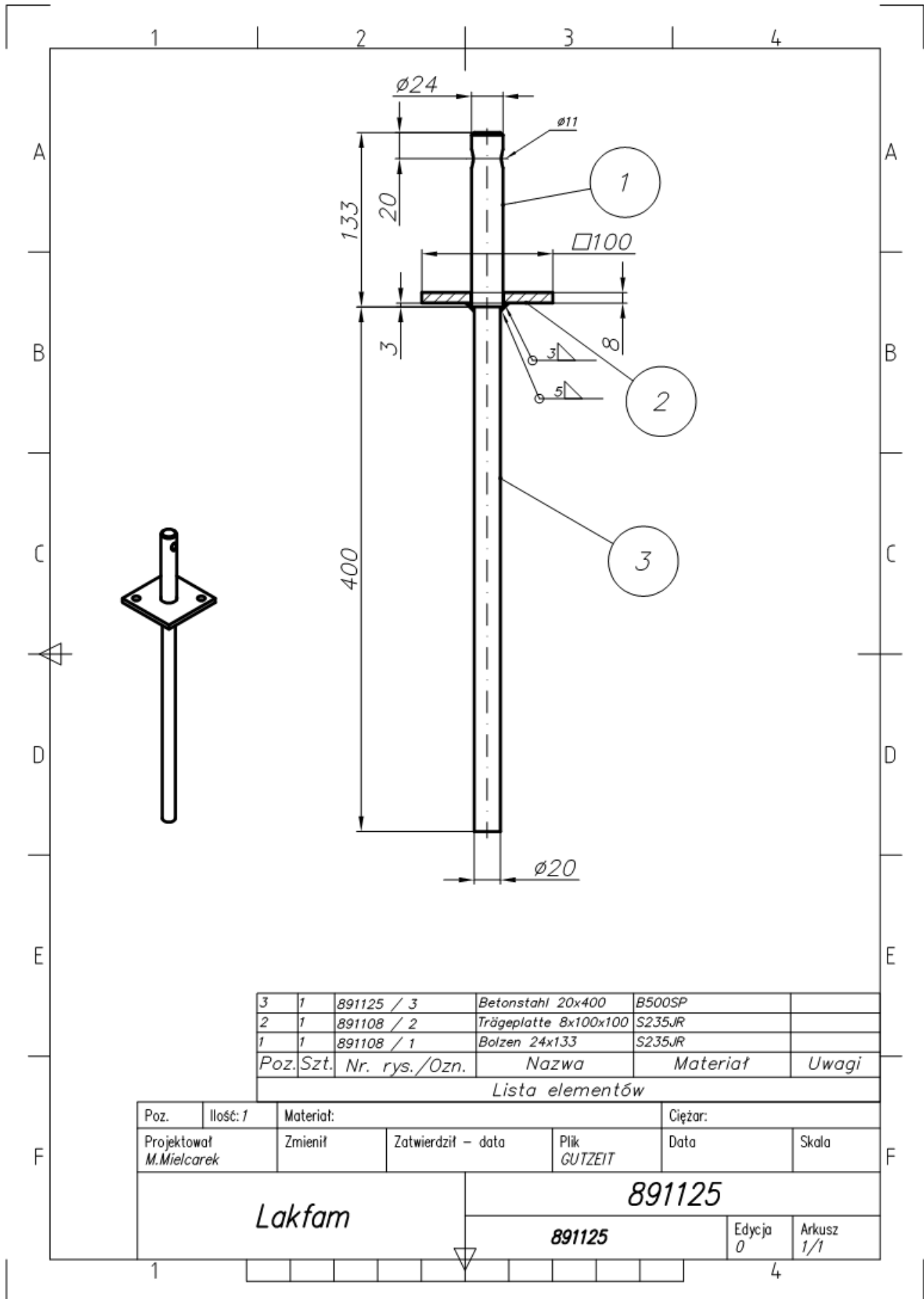
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|----------------------------|---------|--------------------|-----------------|--------------------|
| Poz. | Ilość: | Materiał: | Ciężar: | |
| Projektował M.Mielcarek | Zmienił | Zatwierdził – data | Plik GUTZEIT | Data 31/07/2013 |
| Lakfam | | | 891130 | |
| | | | 891130 | Edycja 0 |
| | | | Arkusz 1/1 | |



| | | | | | |
|----|-------|------------|-----------------------|--------|----------|
| 6 | 1 | 891127 / 6 | Bolzen 24x150 | S235JR | |
| 5 | 1 | 891127 / 5 | Trägeplatte 8x100x100 | S235JR | |
| 4 | 1 | DIN 976 | Gewindebolzen M24x90 | | |
| 3 | 2 | DIN 934 | Mutter M24 | | |
| 2 | 1 | 891109 / 2 | Rohr 48,3x3,25 L=355 | S235JR | |
| 1 | 1 | 891109 / 1 | Grundplatte 5x70x70 | S235JR | |
| Nr | Ilość | Opis | | Normia | Materiał |

| | | | | | |
|------------------------------------|---------|--------------------|------------------------|---------------------------|----------------------|
| Poz. | Ilość: | Materiał: | | Ciężar: | |
| Projektował <i>M. Mielcarek</i> | Zmienił | Zatwierdził - data | Plik <i>GUTZEIT</i> | Data <i>31/07/2013</i> | Skala |
| Lakfam | | | 891109 | | |
| | | | 891109 | Edycja <i>0</i> | Arkusz <i>1/1</i> |

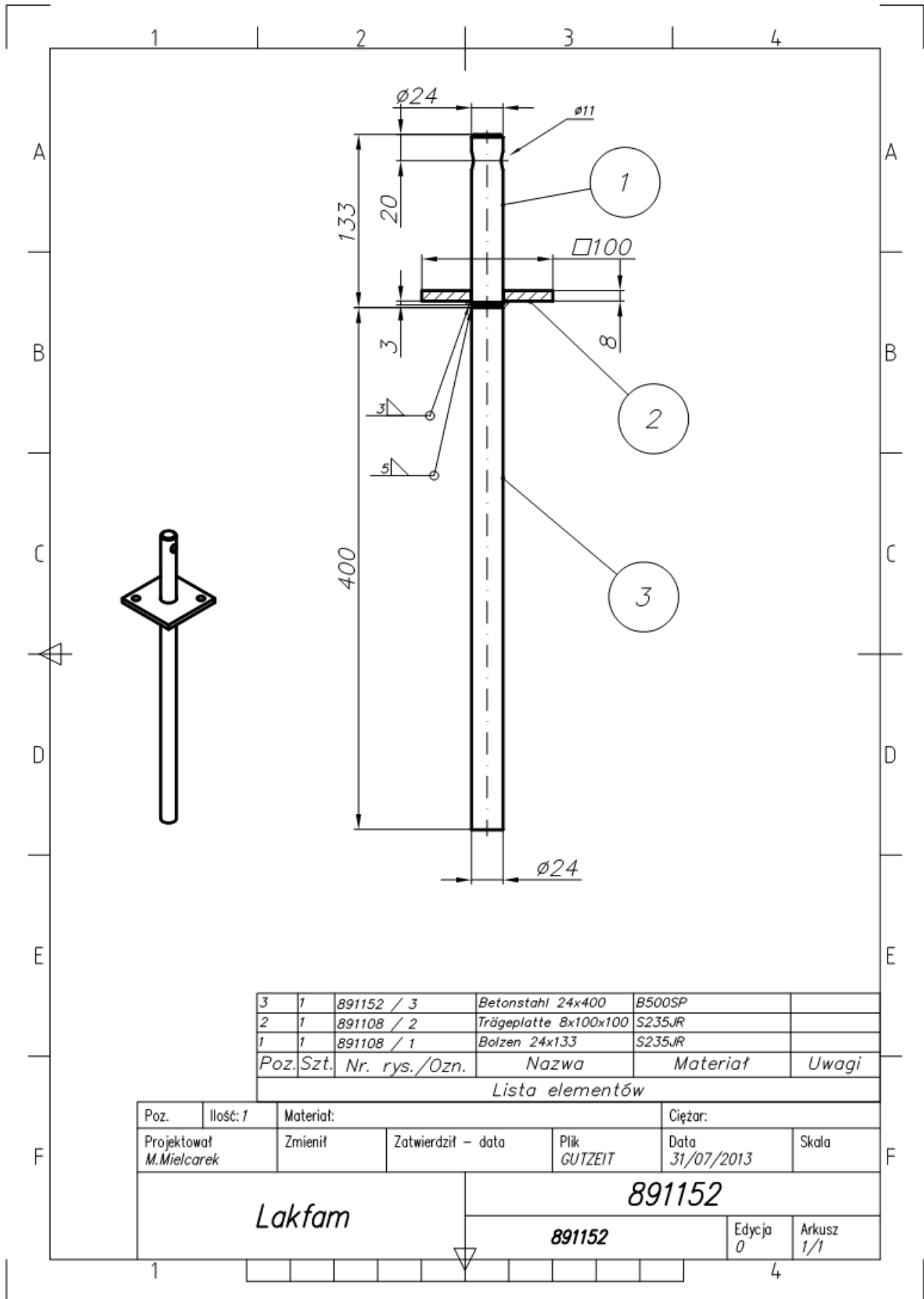


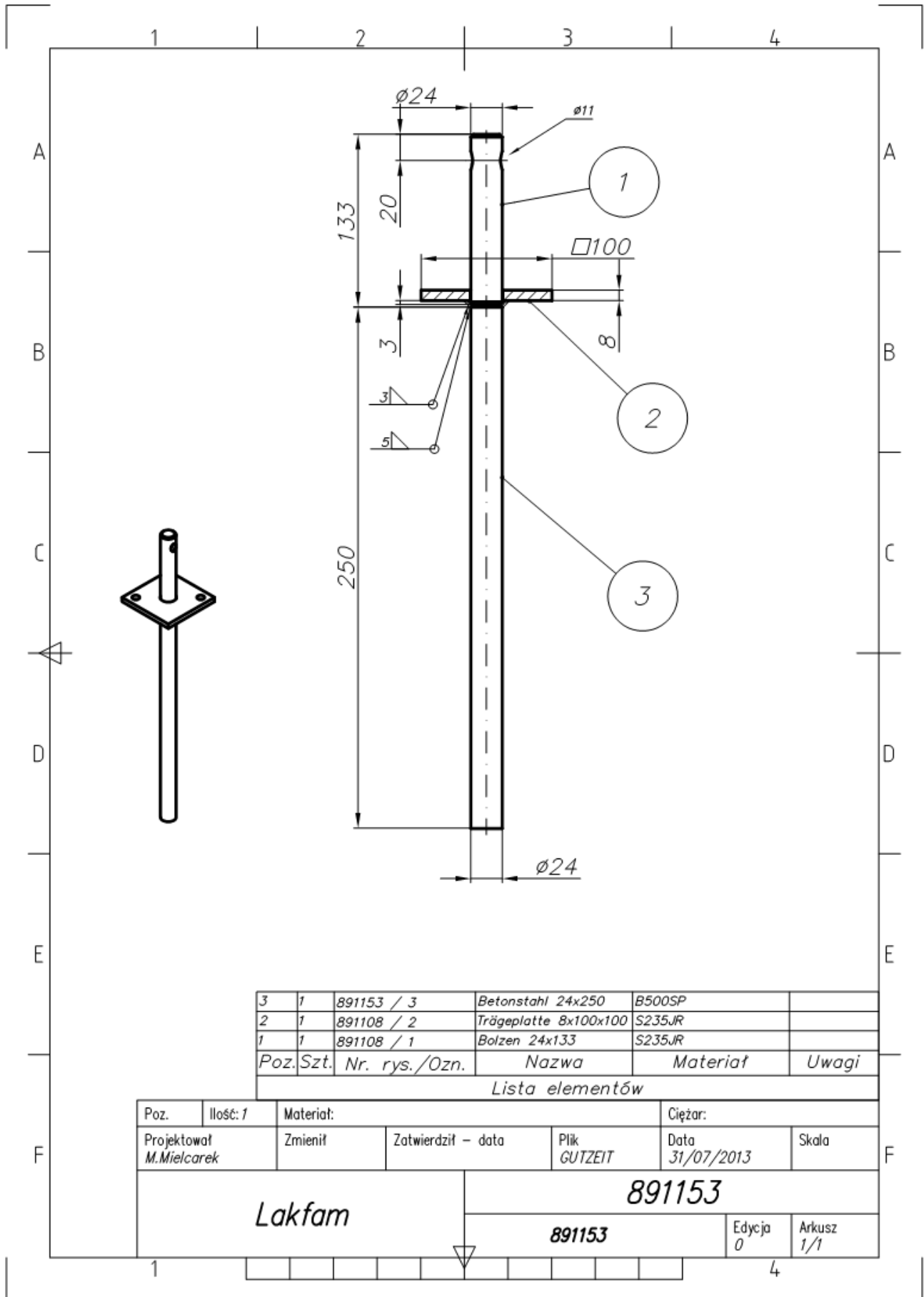


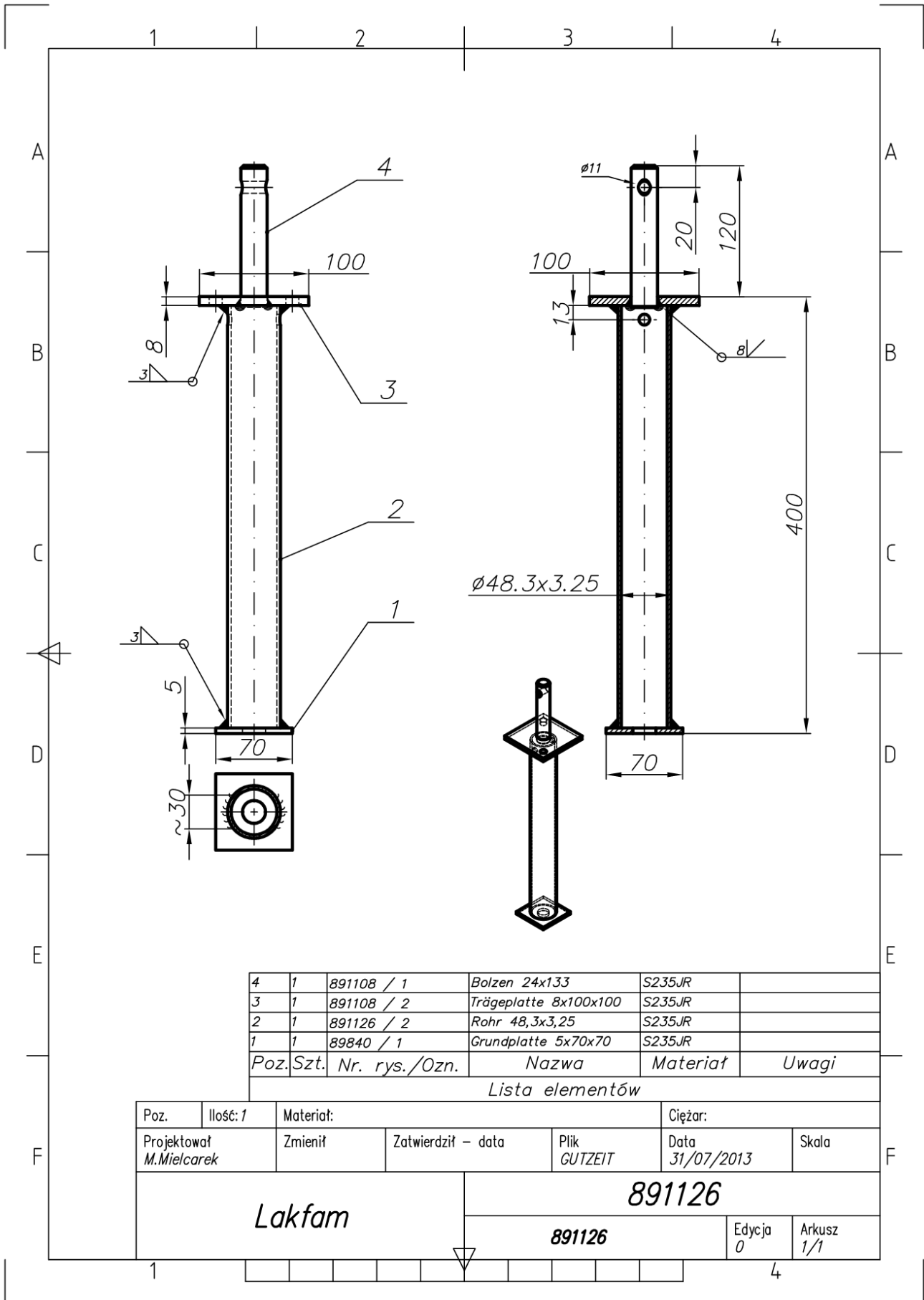
| | | | | | |
|------|------|---------------|------------------------|----------|-------|
| 3 | 1 | 891125 / 3 | Betonstahl 20x400 | B500SP | |
| 2 | 1 | 891108 / 2 | Trägerplatte 8x100x100 | S235JR | |
| 1 | 1 | 891108 / 1 | Bolzen 24x133 | S235JR | |
| Poz. | Szt. | Nr. rys./Ozn. | Nazwa | Materiał | Uwagi |

Lista elementów

| | | | | | | |
|----------------------------|----------|--------------------|--|-----------------|---------|-------------|
| Poz. | Ilość: 1 | Materiał: | | | Ciężar: | |
| Projektował M.Mielcarek | Zmienił | Zatwierdził - data | | Plik GUTZEIT | Data | Skala |
| Lakfam | | | | 891125 | | |
| | | | | 891125 | | Edycja 0 |

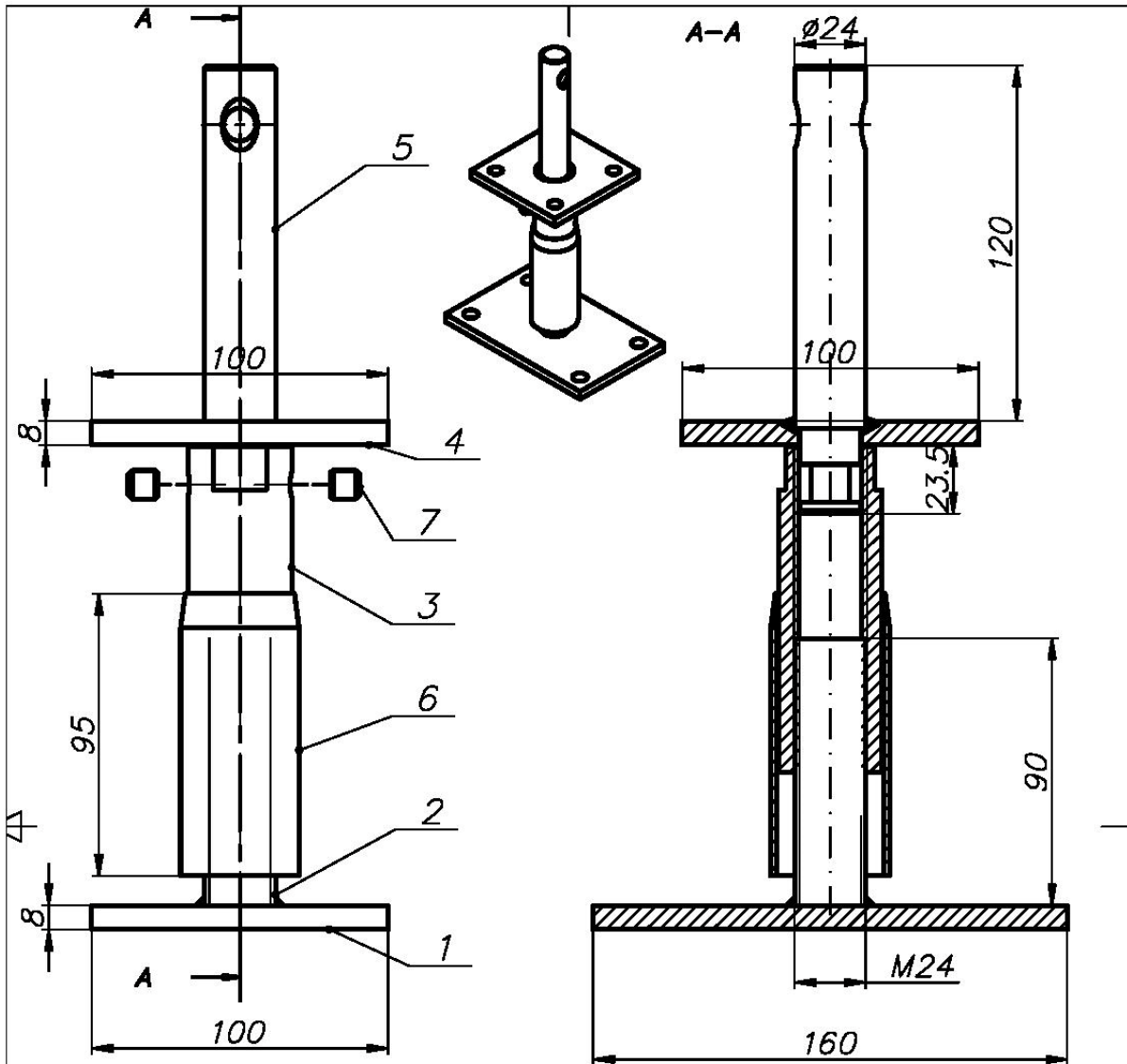






| | | | | | |
|-----------------|------|---------------|------------------------|----------|-------|
| 4 | 1 | 891108 / 1 | Bolzen 24x133 | S235JR | |
| 3 | 1 | 891108 / 2 | Trägerplatte 8x100x100 | S235JR | |
| 2 | 1 | 891126 / 2 | Rohr 48,3x3,25 | S235JR | |
| 1 | 1 | 89840 / 1 | Grundplatte 5x70x70 | S235JR | |
| Poz. | Szt. | Nr. rys./Ozn. | Nazwa | Materiał | Uwagi |
| Lista elementów | | | | | |

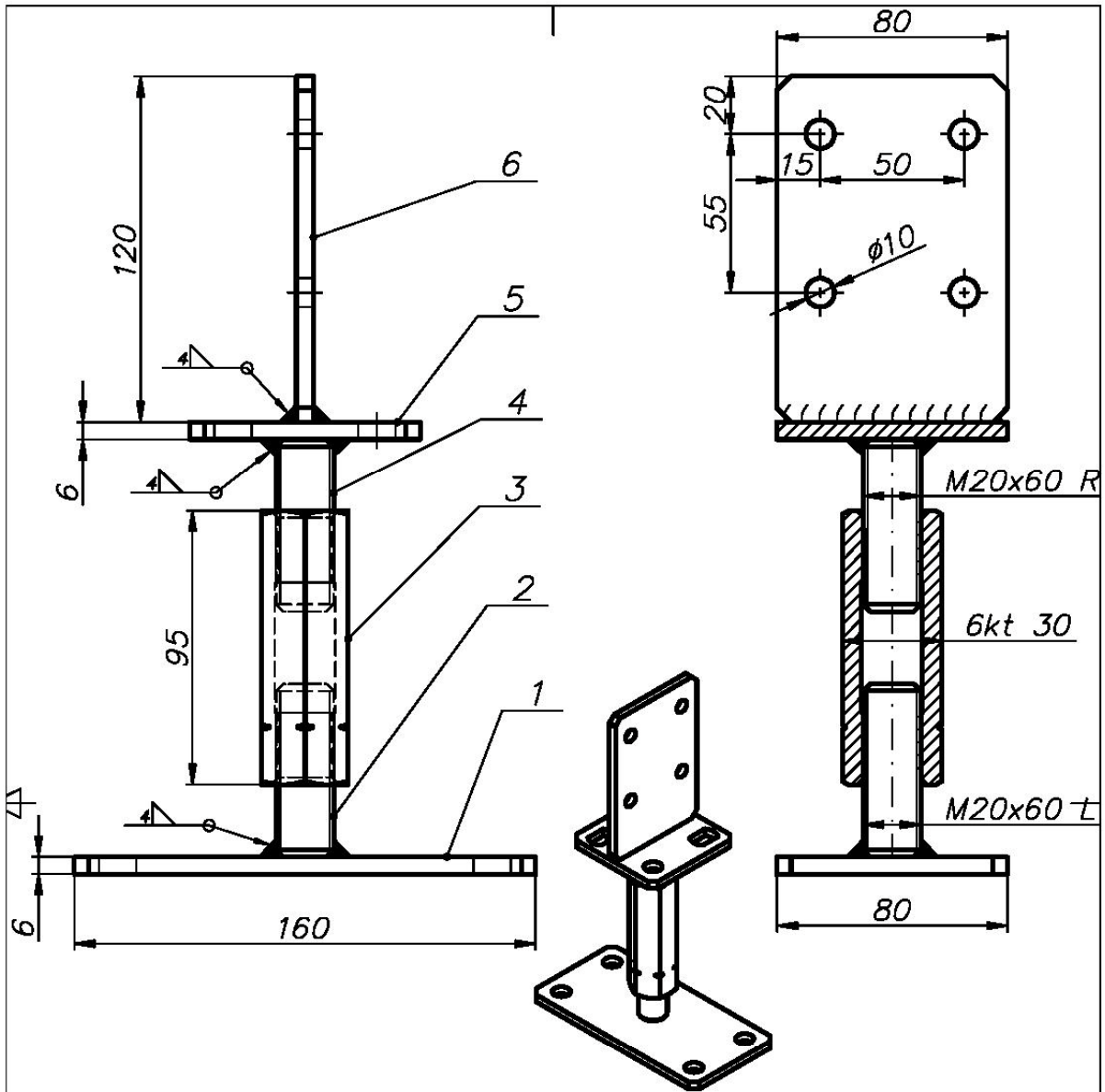
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|-----------------------------|----------|--------------------|-----------------|--------------------|---------------|--|
| Poz. | Ilość: 1 | Materiał: | | | Ciężar: | |
| Projektował M. Mielcarek | Zmienił | Zatwierdził - data | Plik GUTZEIT | Data 31/07/2013 | Skala | |
| Lakfam | | | 891126 | | | |
| 891126 | | | | Edycja 0 | Arkusz 1/1 | |



| | | | | | |
|------|------|---------------|------------------------|----------|-------|
| 7 | 2 | DIN 913 | Schraube M10x10 | | |
| 6 | 1 | 891198 / 6 | Rohr 40x2 L=95 | S235JR | |
| 5 | 1 | 891198 / 5 | Bolzen 24x152 | S235JR | |
| 4 | 1 | 891198 / 4 | Trägerplatte 8x100x100 | S235JR | |
| 3 | 1 | 891198 / 3 | Gewindehülse 35x110 | S235JR | |
| 2 | 1 | DIN 976 | Gewindebolzen M24x90 | S235JR+C | |
| 1 | 1 | 891198 / 1 | Grundplatte 8x100x160 | S235JR | |
| Poz. | Szt. | Nr. rys./Ozn. | Nazwa | Materiał | Uwagi |

Lista elementów

| | | | | |
|-----------------------------|----------|--------------------|-----------------|--------------------|
| Poz. | Ilość: / | Materiał: | Ciężar: | |
| Projektował M. Mielcarek | Zmienił | Zatwierdził – data | Plik GUTZEIT | Data 31/07/2013 |
| Lakfam | | | 891198, h=140 | |
| | | | 891198 | Edycja 0 |
| | | | Arkusz 1/1 | |



| | | | | | |
|------------------|------|---------------|------------------------|----------------|-------|
| 6 | 1 | 891052 / 6 | Steg 6x80x120 | S235JR | |
| 5 | 1 | 891050 / 5 | Trageplatte 6x80x80 | S235JR | |
| 4 | 1 | DIN 976 | Gewindebolzen M20x60 R | S235JR+P+Mo+AR | |
| 3 | 1 | 891050 / 3 | Gewindehulse M20x95 | S235JR | |
| 2 | 1 | DIN 976 | Gewindebolzen M20x60 L | S235JR+P+Mo+AR | |
| 1 | 1 | 891050 / 1 | Grundplatte 6x80x160 | S235JR | |
| Poz. | Szt. | Nr. rys./Ozn. | Nazwa | Materiał | Uwagi |
| Lista elementow | | | | | |

| Poz. | Ilość: / | Materiał: | Ciężar: | |
|-----------------------------|----------|--------------------|-----------------------|--------------------|
| Projektował M. Mielcarek | Zmienił | Zatwierdził – data | Plik GUTZEIT | Data 31/07/2013 |
| Lakfam | | | 891052 – PF–TS | |
| | | | 891052 | Edycja 0 |

