Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment

ETA 22/0260
of 07/11/2023

English translation prepared by IETcc. Original version in Spanish language

General Part

Technical Assessment Body issuing the European Technical Assessment: Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)	
Trade name of the construction Product:	DIBU PILE JOINT & DIBU ROCK SHOE
Product family to which the construction product belongs:	Pile Joints and Rock shoes for concrete piles (PAC 12)
Manufacturer:	DIBU S.L. C/ Berlín, 73, Parla, Madrid (Spain) www.dibusl.com
Manufacturing plant(s):	DIBU S.L. C/ Berlín, 73, Parla, Madrid (Spain)
This European Technical Assessment contains:	11 pages including 1 Annex which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	European Assessment Document (EAD) 200014-01-0103 - Pile joints and rock shoes for concrete piles

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Table of contents

Specific parts

1. Technical description of the product

DIBU Pile Joints & DIBU Rock Shoe is a system to produce long piles joining standard precast reinforced concrete segment of piles. It is used to join segment of piles with square sections of sizes from 200 x 200 to 450 x 450 mm (see Annex 1). DIBU Pile Joints connects two segments of pile in such a way that the device is capable to center the segments and transmit bending moments when the pile is being driven into the bedrock/ground, while DIBU Rock Shoe is used as a guide pin in the process of driving.

The DIBU Pile Joint has two pieces, one casted with the top segment and the other casted with the bottom segment. Both pieces are made of steel and they are assembled by welding. Each half joint consists of 4 connecting elements that are fixed to their counterparts on the other half joint of the next pile section, forming a male-female system that is locked in place by two pins perpendicular to the axis of both halves. Three out of the four elements (Frame, Locking Dowel and Locking block) are manufactured in specialized machining facilities with numerical control in quality S355J2 or similar steel. The remaining element is the Locking pin, which is made of F125 quality steel. Each female block and each male dowel are fully embedded in the concrete mass of the pile and properly anchored to it by corrugated bars with a diameter of Ø16 or Ø20 in B500SD quality, which are either welded or threaded to it. The blocks have two calibrated holes perpendicular to the axis, and the dowel has two pins that, during their insertion into the block, are pushed inside the dowel until they reach the previously detailed holes. Once this position is reached, these two pins are definitively housed in the holes in the block by the action of a spring.

The DIBU Rock Shoe has two pieces, one casted to the last segment of the pile and the other in contact with the ground. Both pieces are made of steel and assembled by welding. The system of joining among pieces and pile is exactly the same as DIBU Pile Joint. DIBU Rock Shoe is truly suitable for rocky ground or down to solid rock to prevent piles from sliding off steep inclined bedrock, or in soil that contains large boulders or other large objects that could potentially influence the forces on the pile during driving.

Figures 1 and 2 show graphically the devices and point out the main parts.

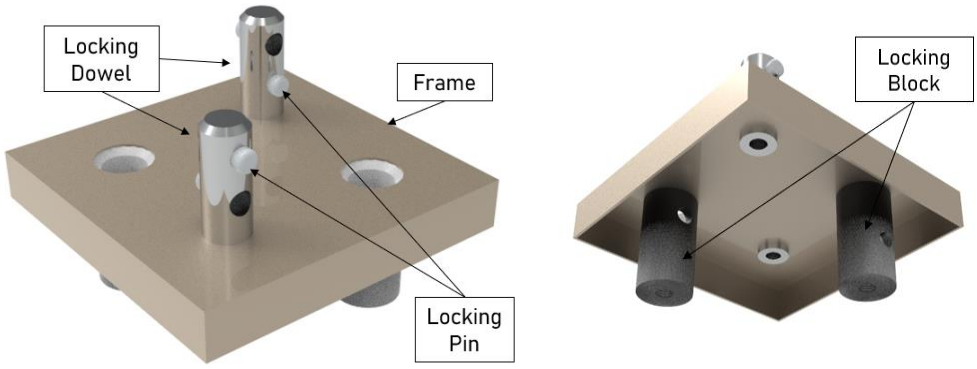


Figure 1. DIBU Pile Joint

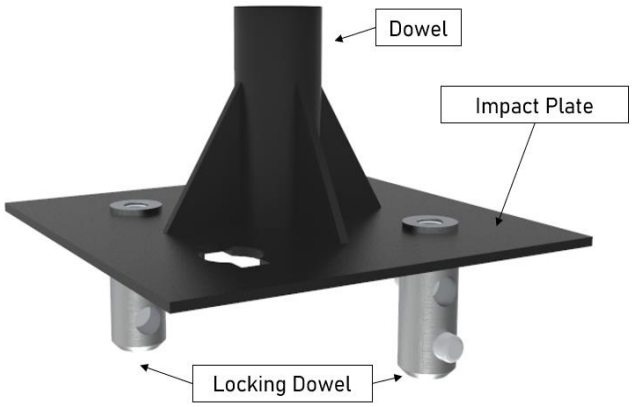


Figure 2. DIBU Rock Shoe

2. Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD).

2.1 Intended use(s)

The intended use of the DIBU pile joints and rock shoe is along with concrete piles made of concrete manufactured according to EN 206. They are intended to be used in undisturbed natural soils (sand, silt, clay, schist) and compacted non-aggressive fills of mineral soil materials. Regarding its durability, corrosion rate of 1.2 mm per 100 years as recommended in standard EN 1993-5 Table 4-1 should then be considered. Alternatively, empirical measurement data and statistical deterioration design model may be used when the conditions certainly can be classified as normal. Local conditions, standards and regulations in force at the place of use shall in both cases be considered and respected.

2.2 Relevant general conditions for the use of the kit

The provisions made in this European Technical Assessment are based on an assumed working life of 100 years from installation in the works, according to EAD 200014-01-0103, as long as the conditions for the installation, packaging, transport and storage are met. In this respect, both the design phase and execution of the solution are key.

The indications given on the working life cannot be interpreted as a guarantee given neither by the product manufacturer nor by EOTA nor by the Technical Assessment Body issuing this ETA, but are regarded only as a means for choosing the right product in relation to the expected economically reasonable working life of the works.

Installation should be carried out according to the ETA holder's specifications and using the specific application instructions of the product manufactured by the ETA holder or by suppliers recognized by the ETA holder. Installation should be carried out by appropriately qualified staff and under the supervision of the technical responsible of the site.

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

The identification tests and the assessment for the intended use of DIBU pile joints according to the Basic Work Requirements (BWR) were carried out in compliance with EAD 200014-01-0103. The characteristics of each system shall correspond to the respective values laid down in Tables 2.1, 2.2 of this ETA, checked by IETcc.

Methods of verification and of assessing and judging are listed in Tables 3.1 and 3.2.

3.1. Mechanical resistance and stability (BWR 1)

Table 3.1: Results for DIBU PILE JOINT & DIBU ROCK SHOE (BWR 1)		
Basic requirement for construction works 1: Mechanical resistance and stability		
Essential characteristic	**Relevant clause in EAD**	**Performance**
Resistance of pile joint	2.2.1.1	Class 1
Resistance of rock shoe	2.2.1.2	Class 1
Robustness and rigidity of pile joint	2.2.1.3	Class A
Dimensional tolerances	2.2.1.4	Annex 1
Mechanical resistance to high-cycle fatigue	2.2.1.5	NPD

Note: NPD means No Performance Determined

3.1.1 Resistance of pile joint

Pile joint satisfy Class 1 in regards to resistance according to EN 12794.

3.1.2 Resistance of rock shoe

Rock shoe satisfy Class 1 in regards to resistance according to EN 12794.

3.1.3 Robustness and rigidity of pile joint

Robustness and rigidity of pile joints fulfilled class A, according to Table 4 from EN 12794.

3.1.4 Dimensional tolerances

Dimensional tolerances are given in Annex 1.

3.1.5 Mechanical resistance to high-cycle fatigue

Mechanical resistance to high-cycle fatigue is given in the following table:

Table 3.1.4: Mechanical resistance to high-cycle fatigue	
Property	**Level**
Stress component k_1	NPD
Stress component k_2	NPD
Stress range $\Delta\sigma_{Rsk}$ at N*=10 million cycles	NPD

Note: NPD means No Performance Determined

3.2 Safety in case of fire (BWR 2)

Table 3.2: Results for DIBU PILE JOINT & DIBU ROCK SHOE (BWR 2)		
Basic requirement for construction works 2: Safety in case of fire		
Essential characteristic	**Relevant clause in EAD**	**Performance**
Reaction to fire	2.2.2	Class A1

3.2.1 Reaction to fire

Pile joint and rock shoe for concrete piles made of Steel are considered to satisfy the requirements for performance Class A1.

3.3 Hygiene, health and environment (BWR 3)

Not Relevant

3.4 Safety and accessibility in use: (BWR 4)

Not Relevant

3.5 Protection against noise (BWR 5)

Not Relevant

3.6 Energy economy and heat retention (BWR 6)

Not Relevant

4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

4.1 System of assessment and verification of constancy of performance

According to the decision 2000/606/EC of the European Commission[1], system 2+ of assessment and verification of constancy of performance (see EC delegated regulation (EU) No 568/2014 amending Annex V to Regulation (EU) Nº 305/2011) applies.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at IETcc[2].

For 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 type testing has to be agreed between IETcc and the notified body.

Issued in Madrid on 7 of November 2023 by:

Mr. Ángel Castillo Talavera

Director

on behalf of Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc – CSIC)

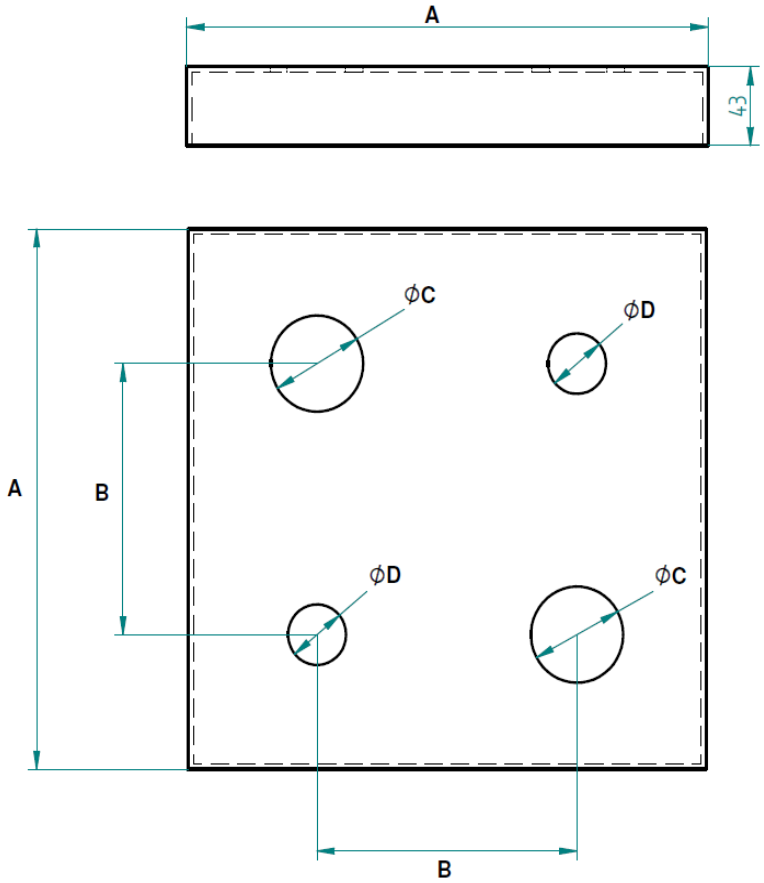
[1] Published in the Official Journal of the European Union (OJEU) L 262 , 14/10/2003 P. 0034 - 0036.

See www.new.eur-lex.europa.eu/oj/direct-access.html

[2] The Control Plan is a confidential part of the ETA and only handed over to the notified certification body involved in the assessment and verification of constancy of performance.

ANNEX 1. Dimensions of DIBU PILE JOINT & DIBU ROCK SHOE

Frame Material: Steel S235 or similar, Tolerances: ± 0.5 mm. Sheet thickness: 3 mm



Type	A	B	C		D	
			Ø16 mm	Ø20 mm	Ø16 mm	Ø20 mm
D-200	199	70	53.2	58.2	33.2	38.2
D-235	234	105	53.2	58.2	33.2	38.2
D-270	269	120	53.2	58.2	33.2	38.2
D-300	299	150	53.2	58.2	33.2	38.2
D-350	349	200	53.2	58.2	33.2	38.2
D-400	399	250	53.2	58.2	33.2	38.2
D-450	449	300	53.2	58.2	33.2	38.2

Figure 3. Dimensions of the Frame

Locking Dowel Material: Steel S355J2, Tolerances: 0 + 0.2 mm.

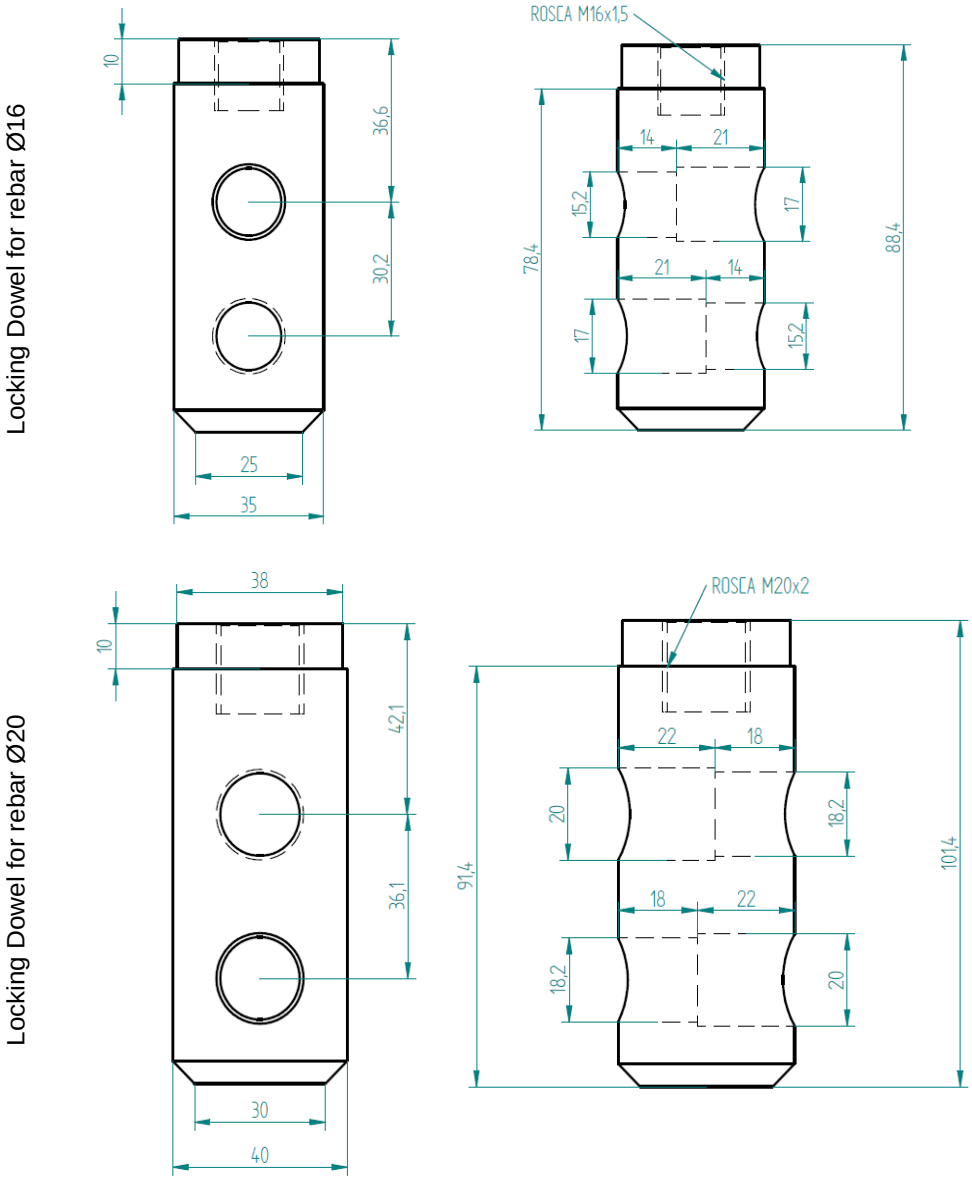


Figure 4. Dimensions of Locking Dowel (units in mm)

Locking Block Material: Steel S355J2, Tolerances: 0 + 0.2 mm.

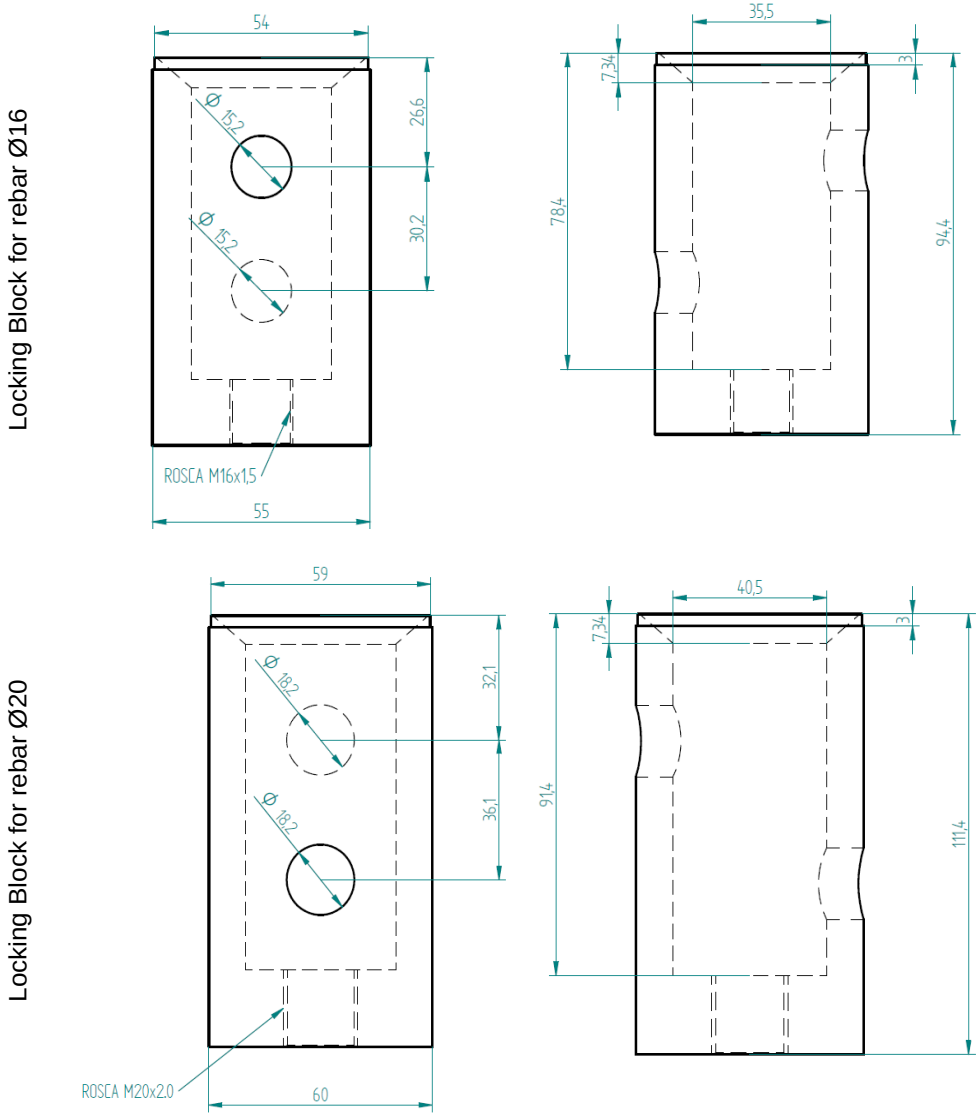
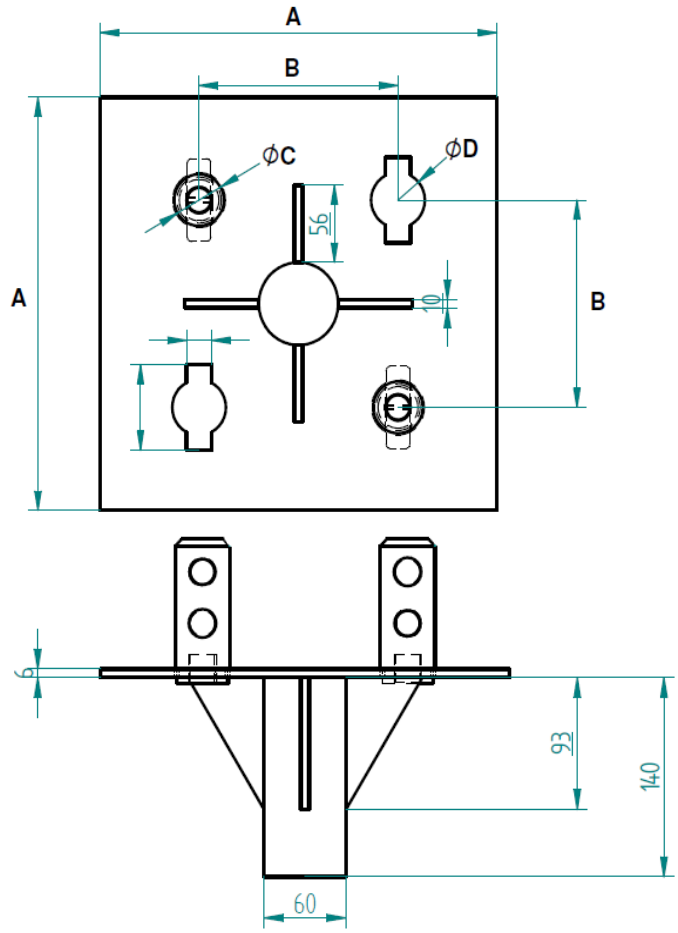


Figure 5. Dimensions of Locking Block (units in mm)

Rock Shoe Material: Steel S235, Tolerances: ± 0.5 mm.
Dowel Material: F1550 (18CrMo4), Hardness: 520-640 HV, Tolerances: ± 0.1 mm.



Tipo	A	B	Ø C		Ø D		E		F
			Ø16 mm	Ø20 mm	Ø16 mm	Ø20 mm	Ø16 mm	Ø20 mm	Ø16 mm
D-200	199	70	33.2	38.2	35.5	40.5	16	19	11
D-235	234	105	33.2	38.2	35.5	40.5	16	19	11
D-270	269	120	33.2	38.2	35.5	40.5	16	19	11
D-300	299	150	33.2	38.2	35.5	40.5	16	19	11
D-350	349	200	33.2	38.2	35.5	40.5	16	19	11
D-400	399	250	33.2	38.2	35.5	40.5	16	19	11
D-450	449	300	33.2	38.2	35.5	40.5	16	19	11

Figure 6. Dimensions of Rock Shoe (units in mm)

Locking Pin Material: F125 (42CrMo4), Tolerances: 0 + 0.2 mm.

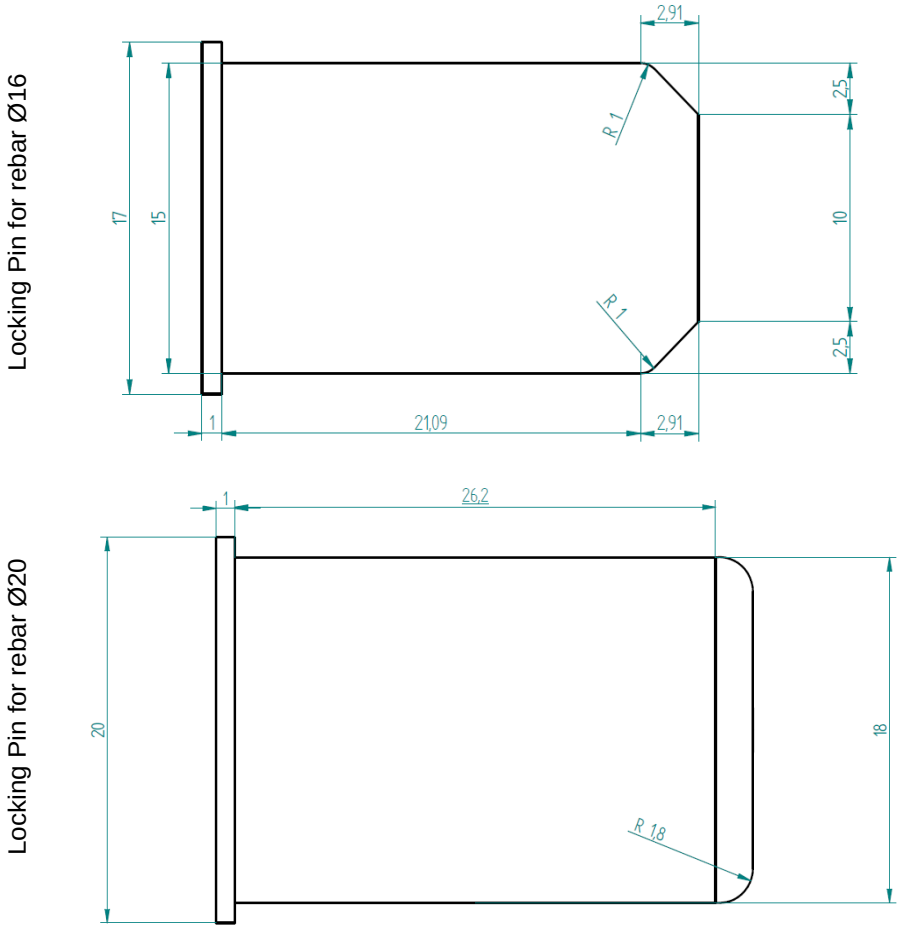


Figure 7. Dimensions of Locking Pin (units in mm)

The dimensions shown in Table 1 correspond to the lapping length between the reinforcing bars of the joint or shoe and the pile itself. The dimensions of the lapping length depend on the diameter of the reinforcing bars.

Table 1. Dimensions of Reinforcing Bars vs Diameter (Ø)

Minimum Lapping Length of Reinforcing Bars (m)	**Ø (mm)**
0.7	16
0.8	20
1.0	25

Notes: Material: Steel B 500 SD (UNE 36065:2011)