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European Technical Assessment

ETA 15/0029
of 22/09/2021

General Part

Technical Assessment Body issuing the ETA:	RISE Research Institutes of Sweden AB
Trade name of the construction product	SS-pile and SSdr-pile
Product family to which the construction product belongs	Structural steel piles with hollow sections and rigid splices
Manufacturer	UAB Scandia Steel Baltic Vytauto 151 97133 Kretinga, Lithuania
Manufacturing plant(s)	UAB Scandia Steel Baltic Vytauto 151 97133 Kretinga, Lithuania
This European Technical Assessment contains	15 pages including 10 Annexes 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 200005-00-0103, edition December 2014.
This version replaces	ETA 15/0029, issued on 15/11/2020.

Specific parts

1 Technical description of the product

SS-piles and SSdr-piles consist of a hollow section structural steel pipe, which is mechanically jointed with an external friction splice or a threaded splice, or jointed by welding. The piles may include a bearing plate (top plate), a rock shoe (pile tip) or other additional accessories.

SS-piles are mechanically jointed with an external friction splice sleeve and SSdr-piles are mechanically jointed with a threaded splice sleeve.

External splice is outside of pile pipe locating pile joint where connection is based on friction. Steel grades used in external splice are either according to the standard EN 10210, EN 10219 or alternatively steels S440J2H, S440MH, S550J2H or S550MH.

Threaded splice is pile joint with or without sleeve where connection is based on threads. Steel grades used in threaded sleeve splice are according to the standards EN 10210, EN 10219, EN 10294-1, EN 10297-1 or alternatively steels S440J2H, S440MH, S550J2H or S550MH.The piles may be equipped with a pressure-distributing bearing plate (top plate) consisting of a steel plate and a plate concentrator.

SS-piles may be equipped with pile tip 1, which is mechanically fastened to the lower end of the pile with friction and conical contact surface. Pile tip 1 is equipped with a dowel made of hardened steel. Alternetively SS-piles may be equipped with pile tip 2 which is fastened by welding, or pile tip 3 which is fastened by friction to the lower end of the pile.

The steel pipe is made of steel grade EN 10219-S460MH or alternatively steels S550J2H or S550MH. The top plate and the sleeve of the pile tip are supplied in steel grade S355J2 according to EN 10025. The pile dowel is made of steel grade 51CrV4 with hardness HV 530-590 alternatively of steel grade 27MnCrB5-2 with hardness HV 530-640.

Diameters of the piles are from 76.1 mm to 406.4 mm and wall thicknesses from 6.3 mm to 12.5 mm.

SS-piles are installed by driving (impact driving, jacking, vibrating, screwing) and SSdr-piles by drilling.

Product description and dimensions of piles and pile components are presented in Annex A1-A7. Material properties and dimensional tolerances are presented in Annex B.

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

SS-piles and SSdr-piles are used as the foundation piles in all kinds of structures where pile foundations are needed e.g. buildings, bridges, harbours or other traffic structures. The piles are designed generally as end bearing piles but designing as shaft bearing piles is also possible. The piles are designed for loading by axial forces or horizontal forces or combined loads. If the pile is subjected to extensive cyclic stress, this must be considered separately.

The performances given in clause 3 are only valid if the piles are used in compliance with the specifications and conditions given in Annex C.

The provisions made in this European Technical Assessment are based on an assumed intended working life of 100 years depending on chosen material thickness and environmental

conditions which are defined in Eurocode EN 1993-5 paragraph 4.4. The indications given on the working life cannot be interpreted as a guarantee given by the producer 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

Mechanically spliced SS-piles and SSdr-piles fulfil the requirements for mechanical resistance and stability according to clause 3.1. Compression strength of mechanically spliced SS-piles and SSdr-piles is equal to or exceeds maximum compression resistance of piles presented in Annex D. Tension resistance of mechanically spliced SS-piles and SSdr-piles is at least 15 % of the compression resistance of piles presented in Annex D.

3.1 Essential characteristics and their performance

		Characteristic	**Performance**
BWR 1	Mechanical resistance and stability	Bending resistance and bending stiffness	Bending stiffness of pile with mechanical pile joint: $E \cdot I_{spliced} \geq 0.75 \cdot E \cdot I_{unspliced}$ (in moment range $0.3 \cdot M_{el} - 0.8 \cdot M_{el}$) Bending resistance of the pile with mechanical pile joint: $M_{spliced} \geq M_{unspliced}$
		Tension resistance	Tension resistance of the pile with mechanical pile joint: $N_{spliced} \geq 0.15 \cdot N_{unspliced}$
		Compression resistance	Compression resistance of the pile with mechanical pile joint: $F_{spliced} \geq F_{unspliced}$
		Robustness of pile joints	Driven pile: Ø76.1- Ø219.1: Impact test with stress level of $0.8 \cdot f_y$ Ø273- Ø406.4: Impact test with stress level of $0.5 \cdot f_y$ Drilled pile: Mechanical joint tightening test with moment M 1500 Nm ≤ M ≤ 7000 Nm for piles 88.9 mm ≤ Ø ≤ 406.4 mm
		Material properties and dimensional tolerances	See Annex B
		Resistance to corrosion	The reduced load bearing capacities of pile pipes in consideration of thickness losses due to corrosion set in EN 1993-5 shall be calculated according to valid EN standards or national regulations.
BWR 2	Safety in case of fire	Reaction to fire	Class A1, according to EN 13501-1

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

According to the decision 2003/655/EC - Commission decision of date 12 September 2003, published in the Official Journal of the European Union (OJEU) L231/12 of 17/09/2003, of the European Commission the system of assessment and verification of constancy of performance (see Annex V to the regulation (EU) No 305/2011) given in the following table apply:

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Structural steel piles with hollow sections and rigid splices	Foundation piles for structural use	-	2+

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

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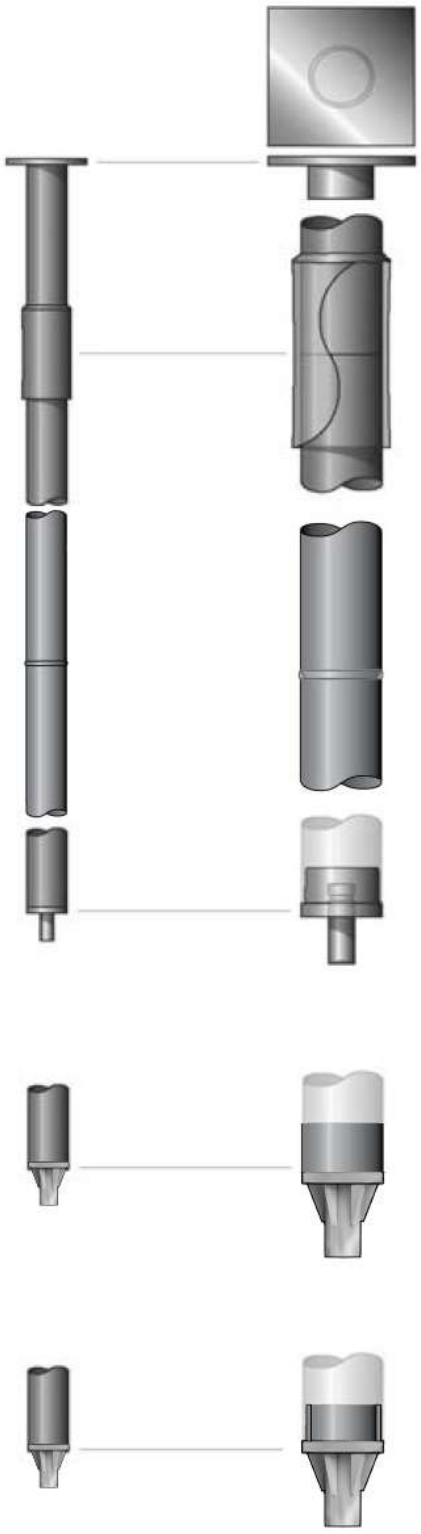
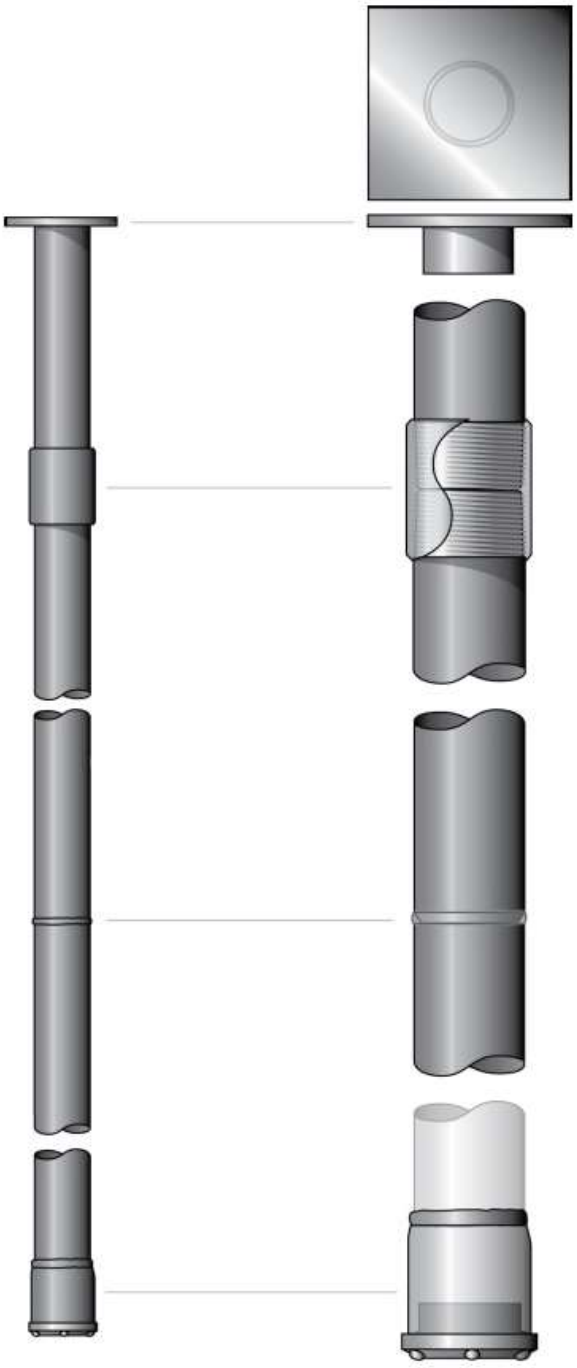
By RISE Research Institutes of Sweden AB

Signed by: Martin Tillander
Reason: I am the author of this document
Date & Time: 2021-09-22 11:42:25 +02:00

Martin Tillander
Product Certification Manager

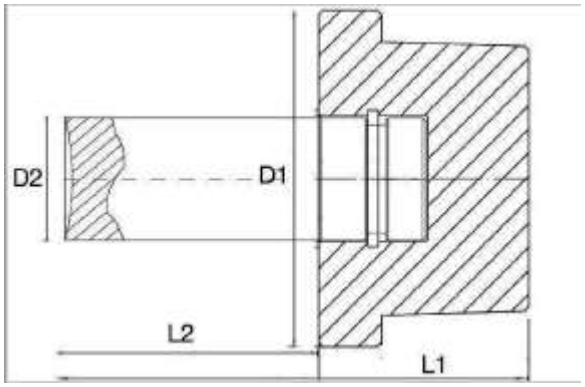


Product description Concept drawing of the SS-pile	**Annex A1** **of European** **Technical Assessment** **ETA 15/0029**



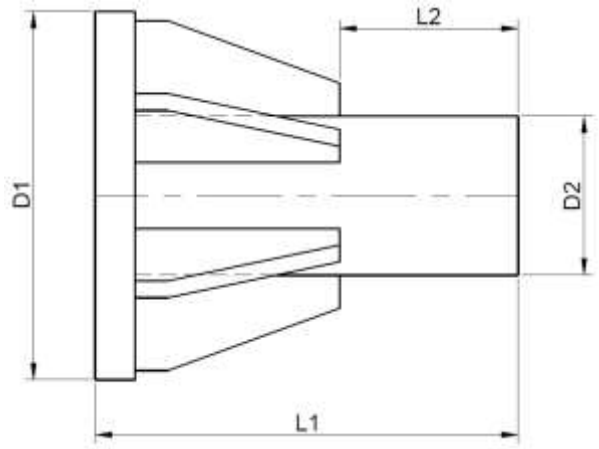
Product description Concept drawing of the SSdr pile.	**Annex A2** **of European** **Technical Assessment** **ETA 15/0029**

Pile tip 1 (fastened by friction)



Pile tip 1, dimensions mm				
Pile pipe (diameter x thickness t1 / t2)	**D1**	**D2**	**L1**	**L2**
76.1 x 6.3	79.5	29.7	103.0	53.0
88.9 x 6.3	89.7	29.7	108.0	53.0
114.3 x 6.3	114.7	39.7	139.5	69.0
114.3 x 8.0	114.7	39.7	139.5	69.0
139.7 x 8.0	140.0	59.7	204.5	104.2
139.7 x 10.0	140.0	59.7	204.5	104.2
168.3 x 10.0	169.7	59.7	219.5	104.2
168.3 x 12.5	169.7	59.7	219.5	104.2
219.1 x 10.0	220.0	79.3	274.5	122.1
219.1 x 12.5	220.0	79.3	274.5	122.1

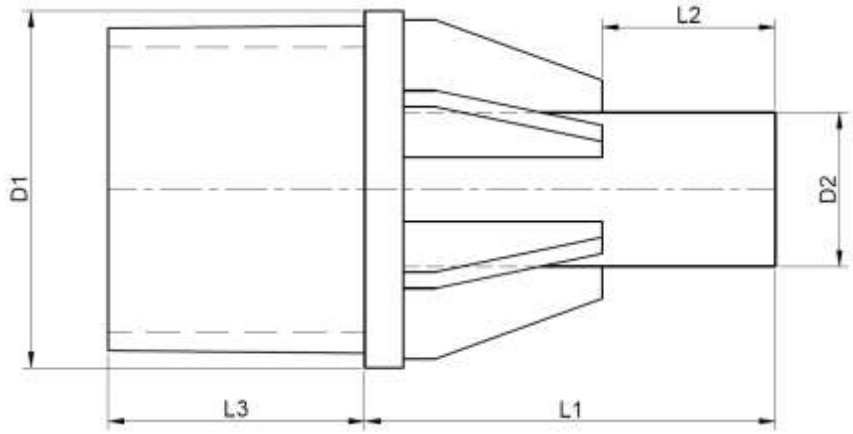
Pile tip 2 (fastened by welding)



Pile tip 2, dimensions mm				
Pile pipe (diameter x thickness t1 / t2)	**D1**	**D2**	**L1**	**L2**
273.0 x 10.0	278	120	320	135
273.0 x 12.5	278	120	320	135
323.9 x 10.0	328	130	375	145
323.9 x 12.5	328	130	375	145
406.4 x 12.5	410	140	470	155

Product description The main dimensions of the pile tips	**Annex A3** **of European Technical Assessment ETA 15/0029**

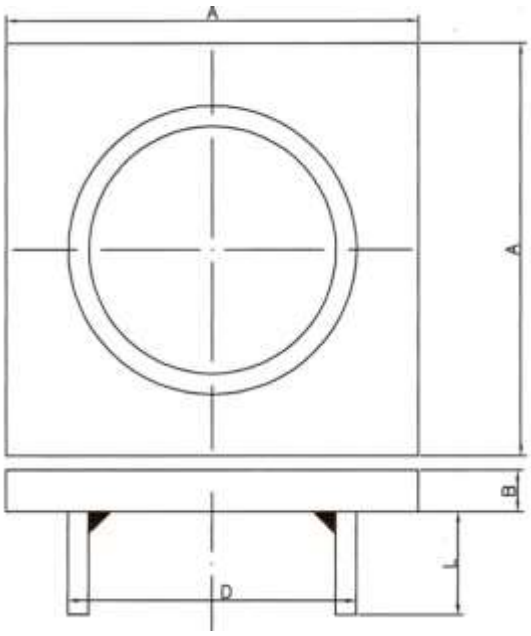
Pile tip 3 (fastened by friction)



Pile tip 3, dimensions mm					
Pile pipe (diameter x thickness t1 / t2)	**D1**	**D2**	**L1**	**L2**	**L3**
273.0 x 10.0	278	120	320	135	200
273.0 x 12.5	278	120	320	135	200
323.9 x 10.0	328	130	375	145	235
323.9 x 12.5	328	130	375	145	235
406.4 x 12.5	410	140	470	155	300

Product description The main dimensions of the pile tips	**Annex A4** **of European Technical Assessment** **ETA 15/0029**

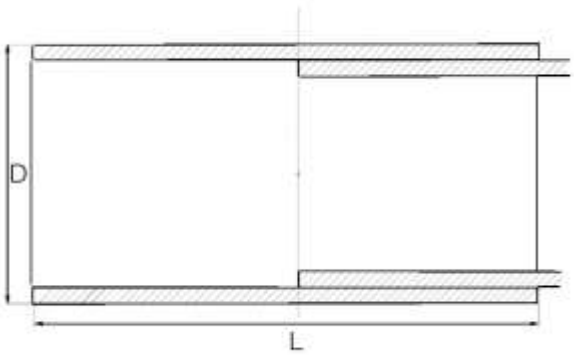
Top plate



Top plate, dimensions (mm)			
Pile pipe (diameter x thickness)	**D**	**AxAxB**	**L**
76.1 x 6.3	60.3	150x150x15	50 (±1)
88.9 x 6.3	60.3-70.0	150x150x15	50 (±1)
114.3 x 6.3	88.9-95.0	200x200x20	50 (±1)
114.3 x 8.0	88.9-95.0	200x200x20	50 (±1)
139.7 x 8.0	88.9-114.3	250x250x25	50 (±1)
139.7 x 10.0	88.9-114.3	250x250x25	50 (±1)
168.3 x 10.0	114.3-139.7	300x300x30	70 (±1)
168.3 x 12.5	114.3-139.7	300x300x30	70 (±1)
219.1 x 10.0	139.7-191.0	300x300x30	70 (±1)
219.1 x 12.5	139.7-191.0	300x300x30	70 (±1)
273.0 x 10.0	168.3-241.0	350x350x30	70 (±1)
273.0 x 12.5	168.3-241.0	350x350x30	70 (±1)
323.9 x 10.0	219.1-292.0	400x400x30	70 (±1)
323.9 x 12.5	219.1-292.0	400x400x30	70 (±1)
406.4 x 12.5	273.0-355.6	500x500x40	70 (±1)

Product description The main dimensions of top plate.	**Annex A5** **of European** **Technical Assessment** **ETA 15/0029**

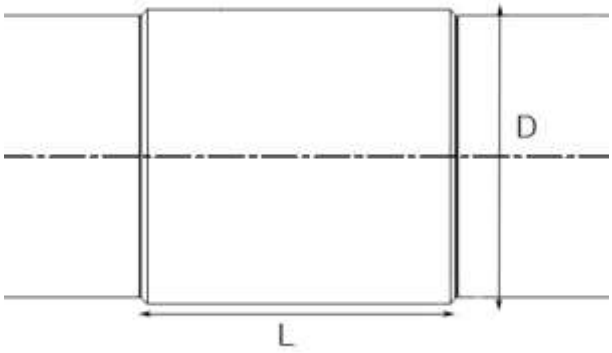
SS friction sleeve splice



SS friction sleeve		
Pile SS / d_{pile} x t_{pile} (mm)	**D (mm)**	**L (mm)**
76.1 x 6.3	88.9	210
88.9 x 6.3	101.6	250
114.3 x 6.3	127.0	280
114.3 x 8.0	127.0	280
139.7 x 8.0	159.0	310
139.7 x 10.0	159.0	310
168.3 x 10.0	191.0	350
168.3 x 12.5	191.0	350
219.1 x 10.0	244.5	420
219.1 x 12.5	244.5	420
273.0 x 10.0	298.5	480
273.0 x 12.5	298.5	480
323.9 x 10.0	355.6	560
323.9 x 12.5	355.6	560
406.4 x 12.5	445.0	750

Product description The main dimensions of splice sleeves.	**Annex A6** **of European** **Technical Assessment** **ETA 15/0029**

SSdr threaded sleeve splice



SSdr threaded sleeve		
Pile SSdr (d_{pile} x t_{pile}) mm	**D (mm)**	**L (mm)**
88.9 x 6.3	101.6	160
114.3 x 6.3	127.0	170
114.3 x 8.0	127.0	170
139.7 x 8.0	152.4	234
139.7 x 10.0	152.4	234
168.3 x 10.0	182.0	289
168.3 x 12.5	182.0	289
219.1 x 10.0	235.0	230
219.1 x 12.5	235.0	230
273.0 x 10.0	292.0	325
273.0 x 12.5	292.0	325
323.9 x 10.0	343.0	320
323.9 x 12.5	343.0	320
406.4 x 12.5	431.8	370

Product description The main dimensions of splice sleeves.	**Annex A7** **of European** **Technical Assessment** **ETA 15/0029**

Tolerances on shape and mass, pile pipes

Characteristic	**Circular hollow section**
Outside diameter (D)*	D ≤ 350 mm, ± 0.5 % D > 350 mm, ± 1 %
Thickness (T)	For D ≤ 406.4 mm: T ≤ 5 mm, ± 10 % T > 5 mm, ± 0.5 mm For D > 406.4 mm: ± 10 % with maximum of ± 2mm
Out-of-roundness (O)	D ≤ 150 mm, ± 1.2 % 150 mm < D ≤ 350 mm, ± 1 % D > 350 mm, ± 2 %
Straightness (e)	0.20 % of total length
Mass per unit length (M)	± 6 % on individual delivered lengths
*The diameter (D) shall be measured by circumference tape at the discretion of the manufacturer.	

Tolerances on shape and mass, sleeve pipes (friction splice)

Characteristic	**Circular hollow section**
Inside diameter (D)*	D ≤ 150 mm, ± 0.5 % D > 150 mm, ± 0.3 %
Thickness (T)	For D ≤ 406.4 mm: T ≤ 5 mm, ± 10 % T > 5 mm, ± 0.5 mm For D > 406.4 mm: ± 10 % with maximum of ± 2mm
Out-of-roundness (O)	D ≤ 150 mm, ± 1.2 % D > 150 mm, ± 1 %
Straightness (e)	0.20 % of total length
Mass per unit length (M)	± 6 % on individual delivered lengths
Length of individual sleeve (L)	± 5 mm
*The diameter (D) shall be measured by circumference tape at the discretion of the manufacturer.	

Material properties and dimensional tolerances Tolerances on shape and mass	**Annex B** **of European** **Technical Assessment** **ETA 15/0029**

Installation

The installation and execution of piles shall be in accordance with EN 1993-5 (chapter 8), EN 14199, EN 1536 and EN 12699 as far as national regulations admit it.

Installation procedures (execution) of the completed piles, shaft grouted piles, grouting materials or welding done at building site are not covered by this ETA.

Design of the product

Steel pipe piles shall be dimensioned in accordance with valid EN standards and/or national regulations. Characteristics mentioned in clause 3.1 shall be taken into account when necessary.

The designing of pile tips, bearing plates and other accessories shall be carried out taking into account the characteristics of connected structures, EN standards and/or national regulations.

The designing of complete piles is not covered by this ETA.

General assumptions Installation and design	**Annex C** **of European** **Technical Assessment** **ETA 15/0029**

Pile types, dimensions and characteristic values of maximum compression resistances.

Pile	Diameter	Characteristic values of maximum compression resistances (kN)			
Designation	[mm]	t_{pile} = 6.3 mm	t_{pile} = 8.0 mm	t_{pile} = 10.0 mm	t_{pile} = 12.5 mm
SS 76.1	76.1	S460: 635 kN			
		S550: 760 kN			
SS 88.9	88.9	S460: 752 kN			
		S550: 899 kN			
SS 114.3	114.3	S460: 983 kN	S460: 1229 kN		
		S550: 1176 kN	S550: 1469 kN		
SS 139.7	139.7		S460: 1523 kN	S460: 1874 kN	
			S550: 1820 kN	S550: 2241 kN	
SS 168.3	168.3			S460: 2288 kN	S460: 2814 kN
				S550: 2735 kN	S550: 3365 kN
SS 219.1	219.1			S460: 3022 kN	S460: 3732 kN
				S550: 3613 kN	S550: 4462 kN
SS 273	273.0			S460: 3801 kN	S460: 4706 kN
				S550: 4544 kN	S550: 5626 kN
SS 323.9	323.9			S460: 4536 kN	S460: 5625 kN
				S550: 5424 kN	S550: 6726 kN
SS 406.4	406.4				S460: 7115 kN
					S550: 8508 kN

	Steel grade S460MH
	Steel grade S550J2H, S550MH

Pile	Diameter	Characteristic values of maximum compression resistances (kN)			
Designation	[mm]	t_{pile} = 6.3 mm	t_{pile} = 8.0 mm	t_{pile} = 10.0 mm	t_{pile} = 12.5 mm
SSdr 88.9	88.9	S460: 752 kN			
		S550: 899 kN			
SSdr 114.3	114.3	S460: 983 kN	S460: 1229 kN		
		S550: 1176 kN	S550: 1469 kN		
SSdr 139.7	139.7		S460: 1523 kN	S460: 1874 kN	
			S550: 1820 kN	S550: 2241 kN	
SSdr 168.3	168.3			S460: 2288 kN	S460: 2814 kN
				S550: 2735 kN	S550: 3365 kN
SSdr 219.1	219.1			S460: 3022 kN	S460: 3732 kN
				S550: 3613 kN	S550: 4462 kN
SSdr 273	273.0			S460: 3801 kN	S460: 4706 kN
				S550: 4544 kN	S550: 5626 kN
SSdr 323.9	323.9			S460: 4536 kN	S460: 5625 kN
				S550: 5424 kN	S550: 6726 kN
SSdr 406.4	406.4				S460: 7115 kN
					S550: 8508 kN

Steel grade S460MH

Steel grade S550J2H, S550MH

Characteristic compression resistance
SS-piles and SSdr-piles

Annex D
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