

A. GENERAL AND TECHNICAL ARRANGEMENTS

1. THE SUBJECT OF THE TECHNICAL APPROVAL

1.1 Technical identification of the construction product

The subject of the Technical Approval are the elements of Chance system for anchors, soil nails and micropiles. System includes:

- Lead section with single, twin, triple or quad helix configurations
- Extensions with helical plates or plain extensions
- Couplings

Lead sections and extensions are round corner square shafts marked with a symbol SS (figures 1– 3) or round pipe shaft marked with a symbol RS(figure 4 and 5). Spacing between helices may be changed. Helices are positioned along shaft at a spacing approximating three times diameter of the lower helical plates.

Elements of Chance system may be galvanized or may be manufactured without anti-corrosion coating.

1.1.1 Type SS Solid Square Shaft for micropiles and anchors

Square shaft diameter may be 38,1 mm, 44,4mm, 50,8 mm or 57,1 mm. Depending on the number of helical plates the length of the shaft may be 91 cm, 152 cm, 213 cm 305 cm. Helical plates are made of 9,5 or 13,00 mm thick steel plates, their diameter may be 152 mm, 203 mm, 254 mm, 305 mm, 356 mm or 406 mm. The edges of the helical plates are cut sheer or sharpened (SLE). Connection between square shafts is secured by a bolt, which is covered by a nut to prevent it from slipping out. The sizes of helical plates for the Type SS lead sections are given in Table nr 1. The sizes of helical plates for the Type SS extensions are given in Table nr 2. The 'T' symbol in Tables 1 and 2 marks helical plate made of 13,0 mm thick steel plate. The rest is made of 9,5 mm thick steel plate. Helical plates are connected to the central shaft by welding.

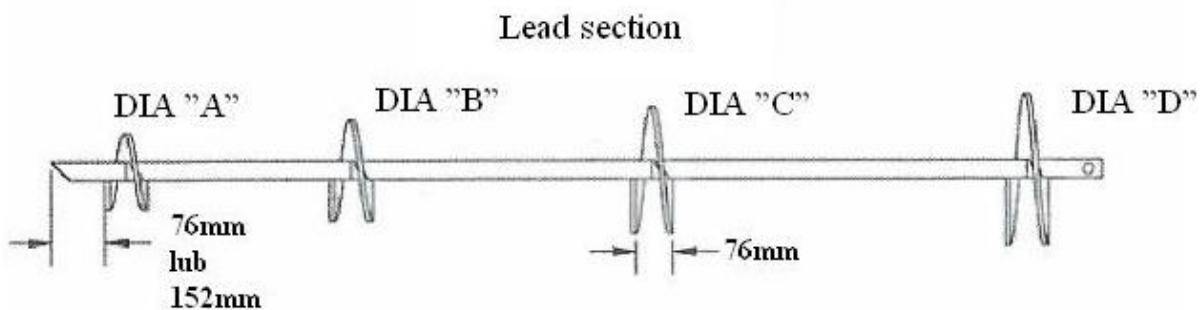


Fig. 1 – Lead section Type SS

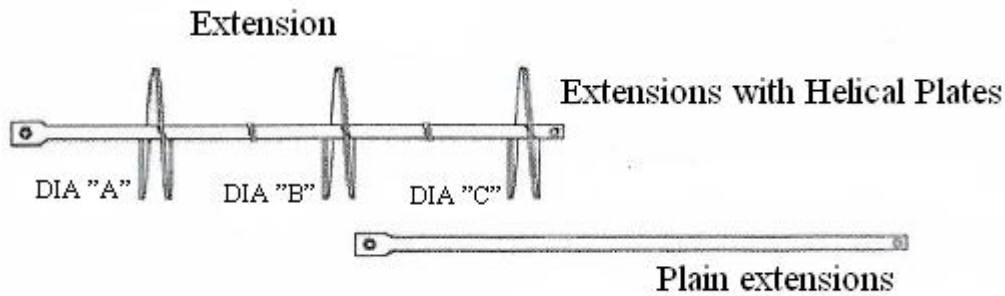


Fig. 2 Extension sections Type SS

Table 1

L.p.	Type SS Shaft product series					Plate diameter (mm)			
	SS5	SS150	SS175	SS200	SS225	„A”	„B”	„C”	„D”
1	2	3	4	5	6	7	8	9	10
1		SS150				102	203	254	x
2	SS5		SS175			152T	x	x	x
3	SS5					152	x	x	x
4	SS5					152	152	x	x
5	SS5					152	203	x	x
6		SS150				152	203	254	x
7				SS200	SS225	152T	203T	254T	x
8				SS200		152T	203T	254T	305T
9	SS5		SS175			203	x	x	x
10	SS5	SS150	SS175			203T	x	x	x
11	SS5	SS150	SS175			203	254	x	x
12	SS5		SS175			203T	254T	x	x
13	SS5	SS150	SS175	SS200		203	254	305	x
14			SS175		SS225	203T	254T	305T	x
15	SS5	SS150	SS175			203	254	305	356
16				SS200	SS225	203T	254T	305T	356T
17	SS5		SS175			254	x	x	x
18			SS175			254T	x	x	x
19	SS5		SS175			254	305	x	x
20	SS5	SS150	SS175			254	305	356	x
21				SS200		254T	305T	356T	x
22	SS5	SS150				254	305	356	356
23	SS5					305	x	x	x
24	SS5					305	356	406	x
25	SS5					356	x	x	x
26	SS5		SS175			356	356	x	x
27		SS150	SS175			356	356	356	x
28				SS200	SS225	356T	356T	356T	x

Table 2

L.p.	Type SS Shaft product series					Plate diameter (mm)		
	SS5	SS150	SS175	SS200	SS225	„A”	„B”	„C”
1	2	3	4	5	6	7	8	9
1	SS5	SS150	SS175	SS200	SS225	x	x	x
2	SS5					254	x	x
3	SS5					305	x	x
4	SS5	SS150	SS175			356	x	x
5			SS175	SS200	SS225	356T	x	x
6		SS150	SS175			356	356	x
7				SS200	SS225	356T	356T	x
8		SS150	SS175			356	356	356
9				SS200		356T	356T	356T

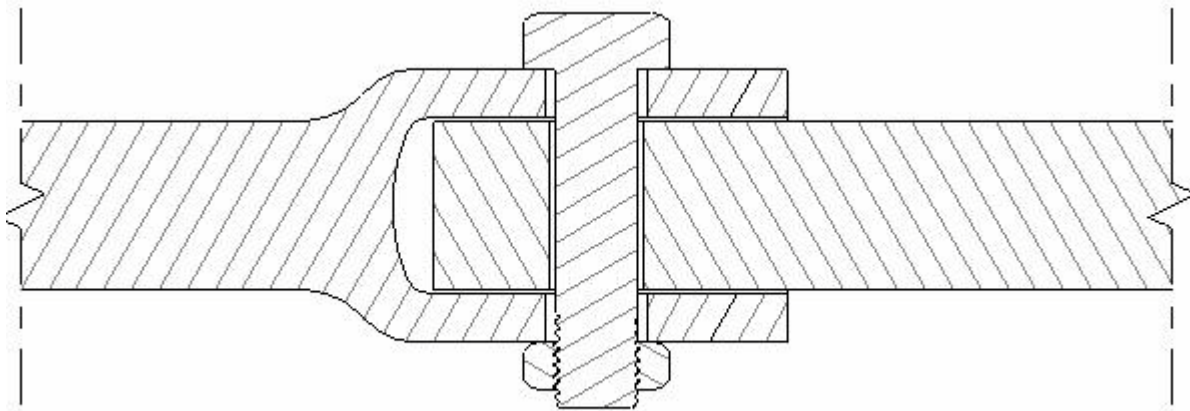


Fig.3 Cross-section of the connection between Type SS shafts

1.1.2 Type RS Round Pipe Shaft for micropiles

Pipe shaft diameter may be 73 mm, 89 mm or 114 mm. Depending on the number of helical plates the length of the shaft may be 90 cm, 110 cm, 150 cm 210 cm, 300 cm, 320 cm or 640cm. Helical plates are made of 9,5 or 13,00 mm thick steel plate. The diameter of the plates may be 203 mm, 254 mm, 305 mm, 356 mm or 406mm. The edges of the helical plates are cut sheer or sharpened (SLE). The sizes of helical plates for the Type RS lead sections are given in Table nr 3. The sizes of helical plates for the RS Type extensions are given in Table nr 4. The ‘T’ symbol in Tables 3 and 4 marks helical plate made of 13,0 mm thick steel plate. The rest is made of 9,5 mm thick steel plate. Connection between round shafts is secured by two or three bolts, covered nuts (shaft RS2875.203 and shaft RS3500.300) or by a pipe coupling (shafts RS2875.165, RS2875.262, RS4500.337 according to Table 5). Helical plates are connected to the central shaft by welding.

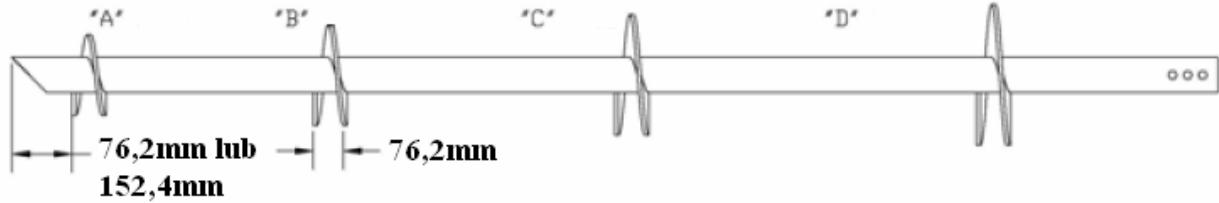


Fig 4 – Round pipe shaft Type RS lead section

Table 3

No.	Type RS shaft product series					Plate diameter (mm)			
	RS2875.165	RS2875.203	RS2875.262	RS3500.300	RS4500.337				
1	2	3	4	5	6	7	8	9	10
1	RS2875.165		RS2875.262	RS3500.300		203	254	x	x
2	RS2875.165	RS2875.203	RS2875.262	RS3500.300		203	254	305	x
3			RS2875.262	RS3500.300		203	254	305	356
4	RS2875.165	RS2875.203	RS2875.262	RS3500.300		254	x	x	x
5	RS2875.165	RS2875.203	RS2875.262	RS3500.300		254	305	x	x
6	RS2875.165	RS2875.203	RS2875.262	RS3500.300		254	305	356	x
7					RS4500.337	254T	305T	356T	x
8				RS3500.300		254	305	356	356
9	RS2875.165		RS2875.262	RS3500.300		305	356	x	x
10					RS4500.337	305T	356T	x	x
11				RS3500.300		305	356	406	x
12					RS4500.337	305T	356T	406T	x
13				RS3500.300		305	356	356	356
14					RS4500.337	356T	406T	x	x

Table 4

L.p.	Type RS shaft product series					Plate diameter (mm)		
	RS2875.165	RS2875.203	RS2875.262	RS3500.300	RS4500.337			
1	2	3	4	5	6	7	8	9
1	RS2875.165	RS2875.203	RS2875.262	RS3500.300	RS4500.337	x	x	x
2				RS3500.300		305	356	x
3				RS3500.300		356	x	x
4	RS2875.165		RS2875.262		RS4500.337	356T	x	x
5				RS3500.300		356	356	x
6	RS2875.165		RS2875.262		RS4500.337	356T	356T	x
7		RS2875.203		RS3500.300		356	356	356
8	RS2875.165		RS2875.262		RS4500.337	356T	356T	356T

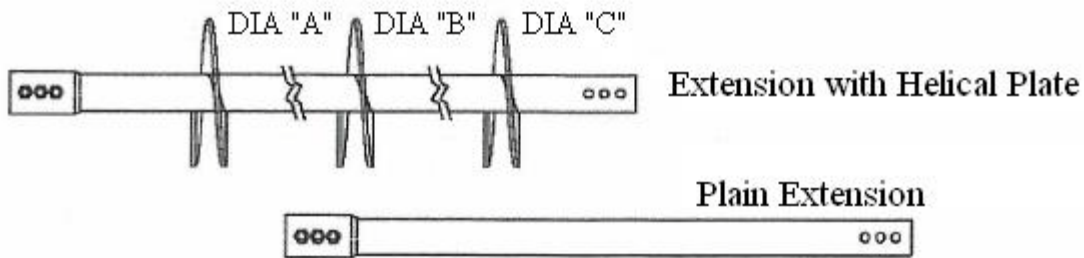
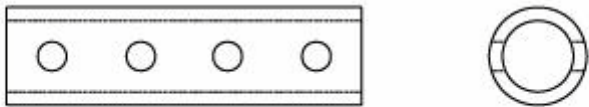


Fig. 5 Type RS Pipe Shaft Extension

Table 5

Couplings for Type RS Pipe Shaft		
		
System couplers for shafts RS2875.165, RS2875.262, RS4500.337		
Catalouge number	Description	Weight [kg]
C-RS2500.134[G]	Coupling for shaft type RS2875.165 with bolts	3,63
C-RS2250.375[G]	Coupling for shaft type RS2875.262 with bolts	4,54
C-RS3750.500[G]	Coupling for shaft type RS4500.337 with bolts	13,61

1.1.3 Type SS Solid Square Shaft for soil nails (Soil Screws)

The diameter of the square shaft for Soil Screw soil nails may be 38,1 mm or 44,4 mm. Depending on the number and diameter of helical plates the length of the shaft may be 145 cm, 150 cm, 157 cm, 205 cm, 206 cm, 208 cm, 211 cm, 213cm. Helical plates are made of 9,5 or 13,00 mm thick steel plate. Along the shaft the plates are of the same diameter which may be 152 or 203 mm. The edges of the helical plates are cut sheer . Connection between square shafts is secured by a bolt, which is covered by a nut to prevent it from slipping out. Lead and extension sections for Soil Screw soil nails are given in Fig. 6, their parameters are presented in Table 6.

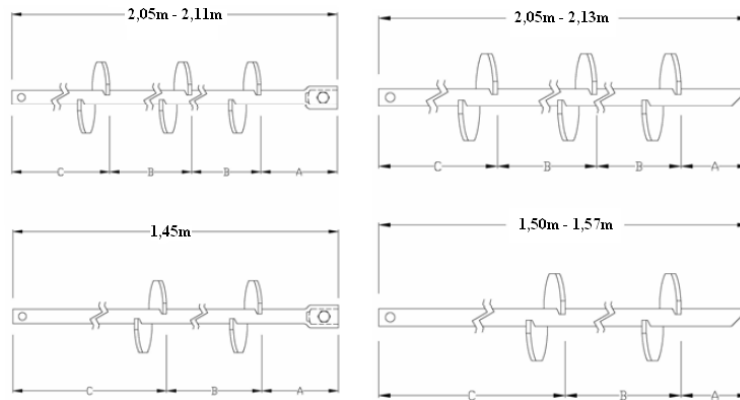


Fig.6 Lead and extension sections for SOIL SCREW soil nails

Table 6

L.p.	Size of the shaft	Plate diameter	Lenght [m]	Spacing between plates [mm]			Number of plates
				A'	B'	C'	
1	2	3	4	5	6	7	8
1	SS5 – lead section	203	1,5	152	736	609	2
2			2,13	152	736	508	3
3	SS5 - extension	203	1,45	127	736	584	2
4			2,05	152	736	431	3
5	SS175 – lead section	152	1,57	203	762	609	2
6		203	2,06	152	762	381	3
7	SS175 - extension	152	2,11	152	762	431	3
8		203	2,08	228	732	381	3

1.1.4 Instant Foundations

Instant Foundations are used for underpinning road sings, traffic light and street lamps. These are pipe shafts with one helical plate placed at the end of the shaft and a plate with prefabricated openings for bolts, which can placed at different spacing, and with an opening for power cables. Instant Foundations are presented in Fig. 7, the parameters of available Instant Foundations are given in Table 7.

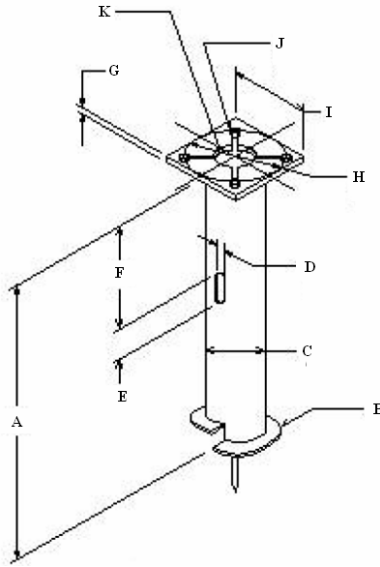


Fig. 7 Pile for underpinning street lamps

L.p.	Type	Parameters [mm]										J***
		A	B	C*	D	E	F	G	H**	I	K	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	C11242QG4VP	2133	356	219/6,4	63,5	305	305	25,4	279 – 432	400	178	1" X 4"
2	T112-0567	2438	356	219/6,4	63,5	457	1219	25,4	241 – 356	305	178	1" X 4"
3	T112-0568	3048	356	219/6,4	63,5	457	1219	25,4	241 – 356	305	178	1" X 4"
4	T112-0590	2133	406	279/6,4	63,5	305	305	25,4	343 – 432	400	178	1" X 4"
5	T112-0564	2438	305	168/7,1	76,2	457	1219	25,4	203 – 356	305	178	1" X 4"
6	T112-0563	3048	305	168/7,1	76,2	457	457	25,4	203 – 356	305	178	1" X 4"
7	T112-0563	3048	305	168/7,1	76,2	457	457	25,4	203 – 356	305	178	1" X 4"
8	T112-0566	3048	356	219/6,4	76,2	457	1219	25,4	241 – 356	305	178	1" X 4"
9	T112-0565	3048	305	168/7,1	76,2	457	1219	25,4	203 – 356	305	178	1" X 4"
10	T112-0592	1524	305	273/6,4	63,5	305	305	25,4	343 – 432	400	127	1" X 4"
11	C11242NG4VP	1524	356	219/6,4	63,5	305	305	25,4	279 – 432	400	127	1" X 4"
12	C112-32JG4VL	1524	305	168/7,1	63,5	305	305	25,4	229 – 356	305	127	1" X 4"
13	T112-0143	1524	305	88,9/7,6	31,7	305	305		133 – 216	222	91,5	3/4" X 3,5"
14	T112-0338	1422	254	102/6,6	76,2	38,1	457	19	152 – 222	222	91,5	1" X 4"

* first number refers to external diameter, second number refers to the thickness of the wall

** spacing of bolts

1.2 Classification of products

	PKWiU (Polish Classification of Products and Services)	PCN
- shafts:	25.11.23	7308 90 99
- couplings:	25.94.11	7318 16 99

2. SUITABILITY, RANGE AND CONDTINIONS OF APPLICATION

2.1 Suitability and range of application

CHANCE system elements are used in the transportation sector for manufacturing:

- tension and compression micropiles, in accordance with PN-EN 14199:2008,
- temporary anchors (up to two years of usage),
- soil nails

CHANCE system elements are also used in the transportation sector for the

- construction of foundation and retaining constructions
- construction of anchors in subsoil
- reinforcing foundation and bedding

Components of CHANCE system should be selected for specific applications on the basis of their technical specifications with regard to the manufacturer's recommendations.

2.2 Usage

The Technical Approval states that the construction product is suitable for use in engineering in the following fields:

- Public roads, within the meaning of and in accordance with the provisions defined in Regulation of the Minister of Transport and Maritime Economy of March 2, 1999 on technical conditions which the public roads and their location should meet (Dz.U. (Journal of Laws No. 43, item 430 as amended) and in Regulation of the Ministry of Transport and Maritime Economy of January 16.
- Internal roads, with no restrictions
- Engineering projects, with no restrictions, within the meaning of and in accordance with the provisions defined in Regulation of the Minister of Transport and Maritime Economy of May 30, 2000 on the technical requirements to be met by traffic engineering objects and their location (Dz.U. (Journal of Laws) No.63, item 735 as amended.)

- Railway engineering projects, with no restrictions, within the meaning of and in accordance with the provisions defined in Regulation of the Ministry of Transport and Maritime Economy of September 10, 1998 on technical conditions which the railway buildings and their location should meet (Dz.U. (Journal of Laws), No. 151, item 978),
- Construction projects of (Fast) Urban Railway “Metro”, with no restrictions,
- Waterways, only for engineering objects and reinforcing embankments
- Aerodromes, only for works on the surface and for vertical signs, within the meaning of and in accordance with the provisions defined in Regulation of the Minister of Transport and Maritime Economy of August 31, 1998 on the technical and construction specifications for civil aerodromes (Dz.U. (Journal of Laws) No. 130, item 859 as amended)

2.3 Conditions of application

Users of „CHANCE” systems may benefit fully from their properties providing that each system has been individually designed for a given application, its specific use for any construction specifications and the specified products have been properly selected in accordance with actual geotechnical, technological and operating conditions and they meet the requirements for components of the system specified in the Technical Approval.

CHANCE shafts must not be welded. All Installers utilizing any of the products of the CHANCE system must be trained for that purpose and obtain Installation certificates of CHANCE system from the manufacturer or its local representative.

Construction product shall be used accordingly to the purposes, regulations and to the extent defined in this Technical Approval, in accordance with the requirements provided in this Technical Approval and relevant regulations concerning particular types of object of the transportation sector. Prior to utilizing the construction product in a way departing from technical and construction regulations a consent for such departure must be obtained, in the manner set out in the in Art. 9 of Construction Law of July, 1994 (Dz.U. (Journal of Laws) of 2006, No. 156, item 1118, as amended).

3. OPERATIONAL AND TECHNICAL PROPERTIES, REQUIREMENTS

3.1 Materials

Properties of steel grade for shafts Type SS and RS must comply with the requirements specified in Table 8. Properties of steel grade for couplings and helical plates must comply with the requirements specified in Table 9.

Table 8

L.p.	Type of element	Product series	Plasticity limit [MPa]	Tensile capacity [MPa]	Testing method in accordance with
1	2	3	4	5	6
1	Type SS shaft	SS5	≥ 482	≥ 689	PN-EN ISO 6892-1:2009
2		SS150 SS175	≥ 620	≥ 827	
3		SS200 SS225			
4	Type RS shaft	RS2875.165	≥ 345	≥ 400	
5		RS2875.203			
6		RS2875.262			
7		RS3500.300			
8		RS4500.337			

Table 9

L.p.	Type of element	Product series	Plasticity limit [MPa]	Tensile capacity [MPa]	Testing method in accordance with
1	2	3	4	5	6
1	Couplings	SS5, SS150	≥ 634	≥ 827	PN-EN ISO 6892-1:2009
2		SS175 SS200 SS225	≥ 723	≥ 861	
3		wszystkie RS	≥ 634	≥ 827	
4	Helical plates	Standard SS5	≥ 345	≥ 450	
		Ordered only SS5	≥ 552	≥ 621	
5		Standard SS150	≥ 552	≥ 621	
		Ordered only SS150	≥ 345	≥ 450	
		Standard SS175, SS200, SS225	≥ 552	≥ 621	
		Standard wszystkie RS	≥ 345	≥ 450	

Helical plates with plasticity limit ≥ 552 and tensile capacity ≥ 661 have a mark “CHANCE & B” stamped on their top side. Helical plates with plasticity limit ≥ 345 and tensile capacity ≥ 450 have a mark “CHANCE” stamped on their top side.

3.2 Shafts, helical plates and couplings

Specifications of the elements of CHANCE system for Type SS shaft are given in the Tables 1, 2 and 6, and in Fig.8. Specifications of the elements of CHANCE system for Type RS shaft are given in the Tables 3 and 4, and in Fig. 9. The specifications must be measured by instruments of 0,01 mm precision. Tolerance is 0,5 mm. The length of elements and diameter, as well as spacing between helical plates must be measured by instruments of 1 mm precision. Tolerance is 5 mm.

Specifications of couplings and the diameter of the opening in the shaft must be measured with precision of 0,1 mm. Tolerance is 0,5 mm.

Strength of couplings connecting the shafts should be measured by applying tension and torque to the connected elements using values defined in Table 10. Tension and torque must be measured with precision of at least 2%.

Table 10

Lp.	Shaft coupling type:	Tensile force [kN]	Torque [kNm]
1	2	3	4
1	SS5	312	7,50
2	SS150	312	9,50
3	SS175	445	14,90
4	SS220	668	21,70
5	SS225	890	31,20
6	RS2875.165, ,	222	6,10
7	RS2875.203	267	7,50
8	RS2875.262	445	10,20
9	RS3500.300	534	17,60
10	RS4500.337	623	31,20

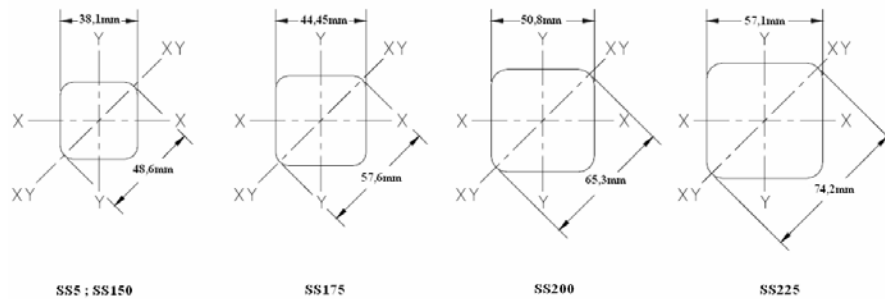


Fig. 8 Cross-section of Type SS shafts

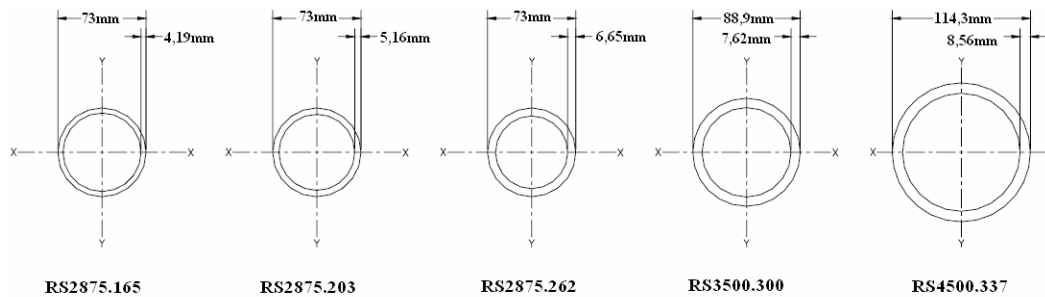


Fig.9 Cross-section of the Type RS shafts

3.3 Corrosion protection

Elements of CHANCE system are protected from corrosion by a zinc coating of at least 500 g/m² thickness which cover their entire surface. Thickness of the zinc coating should be measured in accordance with PN-EN 10244-2:2009.

4. RECOMMENDATIONS CONCERNING PACKAGING, TRANSPORTATION AND LABELING OF THE CONSTRUCTION PRODUCT

4.1 Packaging, storing and transportation

CHANCE shafts must be delivered in bundles, CHANCE couplers must be delivered in bulk containers.

4.2 Labeling the construction product

The construction product must be marked in accordance with Regulation of the Minister of Infrastructure of August 11, 2004 on conformity assessment systems and way of marking construction products with CE-marking (Journal of Laws no. 198, item 2041 as amended).

To each bundle of CHANCE shafts or each package containing other elements of CHANCE system at least two hangtags must be attached containing the following information:

- the name of the article
- name and the address of the manufacturer
- weight of the bundle or package
- production date, number of bundle or package or any identification of production batch
- information confirming that the article has obtained Technical Approval of the Road and Bridge Technical Institute No. AT/2011-02-2692,
- number and date of issuance of the domestic declaration of conformity
- name of the certifying institution which took part in the assessment of conformity.

5. CONFORMITY ASSESMENT OF THE CONSTRUCTION PRODUCT

5.1 CURRENT SYSTEM OF CONFORMITY ASSESMENT

In accordance with Article 4, Article 5 (1) (3) and Article 8 (1) of the Act of April 16, 2004 on construction products (Journal of Laws - Dz. U. No. 92, item 881) products to which this Technical Approval applies may be introduced for sale and used in road construction works to the extent of their operational properties and suitability provided that the Manufacturer performed conformity assessment, issued a domestic declaration of conformity with Technical

Approval of Road and Bridge Technical Institute No. AT/2011-02-2692 and marked the product with a construction mark in accordance with valid regulations.

According to the Regulation of the Minister of Infrastructure of August 11, 2004 on conformity assessment systems and way of marking construction products with CE-marking (Journal of Laws - Dz.U. No. 198, item 2041 as amended) the Manufacturer performs the assessment of the product's conformity with the Technical Approval Road and Bridge Technical Institute Nr AT/2011-02-2692 using **system 2+**.

Within the conformity assessment **system 2+** the Manufacturer may issue a domestic declaration of conformity with the Road and Bridge Technical Institute Technical Approval Nr AT/2011-02-2692 on the basis of:

a) Manufacturer performing the following:

- initial product testing
- factory production control
- testing of the samples collected by the Manufacturer in the production facility, if it is additionally required for harmonized technical specification;

b) Certifying institution issuing certification of the factory production control on the basis of: initial inspection of the production factory and the factory production control, as well as continuous supervision, assessment and acceptance of the factory production control.

5.2 Initial product testing

The aim of initial product testing is to confirm the required technical and operational properties of the product before it is introduced for sale and use.

Initial product testing of particular elements covers:

- confirming the accordance of materials specified in point 3.1 with attestation and certification documents provided by the manufacturers,
- the properties given in Tables 1 to 7,
- the properties given in column 5 of Tables 8 and 9.

Product testing must be repeated in case any changes are introduced to the product, factory production control and/or reference documents, or in all instances when the results of previous testing may be put into question.

Product re-examination may be necessary if raw materials used in production are changed, or significant changes in the technology or conditions of manufacturing occur (for example when the technological line is exchanged or the production factory is relocated).

5.3 Factory Production Control Requirements

Construction product, to which the Technical Approval refers, shall be manufactured according to the factory production control system.

The Manufacturer shall establish, provide documentary evidence, implement and maintain system of the factory production control, in order to ensure that the product entering the market, complies with the requirements of this Technical Approval and declared values. Factory production control system shall include:

- a. procedures, instructions as well as technical specifications and standards
- b. technical description of the product
- c. regular inspections and tests of raw materials and materials
- d. regular inspections and tests of the final product
- e. quality assessment of the final product conducted on the basis of inspection and test results

The results of regular inspections and tests of raw materials and materials, as well as regular inspections and tests of the final product shall be documented in the documentation of factory production control. Manufacturer shall keep a register of documentation regarding factory production control, including proper forms and the logs kept.

Documentation of the factory production control shall be up dated if changes are introduced to the product, to the manufacturing process or to the system of factory production control. Procedures and instruction should contain documentary evidence of the way the following actions are performed:

- a) overseeing the documents and logs,
- b) inspecting raw materials quality and materials quality to confirm its accordance with the established requirements,
- c) overseeing the manufacturing process,
- d) inspections of manufacturing devices and machines, as well as of the equipment used in carrying out product inspections and product tests, which requires measurement traceability,
- e) carrying out assessment of the product's conformity with requirements of this Technical Approval,
- f) dealing with products which do not meet the requirements,
- g) dealing with warranty claims concerning quality of the final product, raw materials or materials,
- h) carrying out corrective and preventive measures,
- i) carrying out internal audits and managements reviews,
- j) personnel training

Quality management system, employed in accordance with PN-EN ISO 9001 requirements, may be accepted as the system of factory production control, if it also meets the requirements of this Technical Approval.

5.4 Testing of the final products

5.4.1 Testing plan

Testing plan includes:

- current testing
- complementary testing

5.4.2 Current testing

The current testing is carried out to check the parameters of particular elements given in the Table 1 and 7, applying tolerance defined in point 3.2.

5.4.3 Complementary testing

Complementary testing includes confirming the accordance of:

- steel grade with the attestation
- couplings (strength) with the values given in point 3.2
- anti-corrosion protection with the values given in point 3.3

5.5 Frequency of testing

Current testing should be conducted in accordance with previously agreed plan of testing, not less than once per each batch of products. The size of the batch should be defined in the documentation of the Factory Production Control.

Complementary testing should be conducted not less often than once a year.

5.6 Testing methods

Testing should be conducted in accordance with the methods given in point 3.

5.7 Collecting samples for testing

Samples for testing should be collected randomly in accordance with the instructions defined in the documentation of the Factory Production Control.

5.8 Assessment of the testing results

The final product may be declared to conform to requirements of the Technical Approval of the Road and Bridge Technical Institute Nr AT/2011-02-2692 provided the results of all the tests are positive.

6. PROCEDURAL ARRANGEMENTS

6.1 Technical Approval of Road and Bridge Technical Institute No. AT/2011-02-2692 does not infringe rights following from the statutory Law on Industrial Property June 30.2000 (Journal of Laws - Dz. U. 2003 No. 119 item 1117 as amended). Securing these rights is an obligation of the manufactures applying for a technical approval of Road and Bridge Technical Institute.

6.2 Technical Approval of Road and Bridge Technical Institute No. AT/2011-02-2692 is a document stating that steel elements of CHANCE system are suitable for micropiles, anchors and soil nails to the extent defined by the provisions of the Technical Approval.

6.3 Technical Approval of Road and Bridge Technical Institute No. AT/2011-02-2692 is not a document allowing the product to be introduced for sale and use in road construction.

Under the provisions of Article 10 of the statutory law of July 7, 1994 Building Law (Journal of Laws - Dz. U. No. 89 item 414 as amended) the product to which the Technical Approval of Road and Bridge Technical Institute No. AT/2011-02-2692 applies, may be used in construction works, provided that it is introduced for sale and use, in accordance with regulations set out in the relevant documents.

6.4 Technical Approval of Road and Bridge Technical Institute No. AT/2011-02-2692 is not a document allowing for marking the product with a construction mark prior to introducing it on the market.

Under the provisions of Article 5.1 (3) and Article 8 of the statutory Law of April 16, 2004 on construction products (Journal of Laws - Dz. U. No. 92 item 881) the product is suitable for use in the construction work provided it is marked with the construction mark.

Marking the construction product with the construction mark is allowed provided that the manufacturer performed the conformity assessment and issued, on his own responsibility, a domestic declaration of product's conformity with the Technical Approval.

6.5 Road and Bridge Technical Institute in Warsaw states, in issuing the Technical Approval, that it accepts no legal liability for infringement of exclusive and acquired rights.

6.6 Technical Approval of Road and Bridge Technical Institute shall not remove the Manufacturer's liability for the quality of the elements of CHANCE system used for manufacturing anchors, micropiles and soil nails, nor the road construction contractor's liability for their appropriate use.

6.7 Technical Approval of Road and Bridge Technical Institute is not a substitute for relevant permissions, issued by construction authorities, necessary for conducting **works for communication engineering**.

6.8 Applicant for this Technical Approval of Road and Bridge Technical Institute is obliged to deliver to the recipients: the elements of CHANCE system for manufacturing anchors,

micropiles and soil nails as well as company's manual in Polish, providing conditions for application, storage and transportation of the products.

7. EXPIRATION DATE

Technical Approval of Road and Bridge Technical Institute No. AT/2011-02-2692 is valid from February 3, 2011 until February 3, 2016.

B. APPROVAL

Under a ministerial decree of the Minister of Infrastructure of November 8, 2004 on Technical Approvals and Bodies Authorized to Their Issue (Journal of Laws - Dz. U. No. 249, item 2497) following proceedings were conducted upon request of the company:

Sub-Surface Technologies, Ltd
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Road and Bridge Technical Institute in Warsaw
has positive view on the construction product and states that:

Elements of CHANCE system for
manufacturing anchors,
micropiles and soil nails

- are suitable for use in communication engineering works, to
the extent defined in the point 2 of this Technical Approval.

Head of the Institute

prof. dr hab. inż. Leszek Rafalski

Warsaw, February 2011

C. ADDITIONAL INFORMATION

KEY WORDS: FOUNDATION, MICROPILES, SOIL NAILS, GROUND ANCHORS, REINFORCING CONSTRUCTION, SECURING EMBANKMENTS.

1. REGULATIONS AND DOCUMENTS REFERRED TO

To refer to dated regulations go only to the edition quoted here. To refer to non-dated regulations go to the most recent edition of the publication (as amended).

PN-EN 1537:2002 Execution of special geotechnical work – Ground anchors

PN-EN 1997-1:2008 Eurocode 7: Geotechnical design – Part 1: General rules

PN-EN 10244-2:2009 Steel wire and wire products - Non-ferrous metallic coatings on steel wire - Part 2: Zinc or zinc alloy coatings.

PN-EN 14199:2008 Execution of special geotechnical work – Micropiles.

PN-EN 14199:2010 Execution of special geotechnical work – Soil Nailing (original).

PN EN 10002-1:2004 Metallic Materials - Tensile Testing - Part 1: Method Of Test At Ambient Temperature

PN-EN ISO 9001 Quality management systems – Requirements

Transportation Law (Dz.U. (Journal of Laws) No.53, of 1984, item 272 as amended)

Act of July 7, 1994 on Building Law (Dz.U. (Journal of Laws) of 2006 No. 156, item 1118 as amended)

Act of June 30, 2000 on Industrial Property Law (Dz.U. (Journal of Laws) of 2003, No.119, item 1117 as amended.)

Act of April 16, 2004 on Construction Products (Dz.U. (Journal of Laws) No.92, item 881)

Regulation of the Minister of Infrastructure of August 11, 2004 on conformity assessment systems and way of marking construction products with CE-marking (Dz.U. (Journal of Laws) no. 198, item 2041 as amended).

Regulation of the Minister of Infrastructure of November 8, 2004 on technical approvals and the bodies entitled to issue technical approvals (Dz. U. (Journal of Laws) No. 249, item 2497 as amended)

Regulation of the Minister of Transport and Maritime Economy of March 2, 1999 on technical conditions which the public roads and their location should meet (Dz.U. (Journal of Laws No. 43, item 430 as amended)

Regulation of the Ministry of Transport and Maritime Economy January 16, 2002 on technical-building regulations regarding paid motorways (Dz.U. (Journal of Laws) No. 12, item 116 as amended)

Regulation of the Minister of Transport and Maritime Economy of May 30, 2000 on the technical requirements to be met by traffic engineering objects and their location (Dz.U. (Journal of Laws) No.63, item 735 as amended).

Regulation of the Ministry of Transport and Maritime Economy of September 10, 1998 on technical conditions which the railway buildings and their location should meet (Journal of Laws, No. 151 item 978)

Regulation of the Minister of Transport and Maritime Economy of August 31, 1998 on the technical and construction specifications for civil aerodromes (Dz.U. (Journal of Laws) No. 130, item 859 as amended)

2. DOCUMENTS USED IN THE APPROVAL PROCEEDINGS

- PN-EN 14490:2010 Execution of special geotechnical works - Soil nailing (*original*)
- *Instrukcja badań podłoża gruntowego budowli drogowych i mostowych. GDDP, Warszawa 1998 r.* (Instruction for testing ground base for road and bridge construction.)
- PN-EN 1997-1:2008 Eurocode 7: Geotechnical designing - general rules.

3. COMPLEMENTARY INFORMATION ABOUT THE PRODUCT

3.1 Complementary elements of CHANCE system

Complementary to the CHANCE system square shaft (Type SS) are lead displacement plates and extension displacement plates (Fig. 10 and 11), which enable to fill in with a cement grout the space around the shaft, above the helical plates. Lead displacement plates are installed after installing the lead section into the soil. Depending on the size of the largest helical plate the diameter of the lead displacement plate may be: 99mm, 127 mm, 178 mm, 216 mm or 254 mm.

Extension displacement plate must be installed on each next extension. The diameter of the extension displacement plate may be 99 mm, 127 mm, 150 mm, 178 mm, 201 mm, 203 mm or 254 mm.

Micropile structure is presented in Fig. 12 and 13.

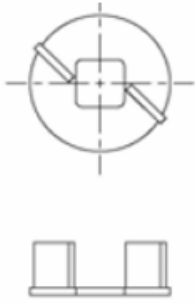


Fig. 10 Lead displacement plate and extension displacement plate used in soils in which the opening remains stable

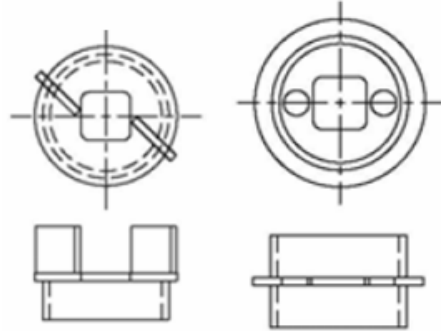
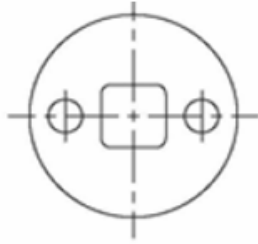


Fig. 11 Lead displacement plate and extension displacement plate used in soils in which pipe sleeves are useful or the opening must be secured with a pipe

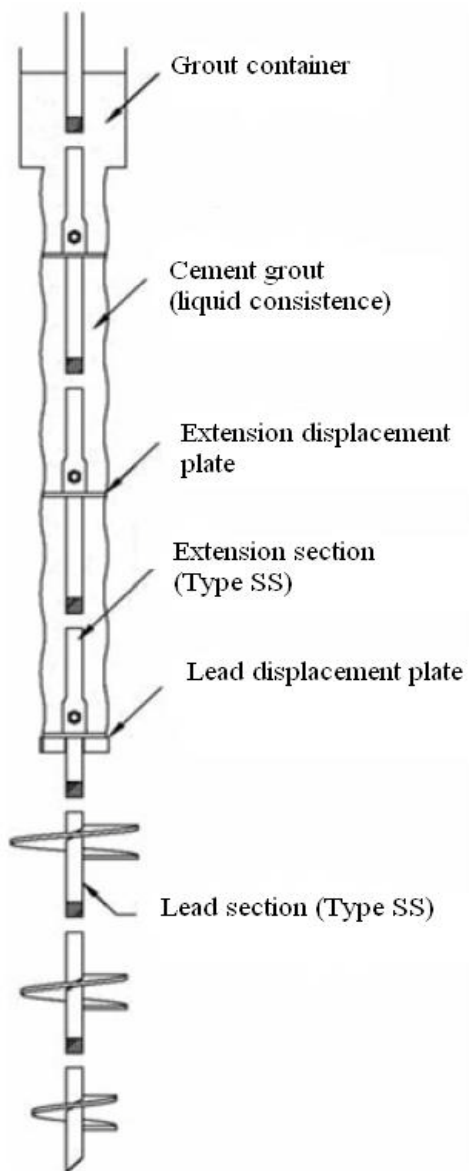


Fig.12 Micropile used in soils where the opening remains stable

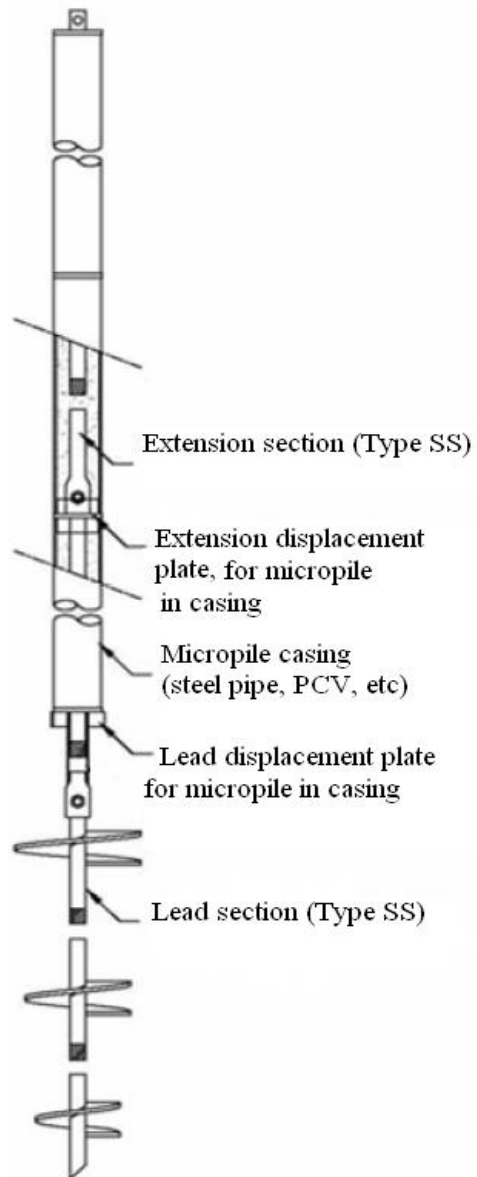


Fig.13 Micropile in soils in which the opening must be secured with a pipe or sleeved shafts are specified for specific soil issues or other engineering needs.

3.2 Recommendations concerning construction project including the use of the elements of CHANCE system

Construction project using CHANCE elements must be carried out by authorized persons and must be compliant with valid norms and regulations. Parts of the project may be prepared by or with participation of an expert sub-contractor or a consultant.

Constructions, where the elements of CHANCE system are used, should be compliant with:

- PN-EN 14199:2008 for micropiles
- PN-EN 1537:2002 for anchors
- PN-EN 14490:2010 for soil nails

Project should be designed on the basis of:

- geotechnical tests performed in accordance with EN 1997-1:2004 Eurocode 7 and Instruction for testing ground base for road and bridge construction GDDP, Warsaw 1998.
- blueprints of an entire building and construction requirements for the elements of CHANCE system.

Project should determine:

- Type, condition and characteristics of the soil including its bearing capacity
- The level of the ground water and permeability of the soil layers
- Corrosion properties of the soil and the ground water
- Information about possible obstacles (e.g. underground installations, old foundation)
- Occurrence of stray electrical currents
- Loads transferred to the construction through the elements of CHANCE system
- Load on the back fill of the retaining structure
- Structure of construction elements and type materials used for their production
- Steps for installation of the elements of CHANCE system, including torque value and depth which must be reached during the installation.

For particular usages defined in point 2 of the Technical Approval of Road and Bridge Technical Institute No. AT/2011-02-2692 the project shall include at least:

- a) Tension and compression micropiles:
 - Axial capacity depending on soil resistance
 - Strength of the material micropiles are made of
 - Methods of securing micropiles in good conditions during the required period of usage
 - Parameters and condition of the underpinned construction
 - Strength of the connection between micropiles and construction
 - Settlement/raising or displacement of foundation or construction

- a) Temporary anchors
 - Pull-out capacity dependent on the soil resistance
 - Balance of the anchored block

- General stability of the anchored construction
 - Strength of the material
 - Strength of the connection between the anchor and construction
 - Displacement of the anchored construction
 - Methods of securing anchors in good conditions during the required period of usage
- b) Soil nails
- Axial capacity of the nail dependent on soil resistance
 - Strength of the material nails are made of
 - Balance of the anchored block
 - General stability of the slope stabilized with the soil nails
 - Movement of the construction stabilized with the soil nails
 - Methods of securing soil nails in good conditions during the required period of usage
 - The type of face of the retaining structure
 - Strength of connection between the construction and the coating
 - In what way the slope is drained

4. APPLICANT/MANUFACTURER

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5. DOMESTIC REPRESENTATIVE OF THE APPLICANT

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