MINOVA

MINOVA SELF DRILLING SYSTEMS.

SELF DRILLING SYSTEMS.

QUALITY ENGINEERING

The system features hollow bars, which are used as a drill string for drilling either with water flush, air flush or cement grout flush.

All system components are rigorously tested according to stringent factory standards based on ISO 9001 to ensure that the specifications are met.

HOLLOW BARS

The hollow bars are fitted with a left-hand R-threads or T-threads for easy extension and connection to conventional rock drilling equipment. The hollow bars are manufactured from seamless steel tubes.

The R-thread according to ISO standards and the T-thread according to factory standard are formed in a cold rolling process. The hollow bolt can be extended using couplers.

COUPLERS

Our patented standard couplers ensure a safe connection of the hollow bars to optimally transfer the impact energy from the drill hammer to the drill bit.

DRILL BITS

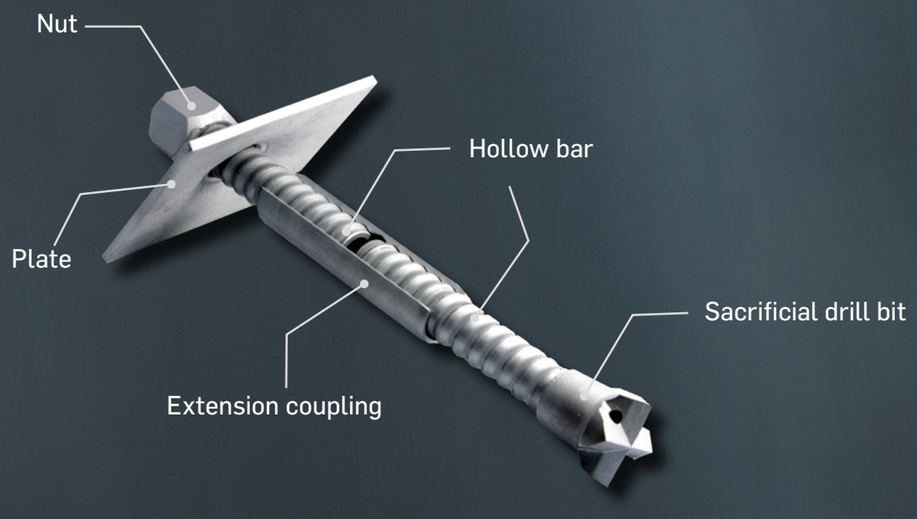
The sacrificial drill bits significantly enhance the productivity of the installation process.

NUTS

The nuts are manufactured with at least one spherical end to compensate for deviations of the borehole angle with respect to the plate surface.

PLATES

The domed or flat plates feature a chamfered bore to ensure firm seating of the nut.



SUPPORT YOU CAN COUNT ON.

Minova Self Drilling Systems provide you with the highest quality and support where you need it the most.

WHERE YOU NEED IT

We offer a wide range of high-performance ground support and consolidation products and services for applications in slope stabilisation, ground engineering, tunnelling, mining and rehabilitation.

With over 135 years of experience in the production and global supply of geotechnical products and services, we provide customised solutions tailored to meet your needs.

The Sellf Drilling Systems products are manufactured by Minova Arnall to meet the highest industrial standards and to provide a quality product that helps you to be safe.

The production facility is certified according to ISO 9001.

A FLEXIBLE SOLUTION

Our offer includes reinforcement solutions for unstable ground conditions such as sand, gravel, silt, clay and soft to medium hard and fractured rock.

Our Self Drilling Systems provide an efficient and cost-effective reinforcement solution.

Our products can be used both as Self Drilling Soil and Rock Nails (SRN) or as Self Drilling Micropiles (MIP).

CERTIFIED QUALITY.

The Self Drilling Systems are available in various lengths and diameters to suit your project needs.

CONTINUOUS IMPROVEMENT

To improve performance and cost-effectiveness of our Self Drilling Systems, we collect project data from around the world.

Our focus is on continuous optimisation of our drill bits to further improve the penetration rate and bit quality while reducing manufacturing costs.

For an improved corrosion resistance, Self Drilling Systems components are either hot dip galvanised or fitted with an Epoxy coating.

ISO CERTIFICATION

Production is certified according to:

- ISO 9001 Quality Management Systems

NATIONAL TECHNICAL APPROVALS

- IBDiM-KOT-2020/0571 Poland

DECLARATIONS

- Environmental Product Declaration - Type III
  No.140/2020 - Instytut Techniki Budowlanej (ITB) Poland

EASY INSTALLATION.

Our Self Drilling hollow bolts offer support particularly in unstable ground conditions.

Conventional ground support and piles require a cased drilling process with retrieval of the casing during grouting in unstable ground conditions.

Minova's Self Drilling Systems have been designed to overcome the need for cased drilling.

The hollow bars can be drilled with water flush, air flush or via simultaneous drilling and grouting.

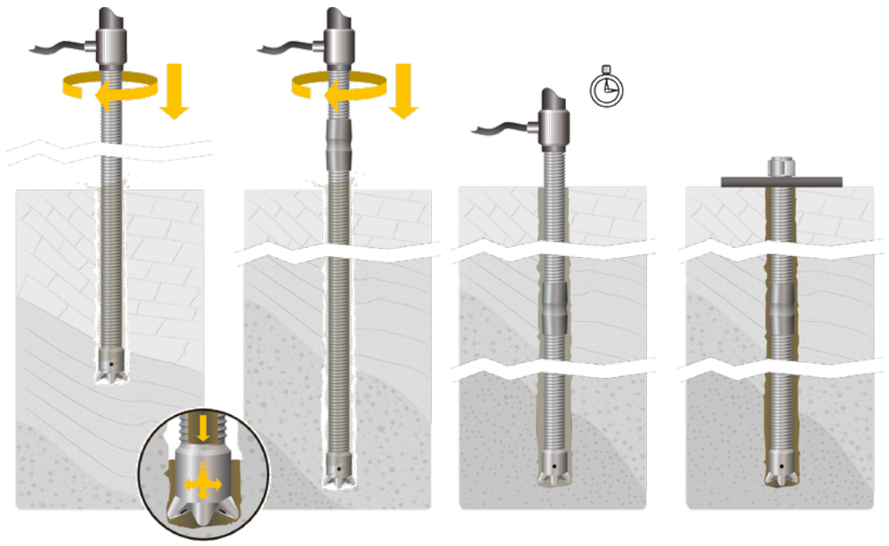
SRNs are typically drilled using water or air flush and are grouted after installation (post grouting).

Micropiles are typically drilled using simultaneous drilling and grouting with the grout serving as the flushing medium while simultaneously stabilising the surrounding ground by filling voids and cracks.

After reaching the final depth, the water to cement ratio is decreased to fill the annular space between hollow bar and borehole wall for optimum load transfer.

Manual, mechanised and automated installation methods are available.

INSTALLATION PROCESS

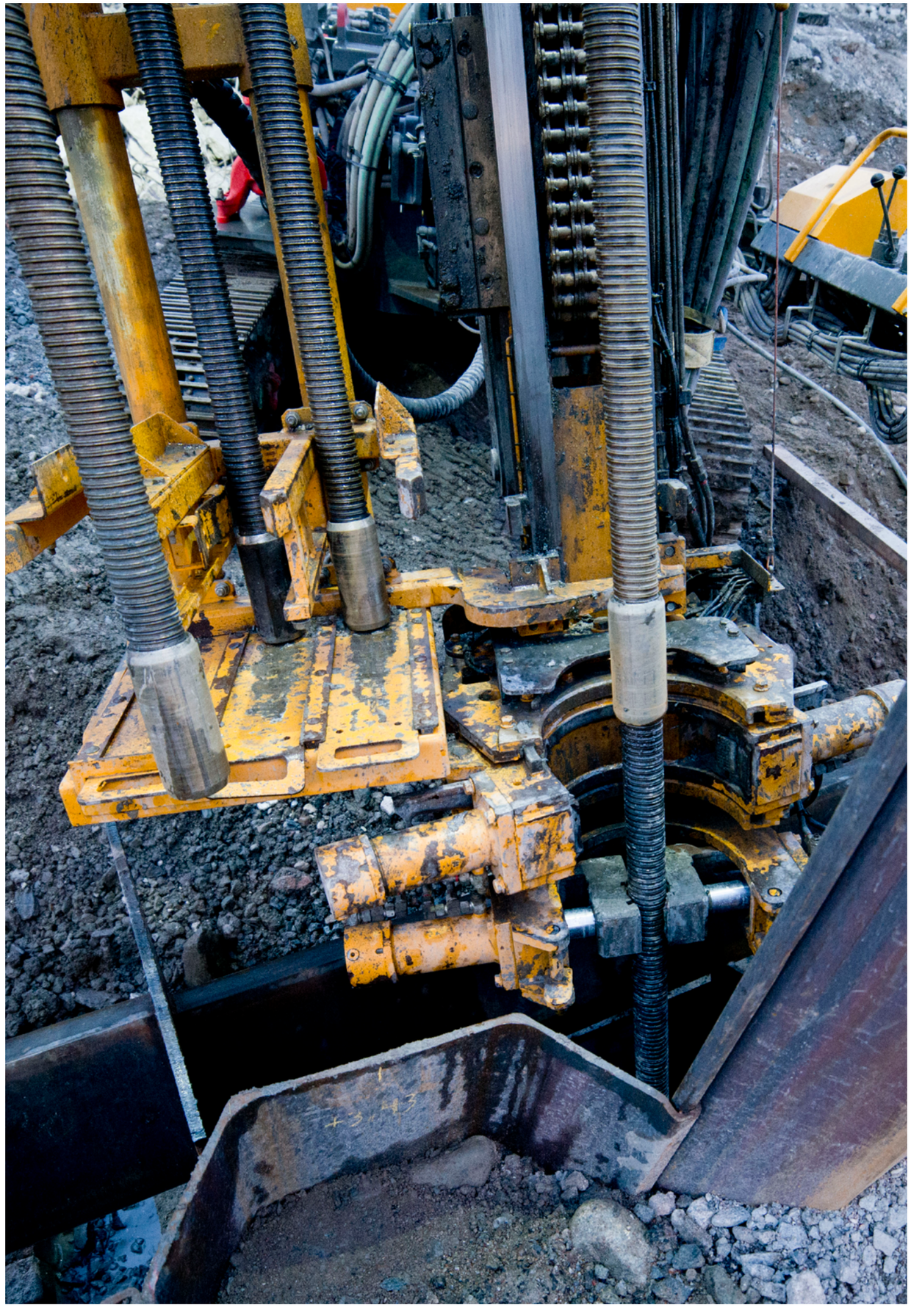


STEP 1
Drilling with grout flush, using a rotary injection adapter

STEP 2
Extension of the pile by using couplers

STEP 3
Curing of the grout

STEP 4
Once the grout is cured, the micropile installation is completed



SELF DRILLING SOIL AND ROCK NAILS.

SURFACE

The SRNs are predominantly subjected to tensile stress, but may also be subjected to bending and shear loads.

In geotechnical engineering, SRNs are used to stabilise natural or artificial slopes or to support structures e.g. retaining walls.

Minova offers various support systems e.g. flexible reinforcing meshes or geotextiles to further stabilise the surface of the slope or rock.

UNDERGROUND

In underground applications, SRNs are predominantly used for forepoling, spiling, face bolting and radial bolting.

Our SRNs provide ideal solutions for weak, unstable or cracked ground conditions and are compatible with our grouting products.

SELF DRILLING MICROPILES.

Dependant on the ground conditions, Self Drilling Micropiles are designed either as end-bearing or friction piles.

The main areas of application include:

- Foundation of new structures
- Underpinning of existing foundations
- Minimising settlements
- Buoyancy control for structures below groundwater level

Self Drilling Micropiles are installed via simultaneous drilling and grouting using cement grout as the flushing medium.

In cohesionless or unstable ground conditions e.g. sand, clay or gravel, this is the fastest and most efficient installation method for micropile systems.

Our Self Drilling Micropiles can be used with smaller drilling equipment, making them ideally suited for projects with limited access, confined spaces or low headroom conditions.

CORROSION PROTECTION.

We offer a suite of complimentary products to help your bolting needs.

PROLONGING THE LIFE SPAN

The required service life is an important design criterion.

The system can be used for temporary (up to 2 years) and permanent applications (up to 50 years and beyond).

Minova provides products for the design of permanent elements in accordance with EN 14199 and EN 14490.

In line to the above mentioned standards, the loss in cross sectional area due to corrosion of the hollow bars and components is taken into account.

The service life of the system is closely linked to ground conditions (soil corrosiveness) and the design load.

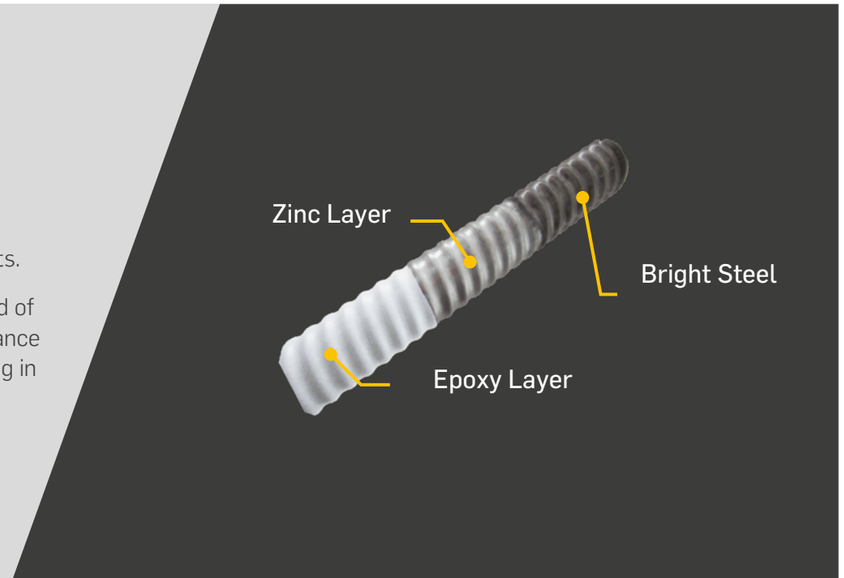
The Minova Self Drilling Systems are available in:

- Bright (uncoated) steel
- Hot dip galvanised according to EN ISO 1461
- Hot dip galvanised according to EN ISO 1461 with an epoxy coating according to EN 12944 on top.

EPOXY COATING

Our epoxy coating process is available for our Self Drilling bolts.

The coating process is comprised of a hot dip galvanisation in accordance to EN ISO 1461 and Epoxy coating in accordance with EN 12944.



LOSS IN CROSS SECTIONAL AREA DUE TO CORROSION

Type	Parameter	Sacrificial corrosion [mm]															
		0	0.05	0.1	0.15	0.2	0.3	0.4	0.45	0.5	0.6	0.7	0.8	0.9	1.0	1.4	1.7
R25N	%	0	2	3	4	5	8	10	12	13	15	18	21	23	25	36	44
R32L	%	0	2	3	4	6	8	11	13	14	17	19	23	25	27	39	48
R32N	%	0	1	2	3	5	7	9	10	11	14	16	18	21	22	32	39
R32S	%	0	1	2	3	4	6	8	9	9	11	13	15	17	18	26	32
R38N	%	0	1	2	2	3	5	6	7	8	9	11	13	14	16	22	27
R51L	%	0	1	2	3	3	5	7	8	8	10	12	14	16	17	25	30
R51N	%	0	1	1	2	3	4	6	7	7	8	10	12	14	14	21	25
T51S	%	0	1	1	2	2	4	5	5	6	7	8	10	11	12	17	20
T63N	%	0	1	1	2	2	4	5	6	6	7	8	9	10	12	16	20
T76N	%	0	1	1	2	3	4	5	6	6	8	10	10	11	13	18	22
T76S	%	0	1	1	2	2	3	4	5	5	6	7	8	9	10	14	17
T111L	%	0	1	1	2	2	3	4	5	5	7	8	9	10	11	15	19
T111N	%	0	0	1	1	2	2	3	4	4	5	6	6	7	8	11	14

Years	Steel	Sacrificial corrosion [mm]		
		l	m	h
2	A	0	0	0.2
	B	0	0	0
7	A	0.15	0.2	0.5
	B	0	0	0.3
10	A	0.15	0.2	-
	B	0	0	-
20	A	0.2	0.4	-
	B	0	0.1	-
30	A	0.3	0.6	-
	B	0	0.3	-
40	A	0.4	0.7	-
	B	0.1	0.45	-
50	A	0.5	0.9	-
	B	0.2	0.6	-
100	A	0.8	1.7	-
	B	0.4	1.4	-

Additional information (residual load capacity due to corrosion for bright and galvanized systems up to 100 years of service life) is available upon request.

Legend
Soil aggressiveness
l = low
m = medium
h = high

Steel
A = bright (uncoated)
B = galvanized, average thickness min. 85 µm

The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer but are to be regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

SELF DRILLING PRODUCTS.

HOLLOW BARS

The system consists of one or several coupled hollow bars for drilling with water or air flush or for simultaneous drilling and grouting.

The hollow bar features a left-hand R-thread (rope thread) or T-thread (trapezoidal thread) for easy extension and connection to all conventional drill rigs. It is manufactured from seamless steel tubes.

The R-thread according to ISO standards and T-thread according to factory standard are both formed in a cold rolling process.

EXTENSION COUPLERS

The couplers are used to extend the hollow bars. The required length of the load-bearing element can thus be achieved also in cases of limited feed length of the drill rig or low headroom conditions.

All couplers are designed to safely transfer the specified system load, with the faces of the hollow bars bearing against each other to ensure safe energy transfer between the hollow bars and the drill bit without affecting the couplers mechanically.

The material is purchased exclusively from carefully selected suppliers with proven expertise in quality. Seamless tubes are used.

Two types of couplers are available:

- Standard couplers with an R-thread or T-thread dependent on the thread of the bar used
- A new thread design allows to significantly reduce the length of the coupler for R-threads thus offering improved economy without impairing the specified system performance (LC coupler)

PLATES

The steel plates feature a chamfered bore allowing an angle of deviation of five degrees in all directions.

We offer a variety of plates dependent on the requirements of your specific project.

NUTS

All nuts are designed to transfer the load from the plate into the hollow bolt. They feature a spherical cap on at least one end to compensate for angle deviations. All nuts are designed to ensure safe transfer of the specified system load.

The material is purchased exclusively from carefully selected suppliers with proven expertise in quality.

Two types of nut options are available:

- Standard nuts with R-thread or T-thread dependent on the thread of the bar used
- A new thread design enables nuts for R-threads to be produced more economically without impairing the specified system performance (LC nut)

NAIL AND PILE NECK PROTECTION TUBE

Protection tubes for soil and rock nails (plastic tubes) and pile neck protection tubes (plastic or steel tubes) are available upon request.

Minova SDA R25

HOLLOW BARS

Item	Type	Length (other lengths on request)		
		2m	3m	4m
Hollow bars bright	R25N	9899100751	9899100750	9899100752
Hollow bars galvanised	R25N	9899101130	9899101131	9899101132

COMPONENTS

Item	Type	Soil Nails
Couplers bright	R25N, L=150mm	9899700032
Couplers galvanised	R25N, L=150mm	9899101136
Couplers LC	R25N, L=90mm	9899710441
Nuts bright	Load bearing	9899100762
Nuts galvanised	Load bearing	9899101136
Plates bright	R25N domed 150 x 150 x 8, ø30mm	9899100795
Plates galvanised	R25N domed 150 x 150 x 8, ø30mm	9899101137

DRILL BITS

Item	Type (other types on request)	Soil Nails
Drill bits	R25/ø51mm/X	9899100778
	R25/ø42mm/EX	9899100780
	R25/ø51mm/EX	9899101506
	R25/ø42mm/EXX	9899101606
	R25/ø42mm/EC	9899710464
	R25/ø42mm/ECC	9899702772

Minova SDA R32

HOLLOW BARS

Item	Type	Length (other lengths on request)		
		2m	3m	4m
Hollow bolts bright	R32L	9899700050	9899700049	9899700051
	R32N	9899100754	9899100755	9899100756
	R32S	9899100758	9899100759	9899100760
Hollow bars galvanised	R32L	9899701377	9899701379	9899701381
	R32N	9899101160	9899101852	9899102188
	R32S	9899101367	9899101366	9899102443
Hollow bars with Epoxy coating	R32N	9899710520	9899710521	9899710522
	R32S	9899710527	9899710528	9899710529

COMPONENTS

Item	Type	Soil Nails	Micropiles
Couplers bright	R32 L & N, L=145mm	9899700083	
	R32S, L=190mm	9899700078	
Couplers galvanised	R32 L & N & S, L=160mm	9899150115	
Couplers with Epoxy coating	R32 L & N & S, L=160mm	9899710569	
Couplers LC	R32 L & N, L=90mm	9899710328	
	R32S, L=110mm	9899710329	
Nuts bright	Load bearing	9899710325	
	Lock nut		9899711188
Nuts galvanised	Load bearing	9899101161	
Nuts LC	Load bearing	9899710325	
Plates bright	R32L domed 150 x 150 x 8, ø35mm	9899702522	
	R32N domed 200 x 200 x 8, ø35mm	9899702521	
	R32S domed 200 x 200 x 10, ø35mm	9899100798	
	R32N flat 95 x 95 x 25, ø35mm, with chamfer	9899702532	
	R32S flat 120 x 120 x 30, ø35mm, with chamfer	9899702533	
Plates galvanised	R32L domed 150 x 150 x 8, ø35mm	9899702518	
	R32N domed 200 x 200 x 8, ø35mm	9899702519	
	R32S domed 200 x 200 x 10, ø35mm	9899101163	
	R32N flat 95 x 95 x 25, ø35mm, with chamfer	9899702535	
	R32S flat 120 x 120 x 30, ø35mm, with chamfer	9899702536	

Minova SDA R32

DRILL BITS

Item	Type (other types on request)	Soil Nails	Micropiles
Drill bits	R32/ø51/X	9899100779	
	R32/ø51/EX	9899100781	
	R32/ø76/EX	9899101267	
	R32/ø90/EX	9899700569	
	R32/ø51/EXX	9899700409	
	R32/ø76/clay	9899702772	
	R32/ø90/clay	9899702773	
	R32/ø110/clay	9899702634	
	R32/ø51/EC	9899150083	
	R32/ø51/ECC	9899150752	
	R32/ø51/ES-F	9899150030	
	R32/ø51/ESS-F	9899150031	
	R32/ø76/ES-F	9899710596	
	R32/ø76/ESS-F	9899710515	

Minova SDA R38

HOLLOW BARS

Item	Type	Length (other lengths on request)		
		2m	3m	4m
Hollow bars bright	R38N	9899100763	9899100764	9899100765
Hollow bars galvanised	R38N	9899102665	9899102043	9899102666
Hollow bars with Epoxy coating	R38N	9899710546	9899710547	9899710548

COMPONENTS

Item	Type	Soil Nails	Micropiles
Couplers bright	R38N, L=220mm	9899700034	
Couplers galvanised	R38N, L=220mm	9899102042	
Couplers with Epoxy coating	R38N, L=220mm	9899710549	
Couplers LC	R38N, L=100mm	9899710327	
Nuts bright	Load bearing	9899710326	
	Lock nut		9899711189
Nuts galvanised	Load bearing	9899101981	
Nuts LC	Load bearing	9899710326	
Plates bright	R38N domed 200 x 200 x 12, ø41mm	9899100800	
	R38N flat 140 x 140 x 35, ø41mm, with chamfer	9899702534	
Plates galvanised	R38N domed 200 x 200 x 12, ø41mm	9899101980	
	R38N flat 140 x 140 x 35, ø41mm, with chamfer	9899702537	

DRILL BITS

Item	Type (other types on request)	Soil Nails	Micropiles
Drill bits	R38/ø110/XX	9899102543	
	R38/ø115/XX	9899700399	
	R38/ø130/XX	9899703259	
	R38/ø150/XX	9899700085	
	R38/ø200/XX	9899703281	
	R38/ø110/clay	9899702774	
	R38/ø115/EXX	9899703304	
	R38/ø130/clay	9899702633	
	R38/ø76/EX	9899100782	
	R38/ø76/EY	9899151017	
	R38/ø76/EYY	9899102623	
	R38/ø90/EX	9899150016	
	R38/ø90/EXX	9899703258	
	R38/ø90/EYY	9899150041	
	R38/ø90/clay	9899702678	
	R38/ø76/ESS-F	9899150029	
	R38/ø90/ES-F	9899710619	
	R38/ø90/ESS-F	9899710620	
	R38/ø115/ESS-D	9899150622	

Minova SDA R51

HOLLOW BARS

Item	Type	Length (other lengths on request)		
		2m	3m	4m
Hollow bars bright	R51L	9899150057	9899150052	9899150064
	R51N	9899150062	9899150061	9899150035
Hollow bars galvanised	R51L	9899700041	9899150988	9899700042
	R51N	9899151312	9899150989	9899700045
Hollow bars with Epoxy coating	R51L	9899710570	9899710561	9899710562
	R51N	9899710375	9899710370	9899710433

COMPONENTS

Item	Type	Soil Nails	Micropiles
Couplers bright	R51L, L=170mm	9899700035	
	R51N, L=220mm	9899700036	
Couplers galvanised	R51 L & N, L=200mm	9899150985	
Couplers with Epoxy coating	R51 L & N, L=200mm	9899710371	
Couplers LC	R51L, L=120mm	9899710412	
	R51N, L=140mm	9899710413	
Nuts bright	Load bearing	9899711137	
	Lock nut		9899711190
Nuts galvanised	Load bearing	9899711142	
Nuts LC	Load bearing	9899710523	
Plates bright	R51L flat 150 x 150 x 40, ø56mm, with chamfer	9899702524	
	R51N flat 180 x 180 x 45, ø56mm, with chamfer	9899702525	
	R51N flat 250 x 250 x 40, ø60mm	9899150097	
Plates galvanised	R51L flat 150 x 150 x 40, ø56mm, with chamfer	9899702526	
	R51N flat 180 x 180 x 45, ø56mm, with chamfer	9899702527	

DRILL BITS

Item	Type (other types on request)	Soil Nails	Micropiles
Drill bits	R51/ø100/XX	9899702977	
	R51/ø110/XX	9899150042	
	R51/ø120/XX	9899700436	
	R51/ø130/XX	9899700066	
	R51/ø76/XX	9899702095	
	R51/ø90/XX	9899702795	
	R51/ø170/XX	9899700456	
	R51/ø175/XX	9899700063	

Minova SDA R51

DRILL BITS (CONTINUED)

Item	Type (other types on request)	Soil Nails	Micropiles
Drill bits	R51/ø183/XX		9899700675
	R51/ø200/XX		9899702974
	R51/ø100/EX		9899702318
	R51/ø115/EX		9899711077
	R51/ø115/EXX		9899711043
	R51/ø130/EX		9899703260
	R51/ø130/EXX		9899703305
	R51/ø200/clay		9899703308
	R51/ø150/clay		9899702586
	R51/ø175/clay		9899702775
	R51/ø76/clay		9899702585
	R51/ø90/EXX		9899703011
	R51/ø90/EY		9899702367
	R51/ø90/clay		9899702756
	R51/ø100/ES-F		9899150022
	R51/ø100/ESS-F		9899150753
	R51/ø115/ES-D		9899150892
	R51/ø115/ESS-D		9899150059
	R51/ø76/ESS-F		9899701917

Minova SDA T51S

HOLLOW BARS

Item	Type	Length (other lengths on request)		
		2m	3m	4m
Hollow bars bright	T51S	9899710582	9899710581	9899710719
Hollow bars galvanised	T51S	9899710750	9899710752	9899710753
Hollow bars with Epoxy coating	T51S	9899710754	9899710755	9899710756

COMPONENTS

Item	Type	Micropiles
Couplers bright	T51S, L=160mm	9899710580
Couplers galvanised	T51S, L=160mm	9899710757
Couplers with Epoxy coating	T51S, L=160mm	9899710763
Nuts bright	Load bearing	9899710724
	Lock nut	9899710748
Nuts galvanised	Load bearing	9899710760
Plates bright	T51S flat 200 x 200 x 50, ø60mm	9899710556
	T51S flat 200 x 200 x 50, ø60mm, with chamfer	9899710725
Plates galvanised	T51S flat 200 x 200 x 50, ø60mm	9899710765
	T51S flat 200 x 200 x 50, ø60mm, with chamfer	9899710767

DRILL BITS

Item	Type (other types on request)	Micropiles
Drill bits	T51/ø175/EX	9899710504
	T51/ø175/clay	9899710505
	T51/ø115/EX	9899710816
	T51/ø115/ESS-F	9899710817
	T51/ø130/clay	9899710818

Minova SDA T63N

HOLLOW BARS

Item	Type	Length (other lengths on request)		
		2m	3m	4m
Hollow bars bright	T63N	9899710906	9899710873	9899710954
Hollow bars galvanised	T63N	9899710971	9899710970	9899710972
Hollow bars with Epoxy coating	T63N	9899710977	9899710978	9899710979

COMPONENTS

Item	Type	Micropiles
Couplers bright	T63N, L=180mm	9899710876
Couplers galvanised	T63N, L=180mm	9899710984
Couplers with Epoxy coating	T63N, L=180mm	9899710985
Nuts bright	Load bearing	9899710874
	Lock nut	9899710875
Nuts galvanised	Load bearing	9899710982
Plates bright	T63N flat 230 x 230 x 55, ø80mm	9899710952
	T63N flat 230 x 230 x 55, ø80mm, with chamfer	9899710884
Plates galvanised	T63N flat 230 x 230 x 55, ø80mm	9899710951
	T63N flat 230 x 230 x 55, ø80mm, with chamfer	9899710953

DRILL BITS

Item	Type (other type on request)	Micropiles
Drill bits	T63/ø115/EX	9899711096
	T63/ø115/ESS-F	9899711097
	T63/ø130/clay	9899711098

Minova SDA T76

HOLLOW BAR

Item	Type	Length (other lengths on request)		
		2m	3m	4m
Hollow bar bright	T76N	9899150644	9899150650	9899150651
	T76S	9899151102	9899151103	9899151104
Hollow bar galvanised	T76N	9899700319	9899700320	9899700321
	T76S	9899700323	9899700324	9899700202
Hollow bars with Epoxy coating	T76N	9899710518	9899710343	9899710492
	T76S	9899710571	9899710563	9899710564

COMPONENTS

Item	Type	Micropiles
Couplers bright	T76, L=220mm	9899150646
Couplers galvanised	T76, L=220mm	9899700325
Couplers with Epoxy coating	T76, L=220mm	9899710344
Nuts bright	Load bearing	9899150645
	Lock nut	9899711191
Nuts galvanised	Load bearing	9899700326
Plates bright	T76 flat 250 x 250 x 60, ø90mm, with chamfer	9899151047
Plates galvanised	T76 flat 250 x 250 x 60, ø90mm, with chamfer	9899703288

DRILL BITS

Item	Type (other types on request)	Micropiles
Drill bits	T76/ø130/XX	9899700003
	T76/ø145/XX	9899700493
	T76/ø175/XX	9899152281
	T76/ø200/XX	9899700094
	T76/ø280/XX	9899701526
	T76/ø300/XX	9899710003
	T76/ø130/EX	9899700054
	T76/ø130/clay	9899702749
	T76/ø150/EX	9899700473
	T76/ø150/EXX	9899703306
	T76/ø150/clay	9899702743
	T76/ø175/clay	9899702744
	T76/ø200/EXX	9899703307
	T76/ø200/clay	9899702750
	T76/ø120/ESS-F	9899700093

Minova SDA T111

HOLLOW BARS

Item	Type	Length (other lengths on request)		
		2m	3m	4m
Hollow bars bright	T111L	9899701772	9899701773	9899701774
	T111N	9899701767	9899701768	9899701769
Hollow bars galvanised	T111L	9899710169	9899702687	9899710170
	T111N	9899710171	9899702688	9899710172
Hollow bars with Epoxy coating	T111L	9899710572	9899710438	9899710566
	T111N	9899710573	9899710565	9899710567

COMPONENTS

Item	Type	Micropiles
Couplers bright	T111, L=250mm	9899701777
Couplers galvanised	T111, L=250mm	9899702690
Couplers with Epoxy coating	T111, L=250mm	9899710568
Nuts bright	Load bearing	9899701778
	Lock nut	9899711192
Nuts galvanised	Load bearing	9899702692
Plates bright	T111L flat 300 x 300 x 80, ø130mm, with chamfer	9899702098
	T111N flat 350 x 350 x 90, ø130mm, with chamfer	9899702099
Plates galvanized	T111L flat 300 x 300 x 80, ø130mm, with chamfer	9899703289
	T111N flat 350 x 350 x 90, ø130mm, with chamfer	9899703290

DRILL BITS

Item	Type (other types on request)	Micropiles
Drill bits	T111/ø175/XX	9899710294
	T111/ø220/EX-4	9899701780
	T111/ø220/EX-5	9899702412
	T111/ø220/clay	9899701779
	T111/ø170/ESS-F	9899701781

TECHNICAL DATA

PRODUCT SPECIFICATION AND CHARACTERISTIC LOAD-BEARING CAPACITIES OF THE HOLLOW BAR SYSTEM

Line	Parameter		Type R							Type T					
			R25	R32L	R32N	R32S	R38N	R51L	R51N	T51S	T63N	T76N	T76S	T111L	T111N
1	Nominal diameter $D_{a,\,nom}$	mm	25	32	32	32	38	51	51	51	63	76	76	111	111
2	Outer diameter D_a	mm	24.7	31.3	31.3	31.3	38.0	50.0	50.0	51.9	64.9	75.4	75.4	111.0	111.0
3	Inner diameter D_i [1]	mm	14.0	20.6	18.5	15.0	19.0	33.3	30.2	26.6	40.6	51.0	44.0	85.0	75.5
4	Nominal cross sectional erea S_0 [2]	mm^2	300	350	430	520	750	900	1070	1325	1720	1870	2400	3185	4395
5	Nominal mass m [3]	kg/m	2.35	2.75	3.4	4.1	5.9	7.05	8.4	10.4	13.5	14.7	18.85	25.0	34.5
6	Relative rib area f_R	-	0.12							0.24					
7	Nominal yield load $F_{p0.2,\,nom}$	kN	150	160	230	280	400	450	630	750	900	1200	1500	2000	2750
8	Nominal tensile load-bearing capacity $F_{m,\,nom}$ [4]	kN	200	210	280	360	500	550	800	1050	1400	1600	1900	2640	3650
9	Yield strength $R_{p0.2}$ [5]	N/mm^2	500	460	530	530	530	500	590	570	520	640	630	630	630
10	Tensile strength R_m [5]	N/mm^2	670	600	650	690	660	610	750	790	810	860	790	830	830
11	R_m / $Rp_{0.2}$ [6]	-	≥1.15												
12	Total elongation at maximum load A_{gt}	%	≥2.5	≥5.0											
13	Fatique strength $2x\sigma_a$ [7]	N/mm^2	≥120							≥100					
14	Notch effect according to EN 1993-1-9	N/mm^2	90							70					
15	Bond strength t_{ak} [8]	N/mm^2	≥2.8							≥5.3					
16	Moment of inertia I [9]	mm^4	11 200	25 800	29 800	33 300	75 700	179 000	211 000	215 000	480 000	863 000	977 000	3 580 000	4 110 000
17	Thread	-	ISO 10208					ISO 1720		Factory Standard					

LEGEND

[1] Mean value
[2] Calculated based on nominal mass m, $S_0 = 10^3 \times m / 7.85$
[3] Allowable deviation - 3% to + 9%
[4] Characteristic value as 5% fractile
[5] Calculated based on nominal force and nominal cross sectional area, rounded value
[6] Characteristic value as 10% fractile

Modulus of elasticity E ≈ 205 000 N/mm^2

[7] Determined at an upper load of Fup = 0.7 x $F_{p0.2,\,nom}$ for the hollow bar, coupler and anchorage 80 N/mm^2
[8] Characteristic value, determined in pull-out tests. The values are based on a mean value with a slip of 0.01, 0.1 and 1.0 mm and a cylinder compressive strength of cement grout of ≥40 N/mm^2
[9] Determined in bending test. Relative to a modulus of elasticity of 205 000 N/mm^2 and reduction by 5% to take into account deviations in the mass tolerances

SELF DRILLING ACCESSORIES.

We offer a suite of complementary products to address your bolting needs.

SACRIFICIAL DRILL BITS & ADAPTERS

The correct selection of the drill bit dependent on the geological conditions on site is essential to ensuring a productive and cost-effective installation of the hollow bars. Conventional drill bits are designed for longevity. We offer a wide range of drill bits suitable for diverse geological conditions. Drill bit adapters increase flexibility by allowing the use of drill bits designed for other dimensions of hollow bars.

COUPLING BOXES

Coupling boxes (crossover couplers) must be installed between the shank adapter and the hollow bar during the drilling operation. Since this section of the drill string is directly and continuously subjected to the impact energy of the drill hammer, our coupling boxes are manufactured from hardened steel and are intended for multiple uses.

SPACERS OR CENTRALISERS

Spacers are used to centre the hollow bars within the borehole and to ensure the correct grout cover of the load-bearing element according to the relevant standards and as specified in the approvals.

GROUT SWIVELS

The grout swivels consist of a grout body and a swivel shaft and are attached to the shank adapter. The grout swivels are suitable for simultaneous drilling and grouting.

PULL TEST EQUIPMENT

A CE-approved pull tester is available to test the self-drilling nails and piles after installation of the system and curing of the grout body.

ACCESSORIES

DRILL BITS

Bit shape											
Bit type	Clay Bit	XX	EX	EC	ES-F	ES-D	EY	EYY	ECC	EXX	ESS-F

DRILL BIT ADAPTERS

Item		Part number
Drill bit adapter R32/R25		9899151091
Drill bit adapter R38/R32		9899150008
Drill bit adapter R51/R38		9899151092
Drill bit adapter R51/T51		9899710500
Drill bit adapter T63/T76		9899711195

INJECTION ADAPTERS

Item	Type	Part number
Injection adapter R25/1"	R25	9899102514
Injection adapter R32/"1	R32	9899101952
Injection adapter R38/1"	R38	9899102542
Injection adapter R51/1"	R51	9899150067
Injection adapter T51/1"	T51	9899711343
Injection adapter T63/1"	T63	9899711344
Injection adapter T76/ 6/4"	T76	9899151830

PULL TESTER

Item		Part number
Pull tester SDA manual hydraulic 300kN complete		**9899710812**

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