



# SELF DRILLING SYSTEMS



ALWAYS AHEAD >>>>

# 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

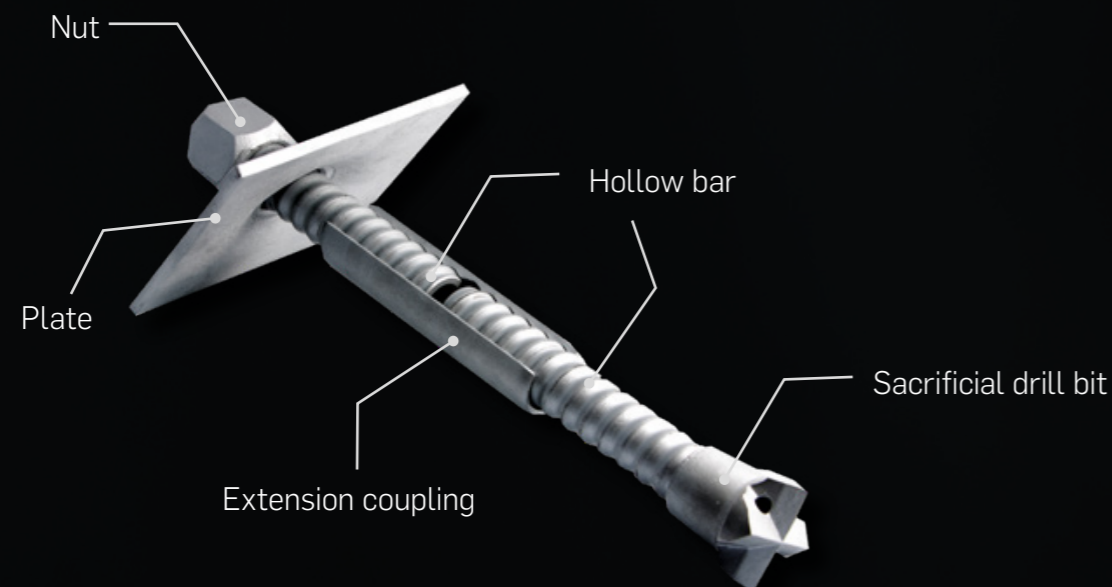
The sacrificial drill bits significantly enhance the productivity of the installation process.

## 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 Self 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

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

## HIGH PERFORMING & COST EFFECTIVE

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 galvanized 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 Instytut Badawczy Dróg i Mostów (IBDiM) Poland
- > Certificate of Conformity of the Factory Production Control No 052-UWB-012

## EUROPEAN TECHNICAL APPROVALS

- > ETA-11/0134 Austrian Institute of Building Engineering (OIB) Austria
- > Certificate of Conformity of the Factory Production Control No 2579-CPR-0009

## DECLARATIONS

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

# EASY INSTALLATION

Our Self Drilling hollow bolts are specifically designed to be used in all ground types, including unstable and difficult 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.

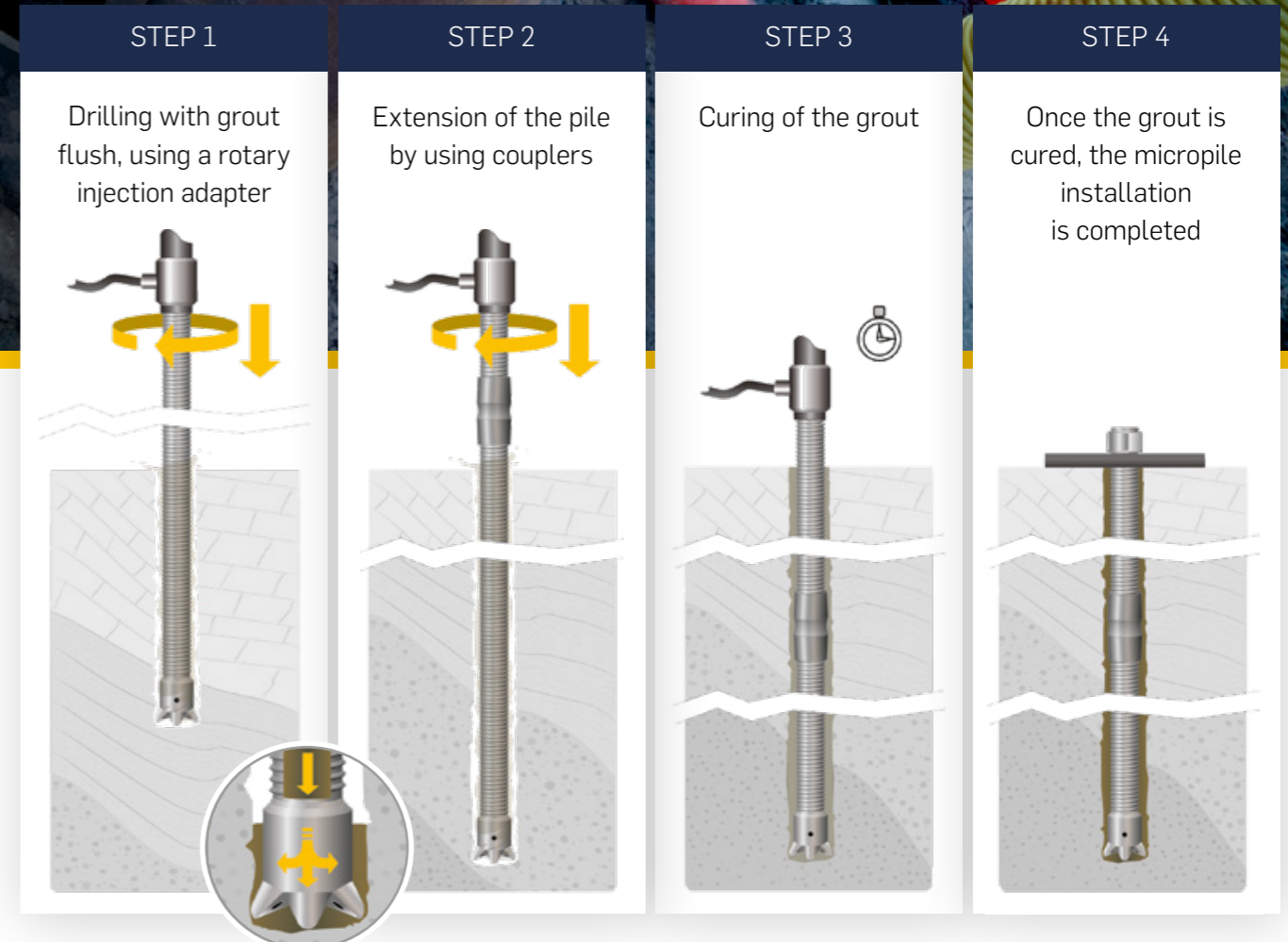
The hollow bars can be drilled with water flush, air flush or via simultaneous drilling and grouting.

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.





# 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.

# 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.



# 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.

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.

## TWINCOAT™ PROCESS

Our TwinCoat process is available for our SDA anchors.

The coating process is comprised of a hot dip galvanisation in accordance to EN ISO 1461 and Epoxy coating in accordance with ISO 2178.

The TwinCoat process is tested for suitability in accordance with corrosion category C5-M and Im3 (durability range according to ISO 12944-2).

Testing performed by OFI (Austria) and ITB (Poland)



# 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)

## 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)

HOLLOW BARS	
Item	Type
Hollow bars bright	R25N
Hollow bars galvanised	R25N

DRILL BITS	
Type (other types on request)	
R25/ø51mm/X	
R25/ø42mm/EX	
R25/ø51mm/EX	
R25/ø42mm/EXX	
R25/ø42mm/EC	
R25/ø42mm/ECC	

## 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.

## 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.

COMPONENTS	
Item	Type
Couplers bright	R25N, L=150mm
Couplers galvanised	R25N, L=150mm
Couplers LC	R25N, L=90mm
Nuts bright	Load bearing
Nuts galvanised	Load bearing
Plates bright	R25N domed 150 x 150 x 8, ø30mm
Plates galvanised	R25N domed 150 x 150 x 8, ø30mm

# MINOVA SDA R32

# MINOVA SDA R38

HOLLOW BARS	
Item	Type
Hollow bolts bright	R32L
	R32N
	R32S
Hollow bars galvanised	R32L
	R32N
	R32S
Hollow bars with Epoxy coating	R32N
	R32S

DRILL BITS	
Type (other types on request)	
R32/ø51/X	
R32/ø51/EX	
R32/ø76/EX	
R32/ø90/EX	
R32/ø51/EXX	
R32/ø76/clay	
R32/ø90/clay	
R32/ø110/clay	
R32/ø51/EC	
R32/ø51/ECC	
R32/ø51/ES-F	
R32/ø51/ESS-F	
R32/ø76/ES-F	
R32/ø76/ESS-F	

COMPONENTS	
Item	Type
Couplers bright	R32 L & N, L=145mm
	R32S, L=190mm
Couplers galvanised	R32 L & N & S, L=160mm
Couplers with Epoxy coating	R32 L & N & S, L=160mm
	R32S, L=110mm
Couplers LC	R32 L & N, L=90mm
	R32S, L=110mm
Nuts bright	Load bearing
	Lock nut
Nuts galvanised	Load bearing
	Lock nut
Nuts LC	Load bearing
	Lock nut
Plates bright	R32L domed 150 x 150 x 8, ø35mm
	R32N domed 200 x 200 x 8, ø35mm
	R32S domed 200 x 200 x 10, ø35mm
Plates galvanised	R32N flat 95 x 95 x 25, ø35mm, with chamfer
	R32S flat 120 x 120 x 30, ø35mm, with chamfer
	R32N flat 95 x 95 x 25, ø35mm, with chamfer
Plates galvanised	R32L domed 150 x 150 x 8, ø35mm
	R32N domed 200 x 200 x 8, ø35mm
	R32S domed 200 x 200 x 10, ø35mm
Plates galvanised	R32N flat 95 x 95 x 25, ø35mm, with chamfer
	R32S flat 120 x 120 x 30, ø35mm, with chamfer
	R32N flat 95 x 95 x 25, ø35mm, with chamfer

HOLLOW BARS	
Item	Type
Hollow bars bright	R38N
Hollow bars galvanised	R38N
Hollow bars with Epoxy coating	R38N

DRILL BITS	
Type (other types on request)	
R38/ø110/XX	
R38/ø115/XX	
R38/ø130/XX	
R38/ø150/XX	
R38/ø200/XX	
R38/ø110/clay	
R38/ø115/EXX	
R38/ø130/clay	
R38/ø76/EX	
R38/ø76/EY	
R38/ø76/EYY	
R38/ø90/EX	
R38/ø90/EXX	
R38/ø90/EYY	
R38/ø90/clay	

COMPONENTS	
Item	Type
Couplers bright	R38N, L=220mm
Couplers galvanised	R38N, L=220mm
Couplers with Epoxy coating	R38N, L=220mm
Couplers LC	R38N, L=100mm
Nuts bright	Load bearing
	Lock nut
Nuts galvanised	Load bearing
	Lock nut
Nuts LC	Load bearing
	Lock nut
Plates bright	R38N domed 200 x 200 x 12, ø41mm
	R38N flat 140 x 140 x 35, ø41mm, with chamfer
Plates galvanised	R38N domed 200 x 200 x 12, ø41mm
	R38N flat 140 x 140 x 35, ø41mm, with chamfer

# MINOVA SDA R51

# MINOVA SDA T51S

HOLLOW BARS	
Item	Type
Hollow bars bright	R51L
	R51N
Hollow bars galvanised	R51L
	R51N
Hollow bars with Epoxy coating	R51L
	R51N

COMPONENTS	
Item	Type
Couplers bright	R51L, L=170mm
	R51N, L=220mm
Couplers galvanised	R51 L & N, L=200mm
Couplers with Epoxy coating	R51 L & N, L=200mm
Couplers LC	R51L, L=120mm
	R51N, L=140mm
Nuts bright	Load bearing
	Lock nut
Nuts galvanised	Load bearing
Nuts LC	Load bearing
Plates bright	R51L flat 150 x 150 x 40, ø56mm, with chamfer
	R51N flat 180 x 180 x 45, ø56mm, with chamfer
	R51N flat 250 x 250 x 40, ø60mm
Plates galvanised	R51L flat 150 x 150 x 40, ø56mm, with chamfer
	R51N flat 180 x 180 x 45, ø56mm, with chamfer

DRILL BITS	
Type (other types on request)	
R51/ø100/XX	
R51/ø110/XX	
R51/ø120/XX	
R51/ø130/XX	
R51/ø76/XX	
R51/ø90/XX	
R51/ø170/XX	
R51/ø175/XX	
R51/ø183/XX	
R51/ø200/XX	
R51/ø100/EX	
R51/ø115/EX	
R51/ø130/EX	
R51/ø130/EXX	
R51/ø200/clay	
R51/ø150/clay	
R51/ø175/clay	
R51/ø76/clay	
R51/ø90/EXX	
R51/ø90/EY	
R51/ø90/clay	
R51/ø100/ES-F	
R51/ø100/ESS-F	
R51/ø115/ES-D	
R51/ø115/ESS-D	
R51/ø76/ESS-F	

HOLLOW BARS	
Item	Type
Hollow bars bright	T51S
Hollow bars galvanised	T51S
Hollow bars with Epoxy coating	T51S

DRILL BITS	
Type (other types on request)	
T51/ø175/EX	
T51/ø175/clay	
T51/ø115/EX	
T51/ø115/ESS-F	
T51/ø130/clay	

COMPONENTS	
Item	Type
Couplers bright	T51S, L=160mm
Couplers galvanised	T51S, L=160mm
Couplers with Epoxy coating	T51S, L=160mm
Nuts bright	Load bearing
	Lock nut
Nuts galvanised	Load bearing
Plates bright	T51S flat 200 x 200 x 50, ø60mm
	T51S flat 200 x 200 x 50, ø60mm, with chamfer
Plates galvanised	T51S flat 200 x 200 x 50, ø60mm
	T51S flat 200 x 200 x 50, ø60mm, with chamfer

# MINOVA SDA T63N

# MINOVA SDA T76

HOLLOW BARS	
Item	Type
Hollow bars bright	T63N
Hollow bars galvanised	T63N
Hollow bars with Epoxy coating	T63N

DRILL BITS	
Type (other type on request)	
T63/ø115/EX	
T63/ø115/ESS-F	
T63/ø130/clay	

COMPONENTS	
Item	Type
Couplers bright	T63N, L=180mm
Couplers galvanised	T63N, L=180mm
Couplers with Epoxy coating	T63N, L=180mm
Nuts bright	Load bearing
	Lock nut
Nuts galvanised	Load bearing
Plates bright	T63N flat 230 x 230 x 55, ø80mm
	T63N flat 230 x 230 x 55, ø80mm, with chamfer
Plates galvanised	T63N flat 230 x 230 x 55, ø80mm
	T63N flat 230 x 230 x 55, ø80mm, with chamfer

HOLLOW BAR	
Item	Type
Hollow bar bright	T76N
	T76S
Hollow bar galvanised	T76N
	T76S
Hollow bars with Epoxy coating	T76N
	T76S

COMPONENTS	
Item	Type
Couplers bright	T76, L=220mm
Couplers galvanised	T76, L=220mm
Couplers with Epoxy coating	T76, L=220mm
Nuts bright	Load bearing
	Lock nut
Nuts galvanised	Load bearing
Plates bright	T76 flat 250 x 250 x 60, ø90mm, with chamfer
Plates galvanised	T76 flat 250 x 250 x 60, ø90mm, with chamfer

DRILL BITS	
Type (other types on request)	
T76/ø130/XX	
T76/ø145/XX	
T76/ø175/XX	
T76/ø200/XX	
T76/ø280/XX	
T76/ø300/XX	
T76/ø130/EX	
T76/ø130/clay	
T76/ø150/EX	
T76/ø150/EXX	
T76/ø150/clay	
T76/ø175/clay	
T76/ø200/EXX	
T76/ø200/clay	
T76/ø120/ESS-F	

# MINOVA SDA T111

HOLLOW BARS	
Item	Type
Hollow bars bright	T111L
	T111N
Hollow bars galvanised	T111L
	T111N
Hollow bars with Epoxy coating	T111L
	T111N

DRILL BITS	
Type (other types on request)	
T111/ø175/XX	
T111/ø220/EX-4	
T111/ø220/EX-5	
T111/ø220/clay	
T111/ø170/ESS-F	

COMPONENTS	
Item	Type
Couplers bright	T111, L=250mm
Couplers galvanised	T111, L=250mm
Couplers with Epoxy coating	T111, L=250mm
Nuts bright	Load bearing
	Lock nut
Nuts galvanised	Load bearing
Plates bright	T111L flat 300 x 300 x 80, ø130mm, with chamfer
	T111N flat 350 x 350 x 90, ø130mm, with chamfer
Plates galvanised	T111L flat 300 x 300 x 80, ø130mm, with chamfer
	T111N flat 350 x 350 x 90, ø130mm, with chamfer

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 area $S_0$ 2)	mm <sup>2</sup>	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 <sup>2</sup>	500	460	530	530	530	500	590	570	520	640	630	630	630
10	Tensile strength $R_m$ 5)	N/mm <sup>2</sup>	670	600	650	690	660	610	750	790	810	860	790	830	830
11	$R_m / R_{p0.2}$ 6)	-								≥1.15					
12	Total elongation at maximum load $A_{gt}$	%	≥2.5								≥5.0				
13	Fatigue strength $\sigma_a$ 7)	N/mm <sup>2</sup>	≥120							≥100					
14	Notch effect according to EN 1993-1-9	N/mm <sup>2</sup>	90							70					
15	Bond strength $t_{ak}$ 8)	N/mm <sup>2</sup>	≥2.8							≥5.3					
16	Moment of inertia $I$ 9)	mm <sup>4</sup>	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  $m$ ,  $S = 10^3 \times m / 7.85$
- 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  $E \approx 205\,000\text{ N/mm}^2$

- 7) Determined at an upper load of  $F_{up} = 0.7 \times F_{p0.2}$ , nom for the hollow bar, coupler and anchorage  $80\text{ N/mm}^2$
- 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  $\geq 40\text{ N/mm}^2$
- 9) Determined in bending test. Relative to a modulus of elasticity of  $205\,000\text{ N/mm}^2$  and reduction by 5% to take into account deviations in the mass tolerances

# SELF DRILLING ACCESSORIES



## 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.

DRILL BITS										
Bit Shape										
Bit Type	CRC	EX	EC	ES-F	ES-D	EY	EYY	ECC	EXX	ESS-F
Type of soil / ground	Soft clay and soil	Loose to dense soil/sand, including bands of soft rock	Loose to dense soil/sand, including bands of soft rock	Weak cemented soil/sands and weak fractured rock & plain concrete	Weak cemented soil/sands and weak fractured rock & plain concrete	Weak cemented soil/sands and weak fractured rock & plain concrete	Medium fractured rock formations	Medium fractured rock formations	Medium to strong fractured rock formations	Strong fractured rock formations
SPT-N Value	< 40	< 50	< 50	> 50	> 50	> 50	> 50	> 50	> 50	> 50
UCT (N/mm <sup>2</sup> )	< 10 Mpa	< 10 Mpa	< 10 Mpa	< 10 Mpa	< 10 Mpa	< 10 Mpa	< 50 Mpa	< 50 Mpa	< 70 Mpa	< 100 Mpa
R32	76	51	51	51	90	76	76	51	51	51
	90	76	76	76		90	90	76	76	76
	100	90	90	90				90	90	90
	110	100		100						100
R38	76	76	76	76	90	76	76	76	76	76
	90	90	90	90	115	90	90	90	90	90
	100	100		100					100	100
	110	110		115					115	115
	120	115								
with adaptor		115		130						130
		130								
R51	90	90		110	115				115	90
	100	115		130					130	100
	110	130								115
	130									130
	150									150
T76	130	130							150	120
	150	150							200	130
	175									
	200									
T111	220		220						170	

INJECTION ADAPTERS	
Item	Type
Injection adapter R25/1"	R25
Injection adapter R32/1"	R32
Injection adapter R38/1"	R38
Injection adapter R51/1"	R51
Injection adapter T51/1"	T51
Injection adapter T63/1"	T63
Injection adapter T76/ 6/4"	T76

PULL TESTER	
Item	
Pull tester SDA manual hydraulic 300kN complete	

DRILL BIT ADAPTERS	
Item	
Drill bit adapter R32/R25	
Drill bit adapter R38/R32	
Drill bit adapter R51/R38	
Drill bit adapter R51/T51	
Drill bit adapter T63/T76	

# ALWAYS >>>> SOLUTIONS



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