

ROBIT ROCKTOOLS **CASING SYSTEMS**



Forepoling

Anchoring

Piling and underpinning

Water and thermal well drilling

Site investigation

Horizontal drilling



Robit[®]
ROCKTOOLS

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ROBIT ROCKTOOLS IN BRIEF

Since 1985 Robit® has been in the front line of drilling business providing high quality drilling tools for mines, quarries, and construction sites around the world. Having its roots in Finnish mining industry Robit® masters the knowledge of drilling in the most challenging rock types. Still it drives to utilize the experience of the end users to develop even better products

with best materials and high precision manufacturing process. Widespread global dealer network guarantees that even the smallest countries receive best customer service available. More holes – more value for the customer has always been the driving force of Robit Rocktools Ltd – the company with faces.

PRODUCT LINES

Rocktools - Button bits

Rocktools offering covers all construction, quarrying and mining drill&blast applications from soft to hardest rock conditions. Tunnelling is one of the most important customer segments for Robit® bits and applications like drifting, cuthole and bolthole drilling are well covered. Also major mining and quarrying customers have approved Robit® quality worldwide.

Ground drilling tools

Robit® Casing Systems products are the key components of the Ground Drilling Tools product line. Its patented locking system enables easy and reliable drilling cost effectively. Robit® Casing Systems have worldwide several references in following ground drilling applications:

- Forepoling
- Anchoring
- Piling and underpinning
- Horizontal drilling
- Water and thermal well drilling
- Soil investigation/monitoring
- Underwater drilling

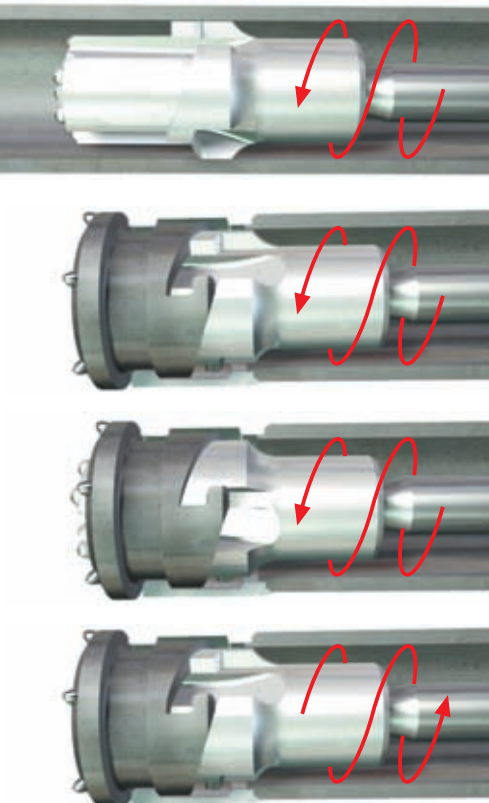


TECHNOLOGICAL FEATURES



Major studies have been carried out with high level **Finnish** research centers to **improve the Robit® Casing Systems**.

AUTOMATIC SPIRAL LOCKING (Patented):



1) Drive the pilot bit through the casing tube

2) Rotate to locked position with the ring bit

3) Robit® Casing System is **READY TO DRILL**

4) Finish drilling by rotating the pilot bit in opposite direction and pulling it out

Robit® Casing Systems high and even quality is guaranteed with **high precision Finnish manufacturing process**.

Robit uses the best materials available:

- **high quality Scandinavian steel** for the bit bodies
- extremely durable **tungsten carbide** for the buttons



CUSTOMER BENEFITS



OPERATIONAL BENEFITS

- Fast Drilling and Easy Handling
- Carefree Drilling
- Straight Holes
- No Unnecessary Flushing to Soil

ECONOMICAL BENEFITS

- More Holes in Time Unit
- Low Set-Up Times
- Long Pilot Bit Lifetime
- Low Investment and Running Costs
- Even Quality

ROBIT SERVICE BENEFITS

- Customer Orientation
- Reliable Deliveries in More Than 50 Countries
- Advice on Needs

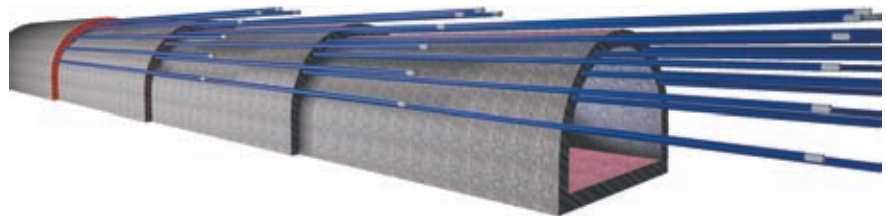




FOREPOLING

Forepoling, also known as tube umbrella, is an application used to strengthen tunnel roof in broken rock conditions. Drilling system consists of casing tubes which are drilled through the overburden as an umbrella and filled with grouting. Robit® Casing System allows easy driving of the casing tubes into the ground with low torque demand.

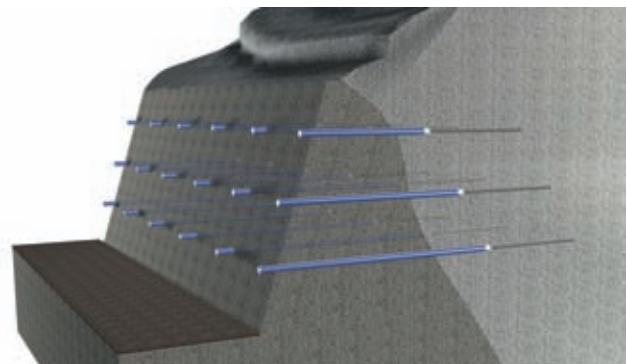
Robit® Casing Systems mostly used in forepoling are RoX+ 88,9/8, RoX 114,3/10, and RoX 139,7/10.



ANCHORING

Anchoring is a method where walls with masses of overburden are anchored to the solid rock. Casing tubes are driven through the overburden. After that drilling is continued with normal drill bit. Steel cable is inserted to the bottom of the hole and next the hole is filled with grouting.

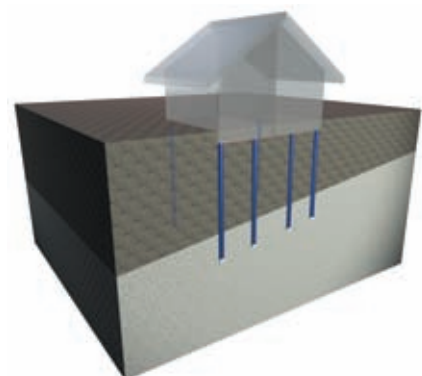
New Robit® Non-Stop Casing System is perfect for anchoring.



PILING AND UNDERPINNING

Softer ground conditions require that the foundations of any type of construction must be stabilized. Drilling system consists of casing tubes drilled through the overburden to the solid bedrock and filled with concrete. Drilled piles made with Robit® Casing Systems have significant advantage compared with other piling methods and systems: Fast drilling with maximum hole straightness, reliability to reach the targeted depth, and extreme simplicity to use.

Robit® Casing Systems mostly used in piling are DTH-RoX+ for permanent casing and DTH-RoX MU for temporary casing.



WATER AND THERMAL WELL DRILLING

Casing drilling is used in making water and thermal wells in broken overburden conditions. Robit® Casing Systems allow easy driving of the casing tubes into the ground with relatively low torque demand. The casing is left in the ground as a protection pipe of the water or thermal well.

Robit® Casing System mostly used in water and thermal well drilling is DTH-RoX+.



SITE INVESTIGATION

Site investigation is used for an initial evaluation of the site and its suitability for proposed development. Casing tube is driven in the selected depth and the sample is taken with a coring tool. Robit® Casing System enables more accurate drilling to reach the targeted depth.

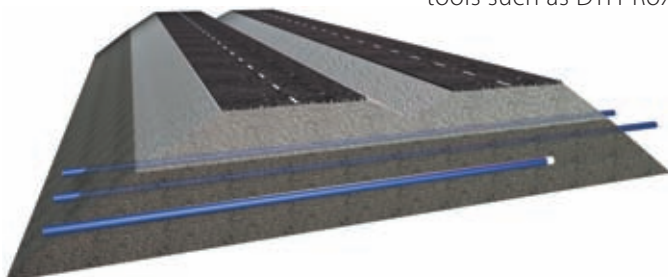
Robit® Casing System typically used in site investigation is DTH-RoX MU when the holes drilled are relatively shallow.



HORIZONTAL DRILLING

Horizontal drilling is used to lead water, sewage, or cable pipes under roads, rivers, and buildings. There is no need to make extensive surface cuttings that block the roads or ruin the landscape. Instead, horizontal holes can be drilled with Robit® Casing System without harming the surroundings.

Robit® Casing Systems typically used in horizontal drilling are large diameter tools such as DTH-RoX MUHZ 406,4/12,7.



ROBIT® CASING SYSTEMS PRODUCTS

RoX+ - Single-Use System for Top Hammer

RoX GFRP - Fiberglass Casing System

DTH-RoX+ - Single-Use System for Down The Hole Hammer

Heavy Duty Ring Bits

DTH RoX MU - Multi-Use System for Down The Hole Hammer

DTH RoX 2-1 - Multi Ring Bit System for Down The Hole Hammer

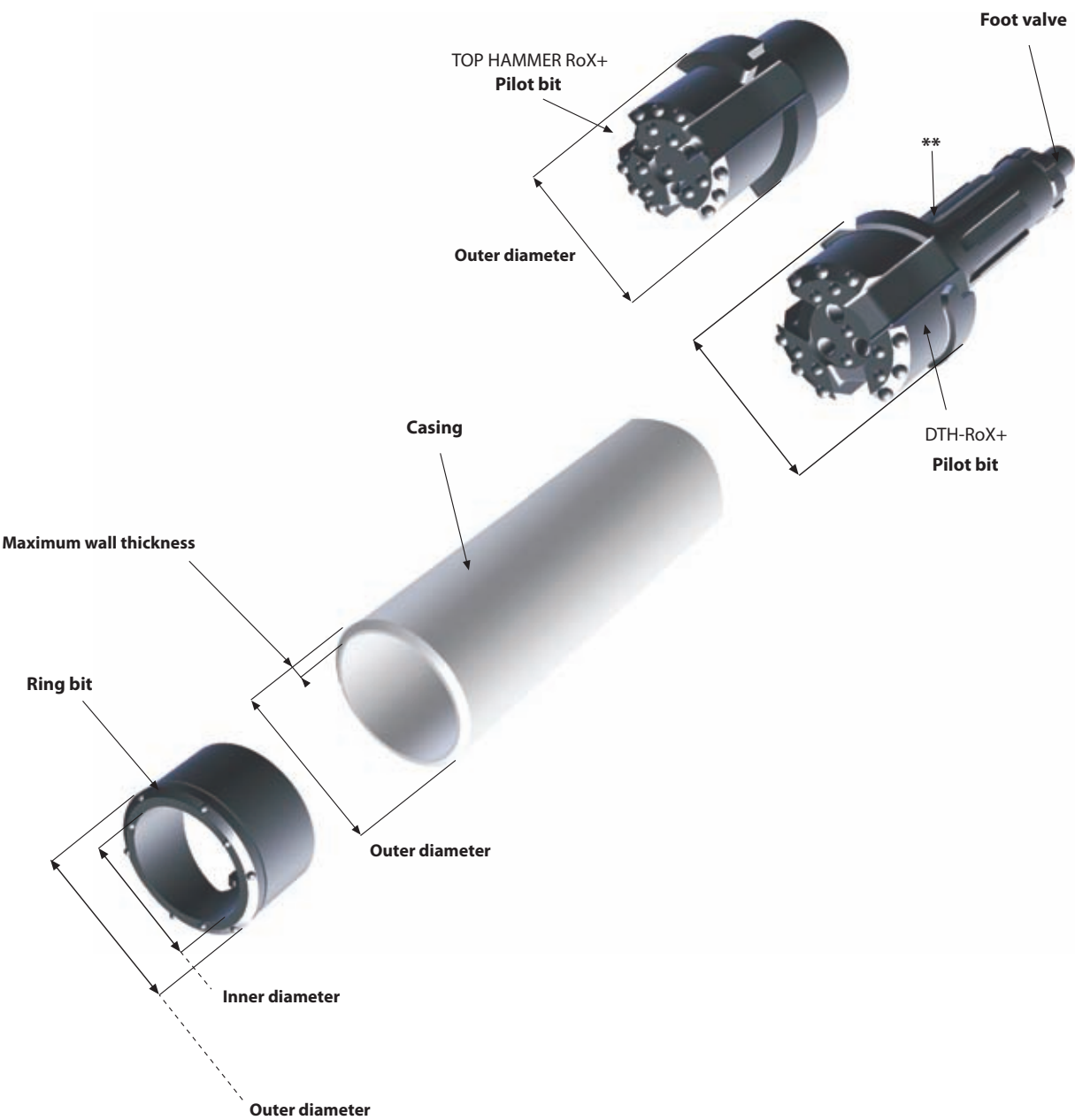
DTH RoX 3-1 - Multi Ring Bit System for Down The Hole Hammer

DTH RoX NS - Non-Stop System for Down The Hole Hammer



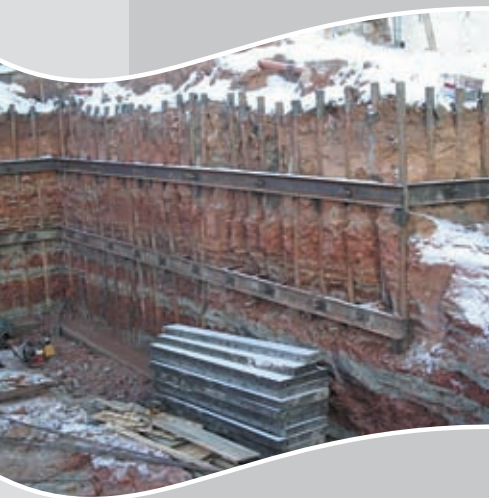
Dimensions explanation

** See chart below for standard shank design.



DTH-hammer size	Standard shank design
3½"	IR 3,5"
4"	IR 340
5"	IR 350
6"	IR 360
8"	IR 380
10"	SD-10
12"	SD-12
18"	NUMA180

* Given casing wall thickness represents the maximum casing wall thickness to be used.

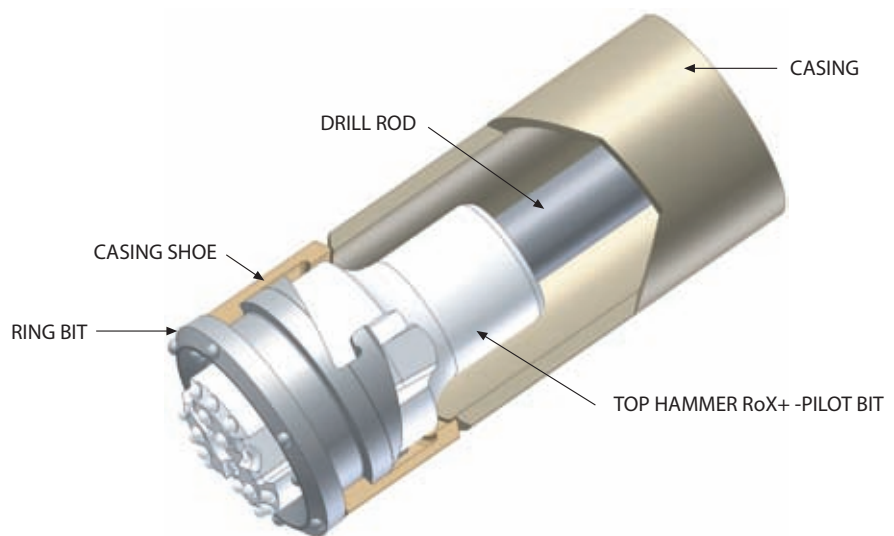


RoX+

SINGLE-USE SYSTEM FOR TOP HAMMER

Robit® Single Casing Systems are available for traditional top hammer machinery. Typically Robit® Single-Use system for Top Hammer is used in applications with relatively short hole requirement and where the casing is left in the ground, such as:

- forepoling or tube umbrella
- anchoring
- micropiling



Drilling parameters example

Product	RoX+ 139,7/10
Rock / Ground conditions	All rock formations
Application	Tube Umbrella, Forepoling
Top hammer thread	T45
Rotation speed	30 - 40 RPM
Torque	1000 - 1200 Nm
Percussion	75 - 100 bars

NOTE:

Parameters may vary depending on ground / rock conditions, application and machinery

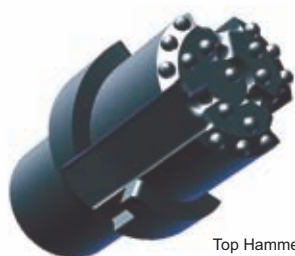
Specifications for RoX+

Order code	casing od		casing wall max.		ring bit id		ring bit od		pilot bit od		thread
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
RoX+ 76,1/8	76,1	3	8	0.315	47	1.850	90	3.543	59	2.323	R32
RoX+ 88,9/4	88,9	3 ½	4	0.157	71	2.795	99	3.898	80	3.150	C38
RoX+ 88,9/8	88,9	3 ½	8	0.315	50,8	2.000	94,9	3.736	70	2.756	C38
RoX+ 101,6/10	101,6	4	10	0.394	65	2.559	110	4.331	79	3.110	C38
RoX 114,3/10	114,3	4 ½	10	0.394	73,5	2.894	120,3	4.736	92,5	3.642	C38
RoX 139,7/10	139,7	5 ½	10	0.394	94	3.701	145,7	5.736	117,5	4.626	C45
RoX+ 168,3/10	168,3	6 ⅝	10	0.394	127	5.000	182,3	7.177	147	5.787	C45

Top Hammer Multi-Use

RoX MU 139,7/10	139,7	5 ½	10	0.394	105	4.134	147	5.787	117,5	4.626	C45/C51
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Robit C –thread corresponds T, FI, etc.



Top Hammer pilot bit



Top Hammer ring bit



All bits are available with round or semiballistic buttons



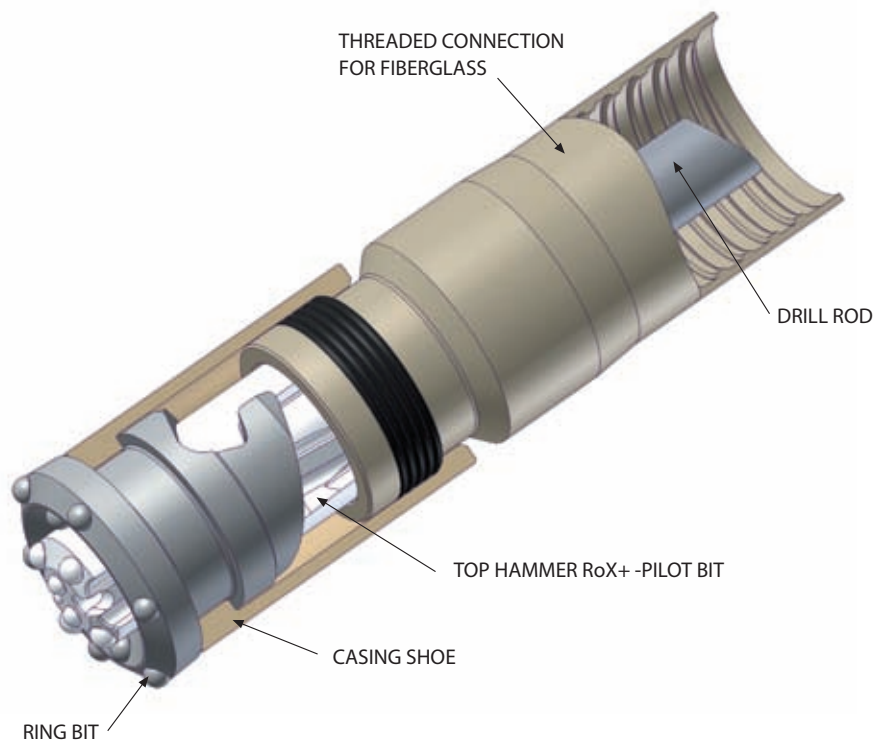
RoX GFRP

SINGLE-USE SYSTEM FOR TOP HAMMER FOR FIBERGLASS CASING

Robit® has developed a system for fiberglass casings. A unique casing shoe works as a shock-absorber protecting the casing from the drilling forces. Fiberglass casing brings several benefits:

- Lighter casings – easier to handle
- Lower material cost – more economic drilling
- Easy to excavate – Drill and Blast in overburden conditions

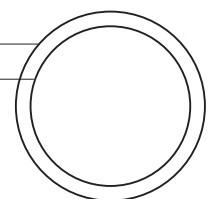
Robit® Fiberglass system is available for top hammer applications.



Fiberglass Casing specifications

Geometrical characteristics

Section	1700 mmq.
External diameter	ø 76 mm
Internal diameter	ø 60 mm
Thickness	8 mm
Weight/m	3,2 kg



Technical characteristics

Glass content in weight	50%
Specific weight	1.8 g/cc
Tensile strenght	600 MPa
Flexural strenght	600 MPa
Elastic modulus	20 000 MPa

See page 24 for more information.

Specifications of RoX GFRP

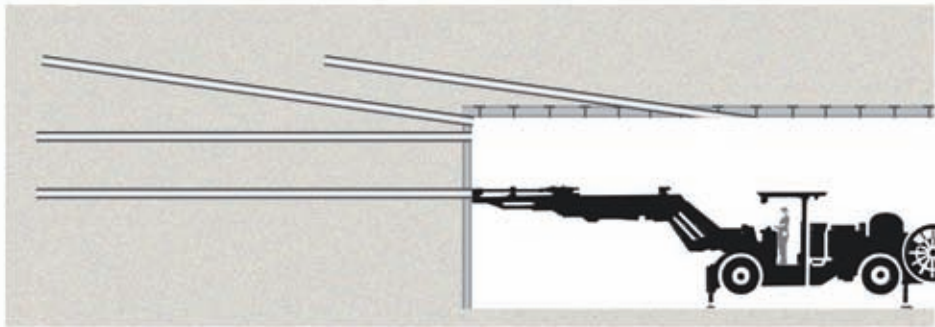
Order code	casing od		casing wall max.		ring bit id		ring bit od		pilot bit od		thread
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
RoX+ GFRP 76,1/8	76,1	3	8	0.315	47	1.850	90	3.543	59	2.323	R32



Top Hammer pilot bit



Top Hammer ring bit



All bits are available with round or semiballistic buttons

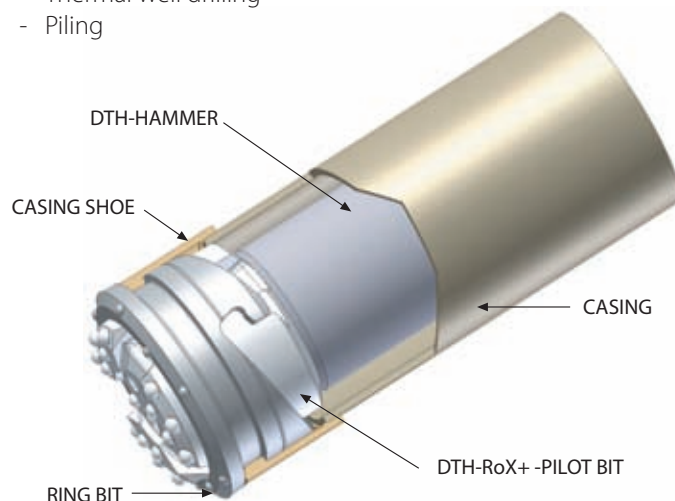


DTH-RoX+

SINGLE-USE SYSTEM FOR DOWN THE HOLE HAMMER

Sometimes overburden is thick and full of boulders. Robit® Single-Use Casing System for DTH Hammer enables easy, fast, and reliable drilling process in all conditions. Robit® Single-Use Casing Systems are available for all the common Down The Hole hammers and are designed for all the applications where the casing is left in the ground:

- Water well drilling
- Thermal well drilling
- Piling



HEAVY DUTY RING BITS

Robit® Heavy Duty Ring Bits have been designed for extra long holes. The casing shoe allows longer welded area which enables stronger connection.

Drilling parameters example

Product	DTH-RoX+ 168,3/10	
Rock / Ground conditions	All rock conditions	
Application	Piling	
DTH hammer size	5"	
Rotation speed	30 - 40 RPM	
Torque	1500 - 2000 Nm	
Compressor output	15 - 24 m ³ /min	Max: 17 kg/cm ²
	530 - 848 CFM	250 psi
Compressor pressure	10 - 16 bar	

NOTE:

Parameters may vary depending on ground / rock conditions, application and machinery

Specifications of DTH-RoX+

Ring bit id optimized (biggest drill through diameter possible)

Order code	casing od		casing wall max.		ring bit id		ring bit od		pilot bit od		DTH-hammer
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
DTH-RoX+ 114,3/5	114,3	4 1/2	5	0.197	91	3.583	128	5.039	102	4.016	3 1/2"
DTH-RoX+ 139,7/5,6	139,7	5 1/2	5,6	0.220	116	4.567	154	6.063	127,5	5.020	4"
DTH-RoX+ 168,3/6	168,3	6 5/8	6	0.236	142	5.591	182,3	7.177	155	6.102	5"
DTH-RoX+ 177,8/6,9	177,8	7	6,9	0.272	153,5	6.043	195	7.677	162	6.378	6"
DTH-RoX+ 193,7/6	193,7	7 5/8	6	0.236	167	6.575	212	8.346	180	7.087	6"
DTH-RoX+ 219,1/6	219,1	8 5/8	6	0.236	186	7.323	234	9.213	205	8.071	6"
DTH-RoX+ 273/8	273	10 3/4	8	0.315	232	9.134	292	11.496	255	10.039	8"
DTH-RoX+ 323,9/8	323,9	12 3/4	8	0.315	281	11.063	343	13.504	306	12.047	8"

Heavy duty rings

DTH-RoX+139,7/5,6 HD	139,7	5 1/2	5,6	0.220	116	4.567	155	6.102		4"
DTH-RoX+168,3/6 HD	168,3	6 5/8	6	0.236	142	5.591	185,5	7.303		5"



Heavy Duty rings

For thick wall casings

Order code	casing od		casing wall max.		ring bit id		ring bit od		pilot bit od		DTH-hammer
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
DTH-RoX+ 114,3/10	114,3	4 1/2	10	0.394	78	3.071	124	4.882	92,5	3.642	3 1/2"
DTH-RoX+ 139,7/10	139,7	5 1/2	10	0.394	94	3.701	150	5.906	117,5	4.626	4"
DTH-RoX+ 168,3/12,7	168,3	6 5/8	12,7	0.500	121	4.764	178	7.008	140	5.512	5"
DTH-RoX+ 193,7/12,7	193,7	7 5/8	12,7	0.500	148	5.827	203	7.992	167	6.575	6"
DTH-RoX+ 219,1/12,7	219,1	8 5/8	12,7	0.500	167	6.575	234	9.213	191	7.520	6"
DTH-RoX+ 273/12,7	273	10 3/4	12,7	0.500	219	8.622	292	11.496	246	9.685	8"
DTH-RoX+ 323,9/12,7	323,9	12 3/4	12,7	0.500	270	10.630	342	13.465	297	11.693	8-10"
DTH-RoX+ 355/12,7	355	14	12,7	0.500	282	11.102	367	14.449	323	12.717	8 - 12"
DTH-RoX+ 406,4/12,7			Please refer to Concept 3-1 in page 20								
DTH-RoX+ 508,0/15			Please refer to Concept 3-1 in page 20								
DTH-RoX+ 609,6/15			Please refer to Concept 3-1 in page 20								

Bigger outside diameter rings

DTH-RoX+115/10 RD	115,0	4 1/2	10	0.394	78	3.071	134	5.276		3 1/2"
DTH-RoX+140/10 RD	140,0	5 1/2	10	0.394	94	3.701	160	6.299		4"
DTH-RoX+170/12,5 RD	170,0	6 5/8	12,5	0.492	121	4.764	188	7.402		5"
DTH-RoX+220/12,5 RD	220,0	8 5/8	12,5	0.492	167	6.575	240	9.449		6"



DTH-RoX+ pilot bit



DTH-RoX+ ring bit



See page 8 for standard shank designs

All bits are available with round or semiballistic buttons

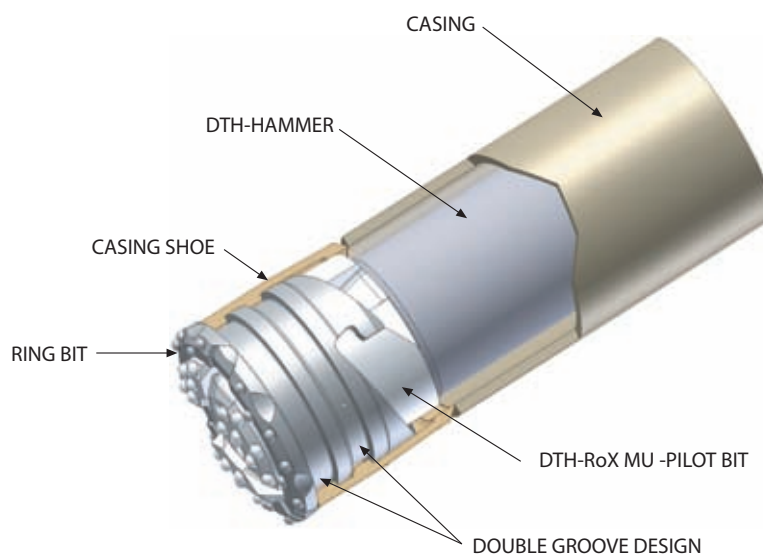


DTH-RoX MU

MULTI-USE SYSTEM FOR DOWN THE HOLE HAMMER

In some overburden drilling applications the casing has to be removed from the ground. This sets higher requirements on the durability of the equipment. Double groove design* in the casing shoe and the best materials available guarantee that Robit® Multi-Use system does not fail even in the most difficult conditions. Robit® Multi-Use system is available for all the common DTH hammers. It is typically used in the following applications:

- Piling
- Anchoring
- Site investigation



Drilling parameters example

Product	DTH-RoX MU 219,1/10	
Rock / Ground conditions	All rock conditions	
Application	Piling	
DTH hammer size	6"	
Rotation speed	20 - 30 RPM	
Torque	2200 - 3200 Nm	
Compressor output	20 - 24 m ³ /min	Max: 17 kg/cm ²
	707 - 848 CFM	250 psi
Compressor pressure	10 - 16 bar	

NOTE:

Parameters may vary depending on ground / rock conditions, application and machinery

Specifications of DTH-RoX MU

Order code	casing od		casing wall max.		ring bit id		ring bit od		pilot bit od		DTH- hammer
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
DTH-RoX MU 114,3/10	114,3	4 1/2	10	0.394	78	3.071	122	4.803	92,5	3.642	3 1/2"
DTH-RoX MU 139,7/10	139,7	5 1/2	10	0.394	104	4.094	147	5.787	117,5	4.626	4"
DTH-RoX MU 152,4/10	152,4	6	10	0.394	115,8	4.559	159,5	6.280	130,6	5.142	4"
DTH-RoX MU 168,3/10	168,3	6 5/8	10	0.394	129	5.079	178	7.008	146	5.748	5"
DTH-RoX MU 177,8/10	177,8	7	10	0.394	142	5.591	191	7.520	155	6.102	5"
DTH-RoX MU 193,7/10	193,7	7 5/8	10	0.394	154	6.063	204	8.031	172	6.772	6"
DTH-RoX MU 219,1/10	219,1	8 5/8	10	0.394	172	6.772	229	9.016	196	7.717	6"
DTH-RoX MU 273,0/12,7	Please refer to Concept 2-1 in page 18										
DTH-RoX MU 323,9/12,7	Please refer to Concept 2-1 in page 18										
DTH-RoX MU 406,4/12,7	Please refer to Concept 3-1 in page 20										
DTH-RoX MU 508,0/15	Please refer to Concept 3-1 in page 20										
DTH-RoX MU 609,6/15	Please refer to Concept 3-1 in page 20										





DTH-RoX 2-1

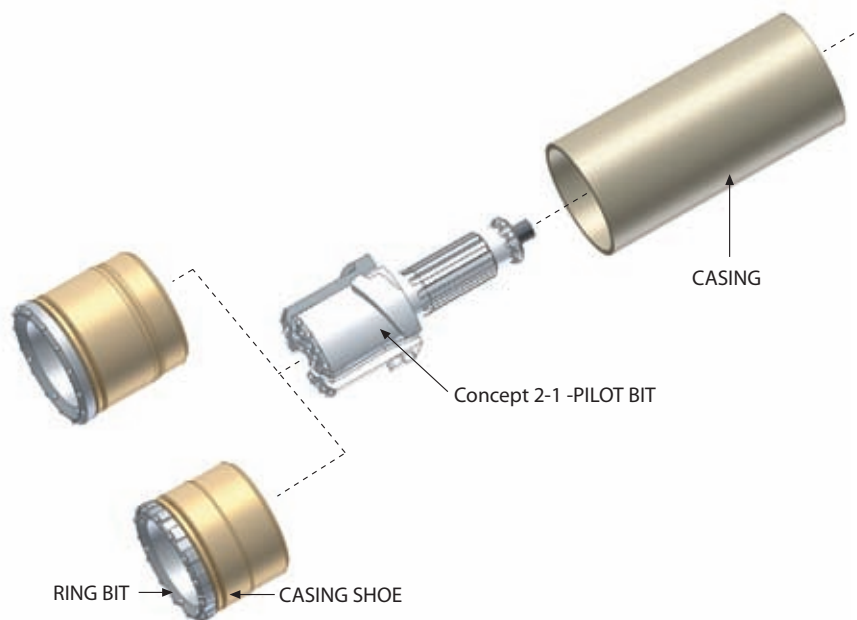
MULTI RING BIT SYSTEM FOR DOWN THE HOLE HAMMER

The Robit® Concept 2-1 is a system where **one** pilot can be used with **two** ring types:

- Ring MU - Multi-use type
- Ring MU-HZ - Multi-use type for Horizontal drilling

The Concept 2-1 was developed following the two main ideas:

- Manufacturing a technically superior product with high quality
- Offering flexibility and cost savings to customers
 - All the advantages of the Robit® Casing System
 - One pilot allows different applications
 - Lower initial investment in consumable tools
 - Lower inventory



Drilling parameters example

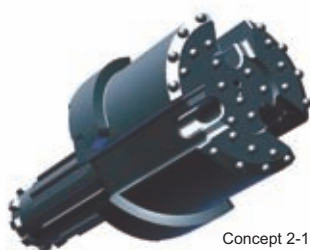
Product	DTH-RoX 2-1 323,9/12,7	
Rock / Ground conditions	All rock conditions	
Application	Piling	
DTH hammer size	8" - 12"	
Rotation speed	15 - 25 RPM	
Torque	7000 - 10000 Nm	
Compressor output	24 - 33 m ³ /min	Max: 17 kg/cm ²
	848 - 1165 CFM	250 psi
Compressor pressure	10 - 14 bar	

NOTE:

Parameters may vary depending on ground / rock conditions, application and machinery

Specifications of DTH-RoX 2-1

Order code	casing od		casing wall max.		ring bit id		ring bit od		pilot bit od		DTH- hammer
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
DTH-RoX 2-1 273,0/12,7	273	10 3/4	12,7	0.500					243	9.567	8"
Ring MU	273	10 3/4	12,7	0.500	211	8.307	286	11.260			8"
Ring MUHZ	273	10 3/4	12,7	0.500	211	8.307	295	11.614			8"
DTH-RoX 2-1 323,9/12,7	323,9	12 3/4	12,7	0.500					293	11.535	8"
Ring MU	323,9	12 3/4	12,7	0.500	257	10.118	338	13.307			8"
Ring MUHZ	323,9	12 3/4	12,7	0.500	257	10.118	346	13.622			8"



Concept 2-1 pilot bit



Concept 2-1 ring bit MU



See page 8 for standard shank designs

All bits are available with round or semiballistic buttons



DTH-RoX 3-1

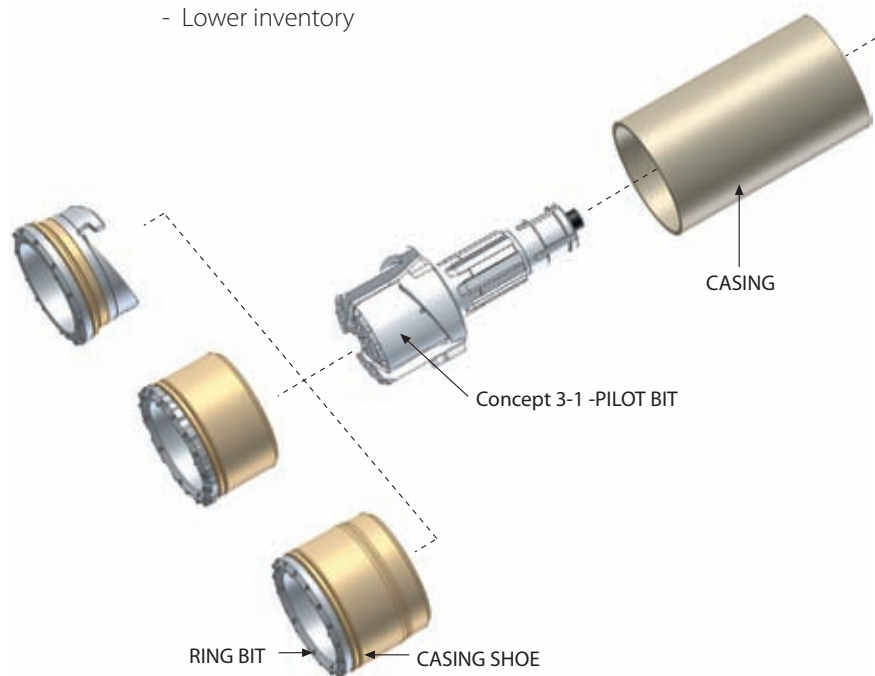
MULTI RING BIT SYSTEM FOR DOWN THE HOLE HAMMER

The Robit® Concept 3-1 is a system where **one** pilot can be used with the **three** following ring types:

- Ring + - Single-use type
- Ring MU - Multi-use type
- Ring MU-HZ - Multi-use type for Horizontal drilling

The Robit® Concept 3-1 was developed for the bigger casing diameters (≥ 406 mm) following the two main ideas:

- Manufacturing a technically superior product with high quality
- Offering flexibility and cost savings to customers
 - All the advantages of the Robit® Casing System
 - One pilot allows different applications
 - Lower initial investment in consumable tools
 - Lower inventory



Drilling parameters example

Product	DTH-RoX 3-1 609/12,7	
Rock / Ground conditions	All rock conditions	
Application	Piling	
DTH hammer size	12" - 18"	
Rotation speed	10 - 15 RPM	
Torque	25000 - 30000 Nm	
Compressor output	24 - 52 m ³ /min	Max: 17 kg/cm ²
	848 - 1850 CFM	250 psi
Compressor pressure	10 - 14 bar	

NOTE:

Parameters may vary depending on ground / rock conditions, application and machinery

Specifications of DTH-RoX 3-1

Order code	casing od		casing wall max.		ring bit id		ring bit od		pilot bit od		DTH- hammer
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
DTH-RoX 3-1 406,4/12,7	406,4	16	12,7	0.500					374	14.724	10-12"
Ring +	406,4	16	12,7	0.500	328	12.913	419	16.496			10-12"
Ring MU	406,4	16	12,7	0.500	328	12.913	423	16.654			10-12"
Ring MUHZ	406,4	16	12,7	0.500	328	12.913	440	17.323			10-12"
DTH-RoX 3-1 508,0/15	508	20	15	0.591					472	18.583	12-15"
Ring +	508	20	15	0.591	414	16.299	521	20.512			12-15"
Ring MU	508	20	15	0.591	414	16.299	526	20.709			12-15"
Ring MUHZ	508	20	15	0.591	414	16.299	534	21.024			12-15"
DTH-RoX 3-1 609,6/15	609,6	24	15	0.591					570	22.441	18"
Ring +	609,6	24	15	0.591	513	20.197	622	24.488			18"
Ring MU	609,6	24	15	0.591	513	20.197	637	25.079			18"
Ring MUHZ	609,6	24	15	0.591	513	20.197	640	25.197			18"



DTH-RoX 3-1 pilot bit



DTH-RoX 3-1 ring bit MU

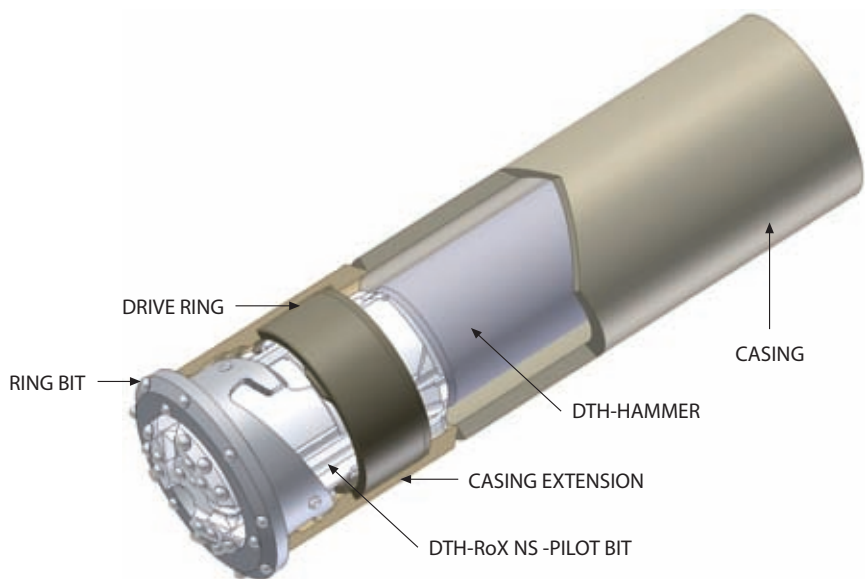


DTH-RoX NS

NON-STOP SYSTEM FOR DOWN THE HOLE HAMMER

Robit® Non-Stop system is an advanced casing system that start to drill with a casing and then to continues beyond it without tool changes. No need to pull out the pilot bit and the drill string to replace it by a conventional down the hole bit.. A single operation diconnects the pilot and the ring from the casing. The drilling can be continued free from the casing tube without losing the drilling diameter. Robit® Non-Stop system can be used in various applications:

- Anchoring
- Piling
- Water and thermal well drilling



Working principle

1. Drill the casing to required depth.
2. Continue drilling with pilot and ring bit combination beyond the casing.
3. Retrieve the pilot. Ring bit is left in the ground.
4. Install the anchor and pull the casing out from the hole.

Specifications of DTH-RoX NS

Order code	casing od		casing wall max.		ring bit id		ring bit od		pilot bit od		DTH- hammer
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
DTH-RoX NS 114,3/10	114,3	4 1/2	10	0.394	82	3.228	124	4.882	92,5	3.642	3 1/2"
DTH-RoX NS 139,7/10	139,7	5 1/2	10	0.394	104	4.094	150	5.906	116	4.567	4"
DTH-RoX NS 152,4/12,7	152,4	6	12,7	0.500	114	4.488	160	6.299	126	4.961	4"
DTH-RoX NS 177,8/10	177,8	7	10	0.394	142	5.591	191	7.520	152	5.984	5"



DTH-RoX NS pilot bit



DTH-RoX NS ring bit



DTH-RoX NS casing shoe



DRILLING WITH DTH CASING SYSTEM

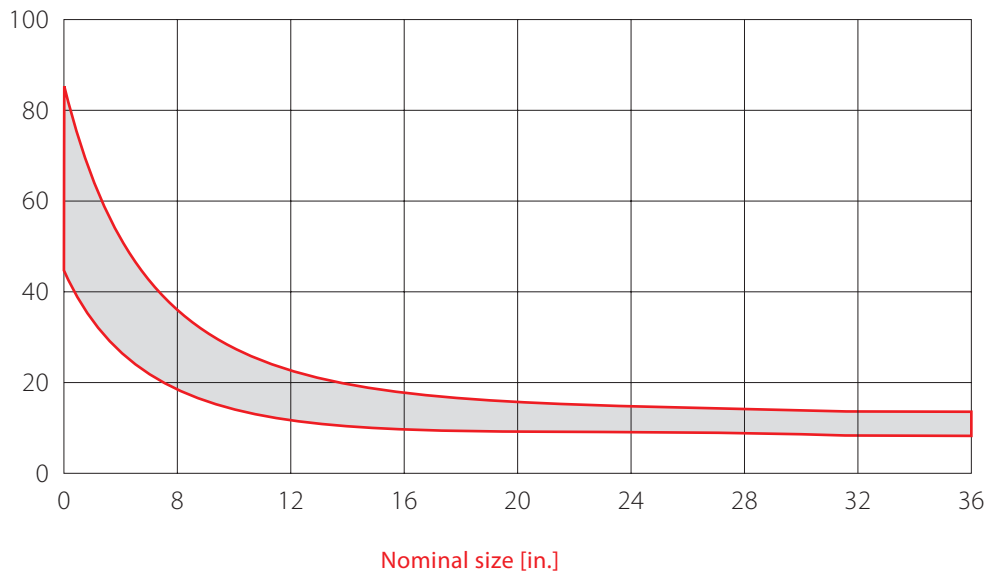
1. Pulldown force

The moderate pulldown force on pilot is 9 kg/mm (500 lbs/inch)

2. Rotation speed

Normal operating RPM ranges are from 10 to 60 RPM (see chart below)

Rotation speed
[rpm]



3. Compressor pressure

Normal operating pressure is from 10 to 15 bar or 150 to 225 psi. Note: in loose formation (i.e. sand) compressor can be set to 7 bar or 100 psi

4. Flushing

Drill exhaust air passes through the bit to clean the bit face and carry cuttings to the surface up the annular space between the drill pipe and the casing tube.

The air consumption can be calculated as below:

$$Q = V (D^2 - d^2) / 1273500$$

Q – Air consumption in m³/min.

V – Velocity of cuttings (between 1100 to 1500 m/min.)

D – Inside diameter of casing tube in mm

d – Outside diameter of the drill tubes in mm

INDEX - Index, weight table and product numbers

Single-Use System for Top Hammer

Order code	weight ring bit kg	weight pilot bit kg	Product number for pilot bit	Product number for ring bit	page
Steel casing					
RoX+ 76,1/8	2.8	2.1	02-132-076-0021	02-011-076-0001	10
RoX+ 88,9/4	2.0	3.9	02-238-088-0022	02-011-088-0003	10
RoX+ 88,9/8	2.8	2.7	02-238-088-0024	02-011-088-0006	10
RoX+ 101,6/10	3.6	4.0	02-238-101-0026	02-011-101-0012	10
RoX 114,3/10	3.8	5.0	02-238-114-0028	02-011-114-0014	10
RoX 139,7/10	5.2	8.1	02-245-139-0032	02-011-139-0016	10
RoX+ 168,3/10	7.4	14.8	02-251-168-0038	02-011-168-0019	10
Steel casing - Top Hammer Multi-Use					
RoX MU 139,7/10	7.4	12.2		02-011-139-0018	10
Fiberglass casing					
RoX+ GFRP 76,1/8	5.0	2.1	02-132-076-0021	please ask from sales	12

Single-Use System for Down The Hole Hammer

Order code	weight ring bit kg	weight pilot bit kg	Product number for pilot bit	Product number for ring bit	page
Ring bit id optimized					
DTH-RoX+ 114,3/5	3.4	6.6	03-531-114-0148	03-011-114-0061	14
DTH-RoX+ 139,7/5,6	4.3	12.7	03-541-139-0162	03-011-139-0071	14
DTH-RoX+ 168,3/6	5.8	20.9	03-551-168-0191	03-011-168-0082	14
DTH-RoX+ 177,8/6,9	7.0	27.0	03-562-177-0227	03-011-177-0093	14
DTH-RoX+ 193,7/6	8.1	31.0	03-562-193-0228	03-011-193-0095	14
DTH-RoX+ 219,1/6	10.0	37.2	03-562-219-0238	03-011-219-0103	14
DTH-RoX+ 273/8	19.8	78.8	03-581-273-0252	03-011-273-0113	14
DTH-RoX+ 323,9/8	26.4	106.9	03-581-323-0259	03-011-323-0119	14
Heavy Duty Ring Bits					
DTH-RoX+139,7/5,6 HD	5.4			03-011-139-0068	14
DTH-RoX+168,3/6 HD	7.6			03-011-168-0084	14
For thick wall casings					
DTH-RoX+ 114,3/10	3.7	5.5	03-531-114-0151	03-011-114-0063	14
DTH-RoX+ 139,7/10	6.2	9.7	03-541-139-0164	03-011-139-0073	14
DTH-RoX+ 168,3/12,7	8.4	17.8	03-551-168-0196	03-011-168-0088	14
DTH-RoX+ 193,7/12,7	10.6	29.2	03-562-193-0233	03-011-193-0099	14
DTH-RoX+ 219,1/12,7	13.9	34.4	03-562-219-0242	03-011-219-0107	14
DTH-RoX+ 273/12,7	22.3	68.7	03-581-273-0255	03-011-273-0114	14
DTH-RoX+ 323,9/12,7	32.8	102.6	03-581-323-0260	03-011-323-0120	14
DTH-RoX+ 355/12,7	27.0	154.0	03-581-355-0263	03-010-355-0057	14
DTH-RoX+ 406,4/12,7	47.4	236.0	03-581-406-0264	03-010-406-0058	14
DTH-RoX+ 508,0/15	71.0	540.0	03-523-508-0146	03-011-508-0122	14
DTH-RoX+ 609,6/15	90.0	670.0	03-522-610-0144	03-010-610-0060	14
Bigger Outside Diameter Ring Bits					
DTH-RoX+115/10 RD	5.0				14
DTH-RoX+140/10 RD	7.9				14
DTH-RoX+170/12,5 RD	10.3				14
DTH-RoX+220/12,5 RD	18.6				14

DTH-ROX pilots are with IR shank and buttons mentioned above are round.
Please indicate when ordering which shank and buttons shape is needed.

Multi-Use System for Down The Hole Hammer

Order code	weight ring bit kg	weight pilot bit kg	Product number for pilot bit	Product number for ring bit	page
DTH-RoX MU 114,3/10	5.4	6.4	03-531-114-0153	03-011-114-0064	16
DTH-RoX MU 139,7/10	7.5	13.2	03-541-139-0166	03-011-139-0075	16
DTH-RoX MU 152,4/10	8.9	16.9	03-541-152-0172	03-011-152-0079	16
DTH-RoX MU 168,3/10	10.7	21.6	03-551-168-0194	03-011-168-0086	16
DTH-RoX MU 177,8/10	11.9	27.5	03-551-177-0198	03-011-177-0094	16
DTH-RoX MU 193,7/10	13.5	35.0	03-562-193-0231	03-011-193-0097	16
DTH-RoX MU 219,1/10	16.8	40.0	03-562-219-0240	03-011-219-0105	16
DTH-RoX MU 273,0/12,7	32.0	80.0	03-581-273-0257	03-011-273-0117	16
DTH-RoX MU 323,9/12,7	51.0	120.0	03-581-323-0125	03-022-323-0124	16
DTH-RoX MU 406,4/12,7	75.1	236.0	03-581-406-0264	03-022-406-0127	16
DTH-RoX MU 508,0/15	120.0	540.0	03-523-508-0146	03-011-508-XXXX	16
DTH-RoX MU 609,6/15	160.0	670.0	03-522-610-0144	03-022-610-XXXX	16

Multi Ring Bit System for Down The Hole Hammer

Order code	weight ring bit kg	weight pilot bit kg	Product number for pilot bit	Product number for ring bit	page
Concept 2-1					
Pilot bit					
DTH-RoX MU 273,0/12,7		80.0	03-581-273-0257		18
DTH-RoX MU 323,9/12,7		120.0	03-581-323-0262		18
Ring bit					
DTH-RoX MU 273,0/12,7	32.0			03-011-273-0117	18
DTH-RoX MUHZ 273,0/12,7	35.0			03-011-273-0116	18
DTH-RoX MU 323,9/12,7	51.0			03-022-323-0124	18
DTH-RoX MUHZ 323,9/12,7	62.0			03-011-323-0125	18
Concept 3-1					
Pilot bit					
DTH-RoX 406,4/12,7	47.4	236.0	03-581-406-0264	03-010-406-0058	20
DTH-RoX 508,0/15	71.0	540.0	03-523-508-0146	03-011-508-XXXX	20
DTH-RoX 609,6/15	90.0	670.0	03-522-610-0144	03-010-610-0060	20
Ring bit					
DTH-RoX+ 406,4/12,7	47.4	236.0	03-581-406-0264	03-022-406-0058	20
DTH-RoX MU 406,4/12,7	75.1	236.0	03-581-406-0264	03-022-406-0127	20
DTH-RoX MUHZ 406,4/12,7	95.3	236.0	03-581-406-0264	03-010-406-0059	20
DTH-RoX+ 508,0/15	71.0	540.0	03-523-508-0146	03-011-508-0122	20
DTH-RoX MU 508,0/15	120.0	540.0	03-523-508-0146	03-011-508-XXXX	20
DTH-RoX MUHZ 508,0/15	140.0	540.0	03-523-508-0146	03-011-508-0123	20
DTH-RoX+ 609,6/15	90.0	670.0	03-522-610-0144	03-010-610-0060	20
DTH-RoX MU 609,6/15	160.0	670.0	03-522-610-0144	03-022-610-XXXX	20
DTH-RoX MUHZ 609,6/15	185.0	670.0	03-522-610-0144	03-022-610-XXXX	20

Non-Stop System for Down The Hole Hammer

Order code	weight casing extension kg	weight ring bit kg	weight pilot bit kg	Product number for casing extension	Product number for pilot bit	Product number for ring bit	page
DTH-RoX NS 114,3/10	3.3	1.6	7.7				22
DTH-RoX NS 139,7/10	5.0	2.2	14.0	03-000-139-0039	03-541-139-0169	03-010-139-0050	22
DTH-RoX NS 152,4/12,7	6.4	2.9	16.7	03-000-152-0040	03-541-152-0174	03-010-152-0052	22
DTH-RoX NS 177,8/10	7.8	3.3	28.0	03-000-177-0041	03-551-177-0199	03-010-177-0055	22

DTH-ROX pilots are with IR shank and buttons mentioned above are round.
Please indicate when ordering which shank and buttons shape is needed.

NOTES

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