

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 bolhole 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

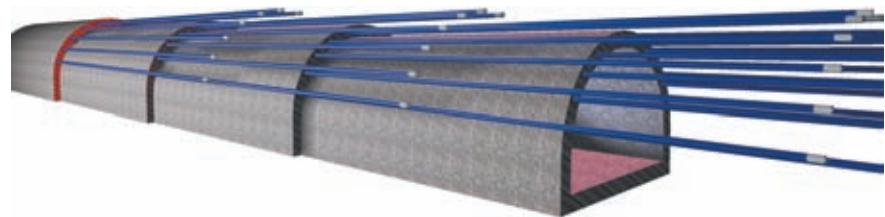




FOREPOLING

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.

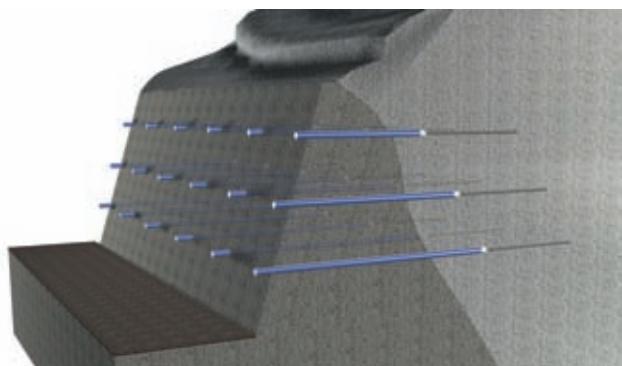
Robit® Casing Systems mostly used in forepoling are RoX+ 88,9/8, RoX 114,3/10, and RoX 139,7/10.



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.

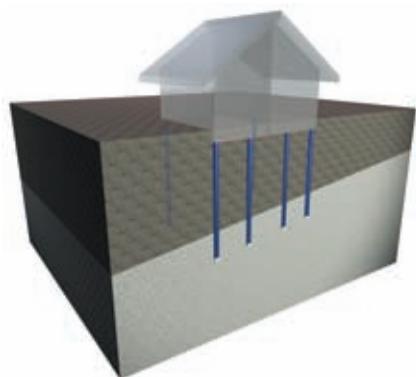
New Robit® Non-Stop Casing System is perfect for anchoring.



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.

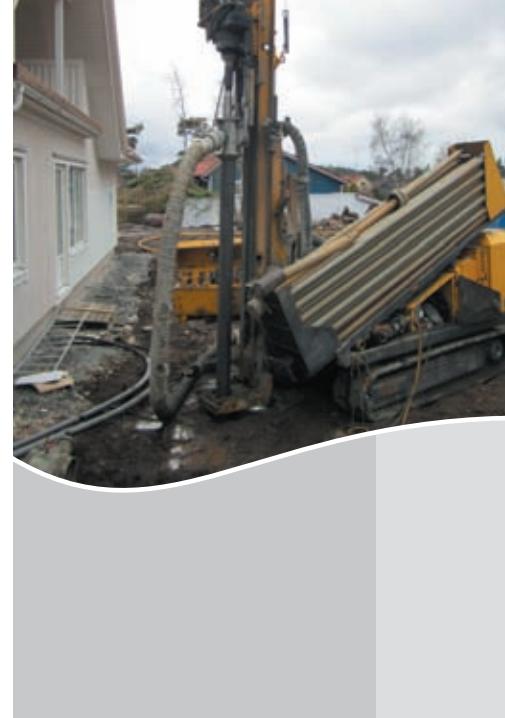
Robit® Casing Systems mostly used in piling are DTH-RoX+ for permanent casing and DTH-RoX MU for temporary casing.



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.

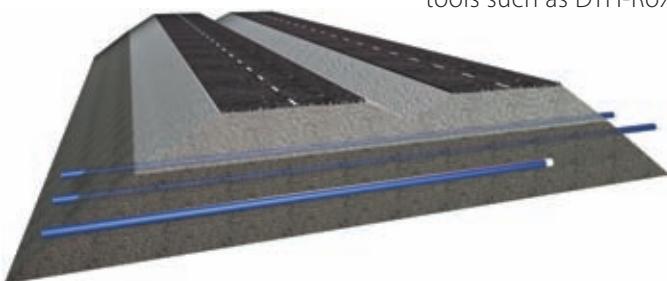
Robit® Casing System typically used in site investigation is DTH-RoX MU when the holes drilled are relatively shallow.



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.



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

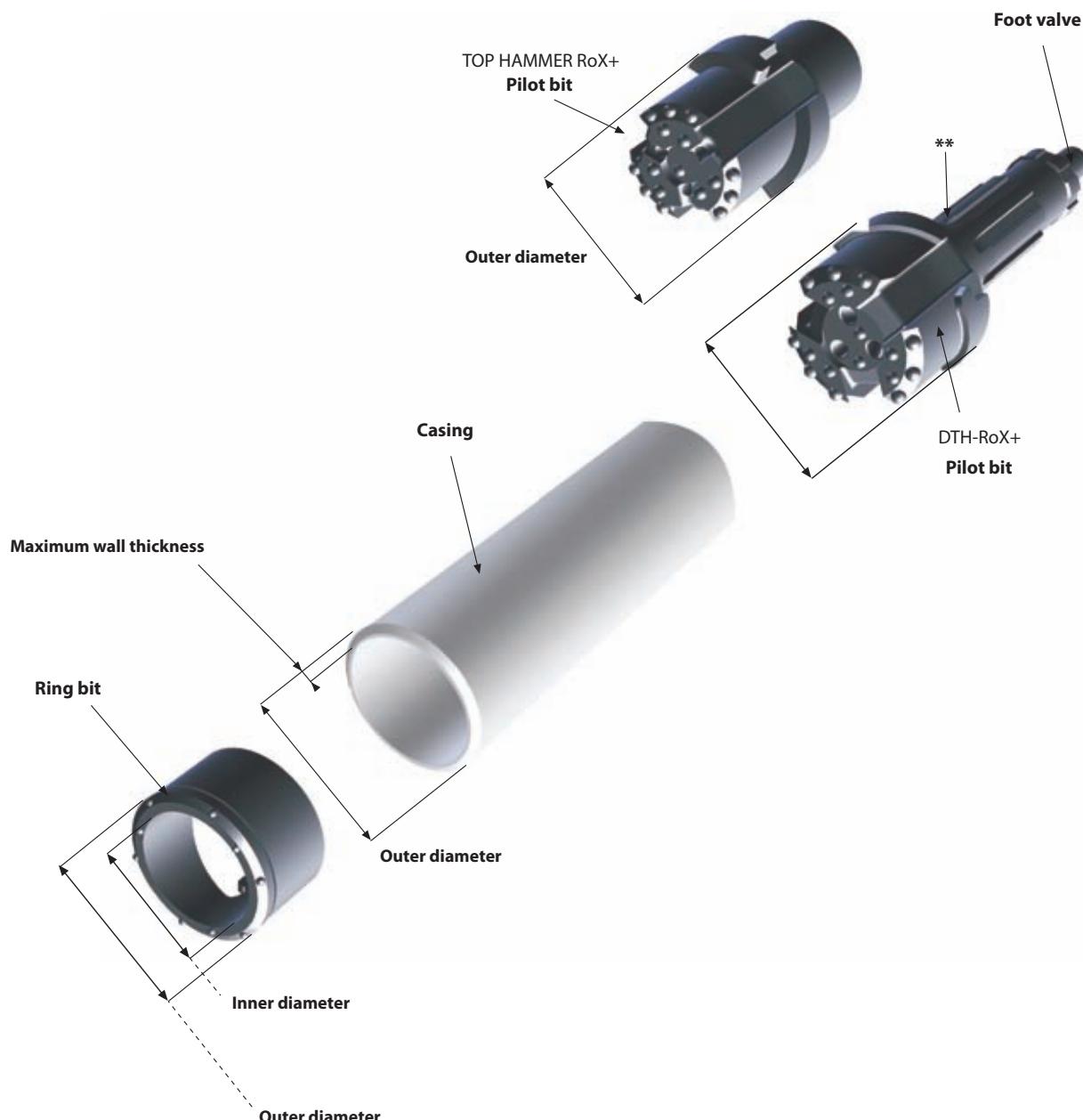
DTH RoX NS - Non-Stop System for Down The Hole Hammer



ROBIT® CASING SYSTEMS

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.

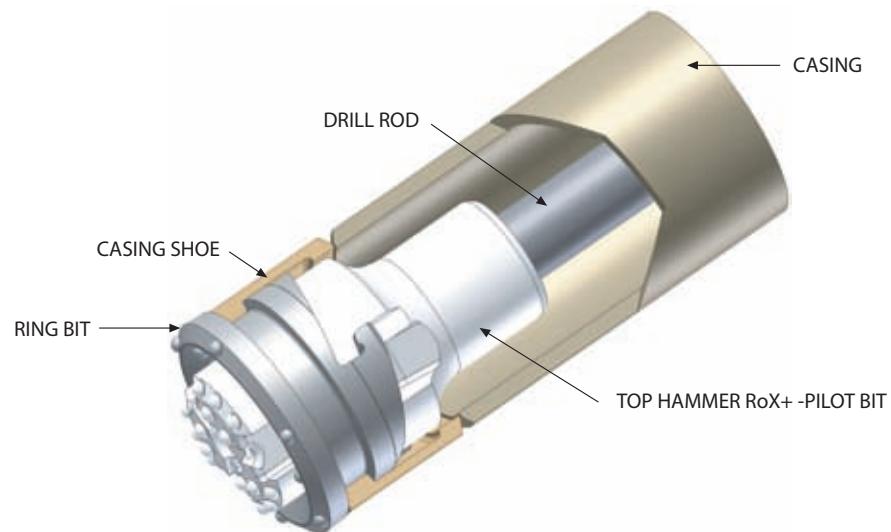


RoX+

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 1/2 | 4 | 0.157 | 71 | 2.795 | 99 | 3.898 | 80 | 3.150 | C38 |
| RoX+ 88,9/8 | 88,9 | 3 1/2 | 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 1/2 | 10 | 0.394 | 73,5 | 2.894 | 120,3 | 4.736 | 92,5 | 3.642 | C38 |
| RoX 139,7/10 | 139,7 | 5 1/2 | 10 | 0.394 | 94 | 3.701 | 145,7 | 5.736 | 117,5 | 4.626 | C45 |
| RoX+ 168,3/10 | 168,3 | 6 5/8 | 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 1/2 10 0.394 105 4.134 147 5.787 117,5 4.626 C45/C51

Robin C –thread corresponds T, FI, etc.



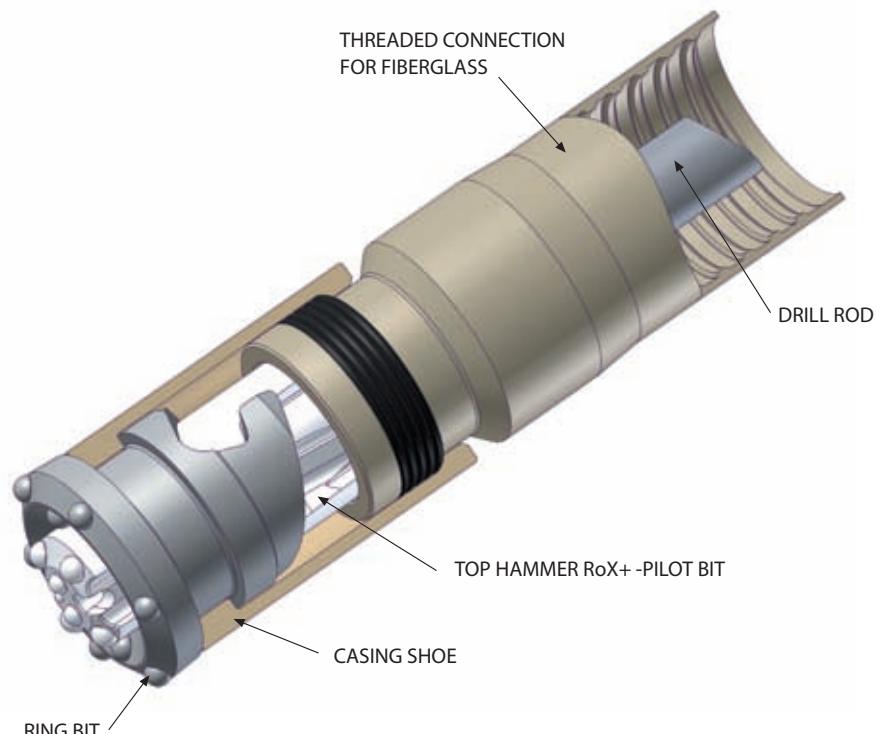
RoX GFRP

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

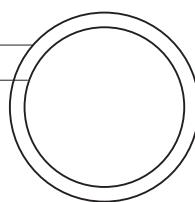
Robit® Fiberglass system is available for top hammer applications.



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 |

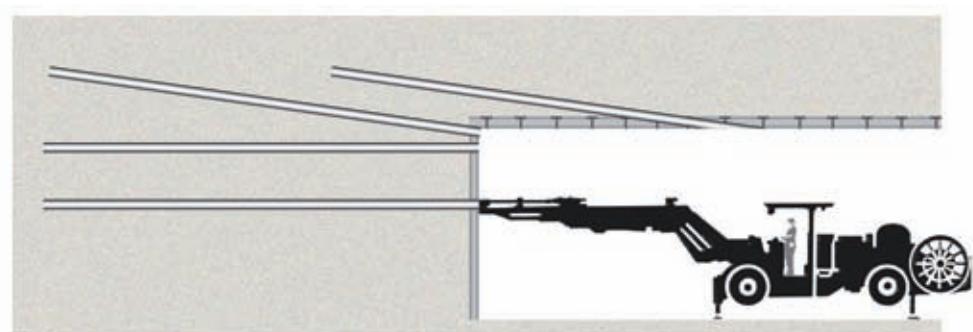
Specifications of RoX GFRP

| Order code | casing od mm inch | | casing wall max. mm inch | | ring bit id mm inch | | ring bit od mm inch | | pilot bit od mm inch | thread | |
|------------------|-------------------------|---|--------------------------------|-------|---------------------------|-------|---------------------------|-------|----------------------------|--------|-----|
| 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

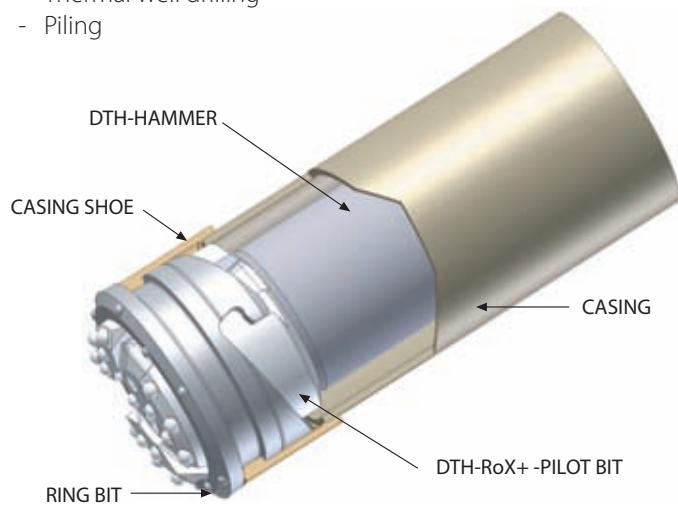


DTH-RoX+

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 |
| Compressor pressure | 530 - 848 CFM 250 psi |

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 mm inch | casing wall max. mm inch | ring bit id mm inch | ring bit od mm inch | pilot bit od mm inch | DTH- hammer |
|--------------------|-------------------------|--------------------------------|---------------------------|---------------------------|----------------------------|----------------|
| 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 mm inch | casing wall max. mm inch | ring bit id mm inch | ring bit od mm inch | pilot bit od mm inch | DTH- hammer |
|---------------------|-------------------------|--------------------------------|--|---------------------------|----------------------------|----------------|
| 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 | | | |

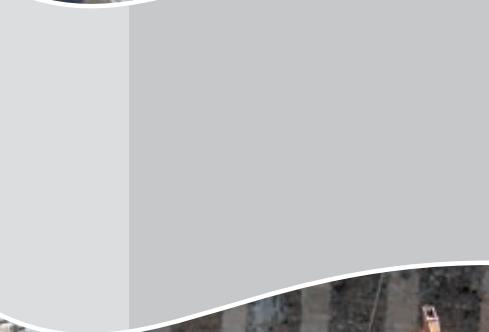
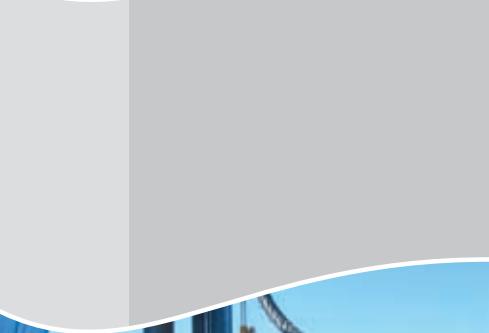
Bigger outside diameter rings

| | | | | | |
|---------------------|-------------|------------|-----------|-----------|--------|
| 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" |



See page 8 for standard shank designs

All bits are available with round or semiballistic buttons

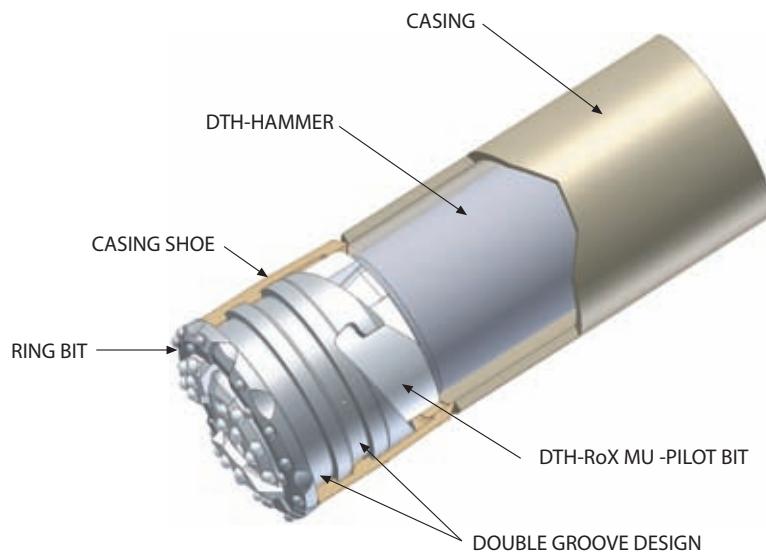


DTH-RoX MU

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 m³/min Max: 17 kg/cm² 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 mm inch | casing wall max. mm inch | ring bit id mm inch | ring bit od mm inch | pilot bit od mm inch | DTH- hammer |
|-----------------------|-------------------------|--------------------------------|--|---------------------------|----------------------------|----------------|
| 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

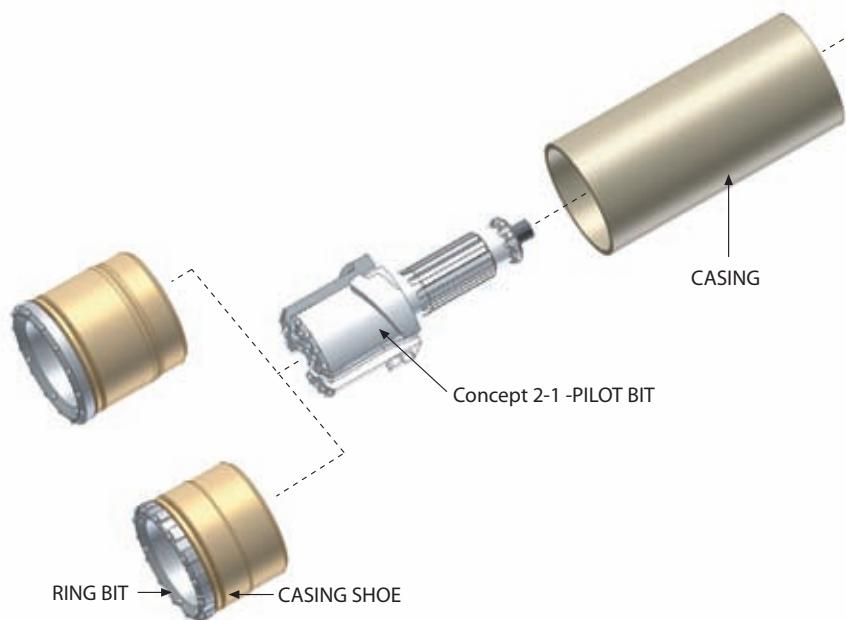
MULTI RING BIT SYSTEM FOR DOWN THE HOLE HAMMER

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 m³/min | Max: 17 kg/cm² |
| | 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 mm | casing wall max. inch | ring bit id mm | ring bit od mm | pilot bit od mm | DTH- hammer |
|------------------------|--------------------|-----------------------------|----------------------|----------------------|-----------------------|----------------|
| DTH-RoX 2-1 273,0/12,7 | 273 | 10 3/4 | 12,7 | 0.500 | 243 | 9.567 |
| Ring MU | 273 | 10 3/4 | 12,7 | 0.500 | 211 | 8.307 |
| Ring MUHZ | 273 | 10 3/4 | 12,7 | 0.500 | 211 | 8.307 |
| DTH-RoX 2-1 323,9/12,7 | 323,9 | 12 3/4 | 12,7 | 0.500 | 293 | 11.535 |
| Ring MU | 323,9 | 12 3/4 | 12,7 | 0.500 | 257 | 10.118 |
| Ring MUHZ | 323,9 | 12 3/4 | 12,7 | 0.500 | 257 | 10.118 |
| | | | | | 338 | 13.307 |
| | | | | | 346 | 13.622 |



Concept 2-1 pilot bit



Concept 2-1 ring bit MU





DTH-RoX 3-1

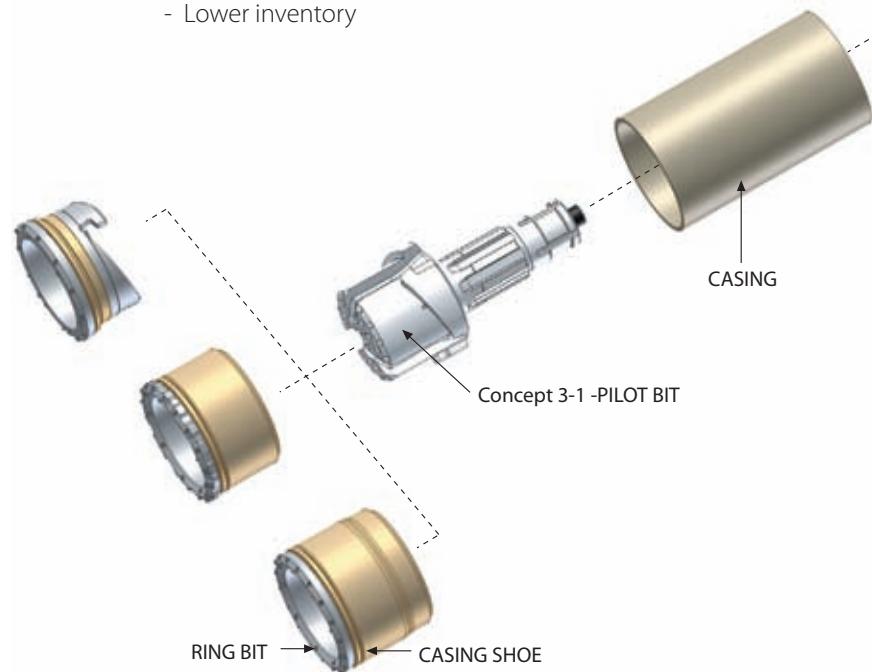
MULTI RING BIT SYSTEM FOR DOWN THE HOLE HAMMER

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 m³/min Max: 17 kg/cm² 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

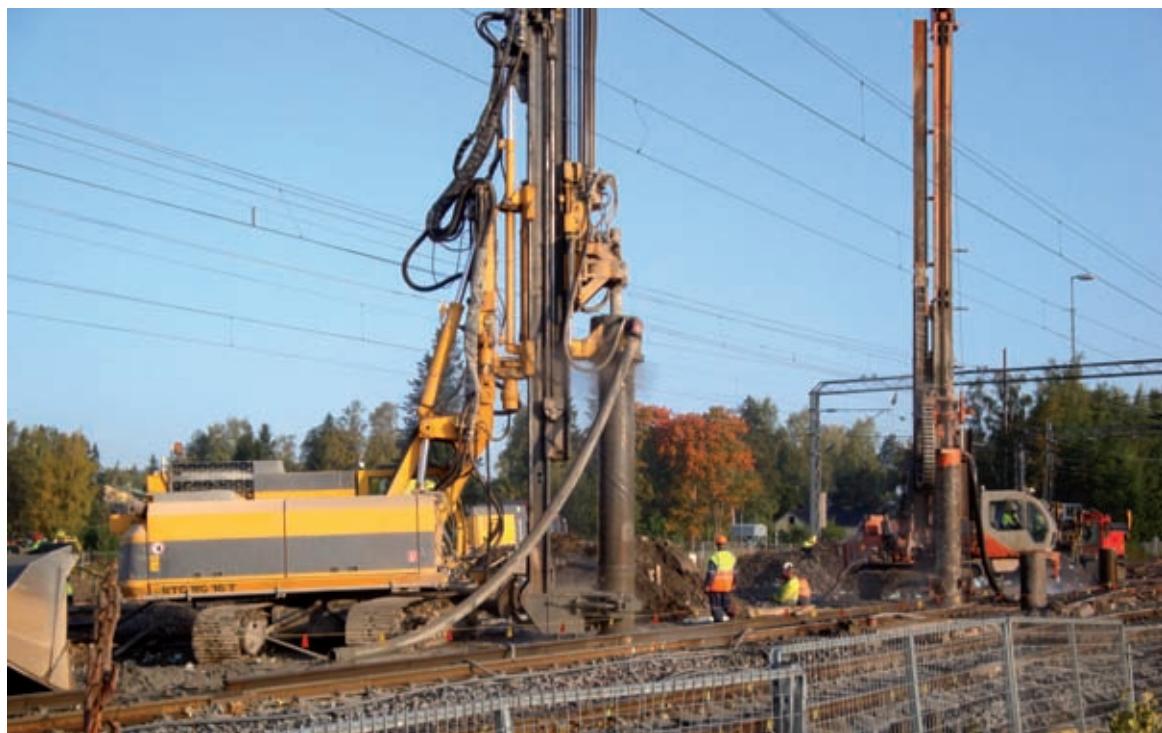
| Order code | casing od mm inch | | casing wall max. mm inch | | ring bit id mm inch | ring bit od mm inch | pilot bit od mm inch | DTH- hammer |
|------------------------|-------------------------|--|--------------------------------|--|---------------------------|---------------------------|----------------------------|----------------|
| 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 | | |
| Ring MU | 406,4 16 | | 12,7 0.500 | | 328 12.913 | 423 16.654 | | |
| Ring MUHZ | 406,4 16 | | 12,7 0.500 | | 328 12.913 | 440 17.323 | | |
| 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 | | |
| Ring MU | 508 20 | | 15 0.591 | | 414 16.299 | 526 20.709 | | |
| Ring MUHZ | 508 20 | | 15 0.591 | | 414 16.299 | 534 21.024 | | |
| 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 | | |
| Ring MU | 609,6 24 | | 15 0.591 | | 513 20.197 | 637 25.079 | | |
| Ring MUHZ | 609,6 24 | | 15 0.591 | | 513 20.197 | 640 25.197 | | |



DTH-RoX 3-1 pilot bit



DTH-RoX 3-1 ring bit MU



See page 8 for standard shank designs

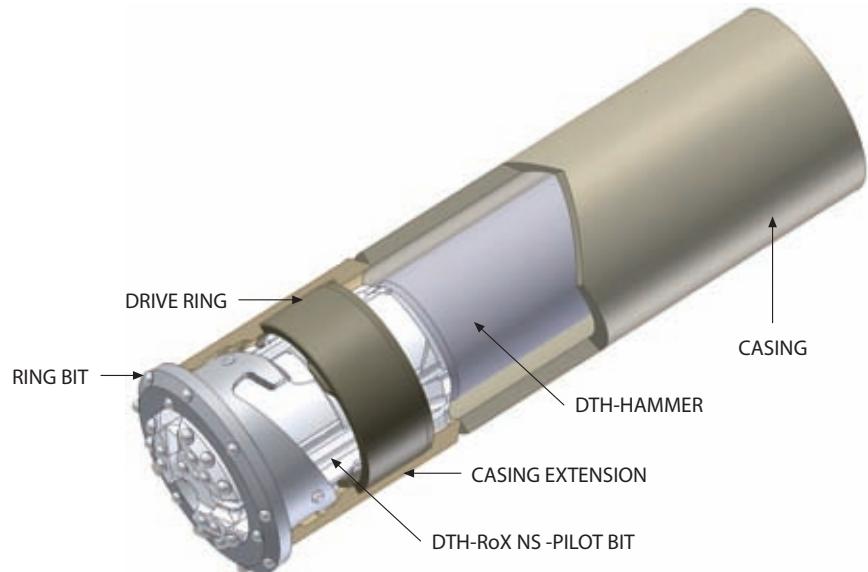
All bits are available with round or semiballistic buttons

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 disconnects 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 mm inch | casing wall max. mm inch | ring bit id mm inch | ring bit od mm inch | pilot bit od mm inch | DTH- hammer |
|-----------------------|-------------------------|--------------------------------|---------------------------|---------------------------|----------------------------|----------------|
| 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



See page 8 for standard shank designs

All bits are available with round or semiballistic buttons

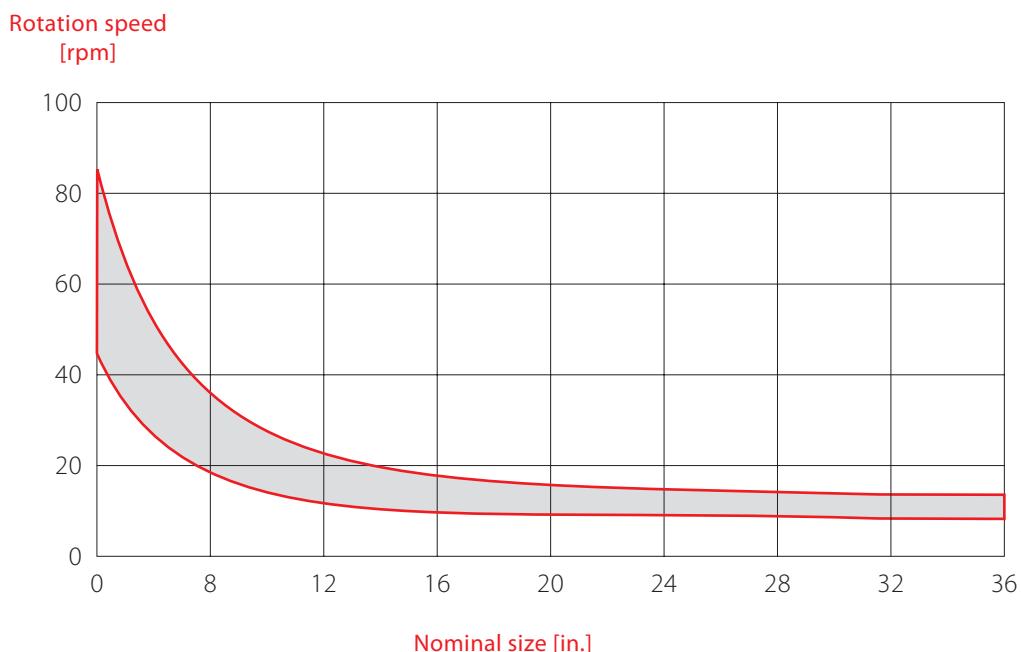
DRILLING WITH DTH CASING SYSTEM

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)



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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