

Secoroc Rock Drilling Tools

# Product catalogue – Rotary products



# The market's most complete rotary drilling system

Atlas Copco Secoroc can now offer worldwide customers the market's most complete rotary drilling system. Our commitment is to develop, manufacture, and distribute the highest quality, most cost-effective rock drilling tools for the mining and construction drilling industry.



Atlas Copco Secoroc and Thiessen Team have individually accumulated a long and established record of providing superior rotary drill products and services. Now working together, the partnership results in products and services with unequalled market leadership.

Thiessen Team began providing fabricated rotary drill pipes, sub adaptors and roller stabilizers to the blast hole drilling industry in western Canada in the early 1970's. As a result of multiple expansions and robust business growth, their products and services are now manufactured and offered worldwide from strategic locations in Canada, Australia, Chile, South Africa and Peru.

When this manufacturing strength is added to the industry-leading Atlas Copco drill rigs and Tricone bits, the result is a complete and reliable rotary drilling system backed by proven service.

The quality and performance of these rotary drilling products not only set new production standards, but are the most cost-effective in the industry.

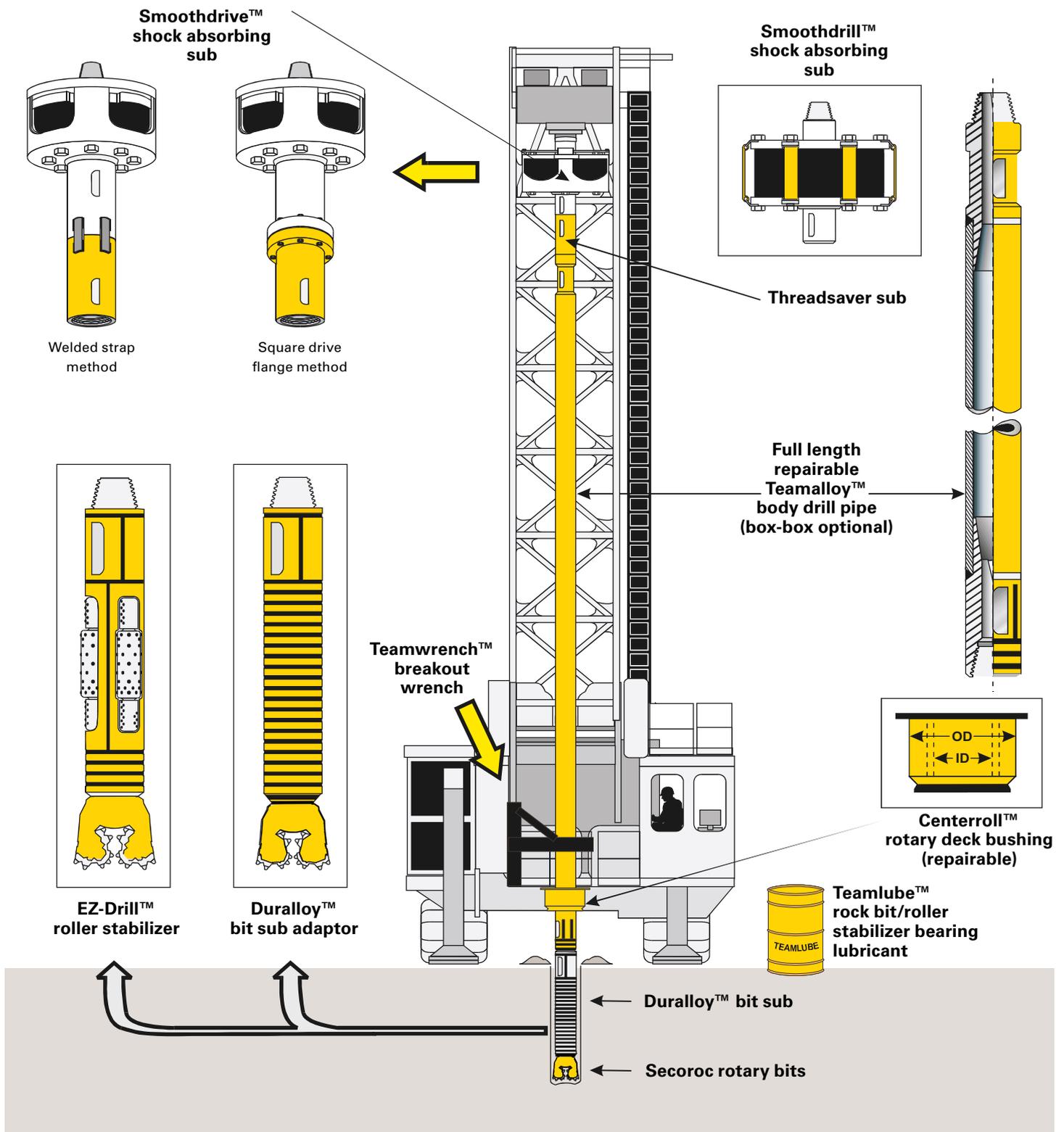
Consider these pioneering and innovative contributions:

- Fully heat-treated fabricated alloy drill pipe.
- Recessed hardface wear protection in critical areas.
- Roller stabilizers with replaceable blocks and rollers.
- Economic reconditioning of drill pipes and subs.
- State-of-the-art pipe straightening equipment
- Post heat-treated tool joints for multi-pass drilling.
- Tricone bits designed for highest productivity.

For customers of their industry-leading rotary drill products, Atlas Copco Secoroc also offers the market's most extensive and comprehensive support services, including regularly scheduled, on-site assistance.

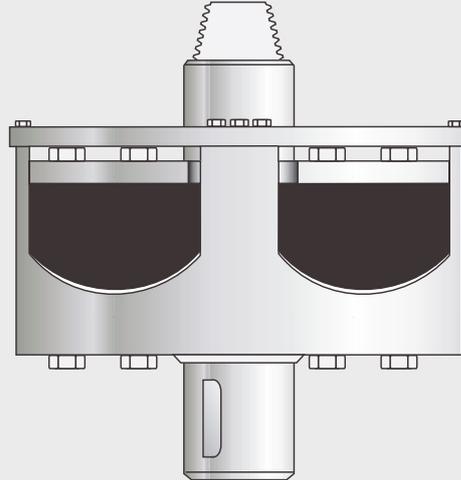
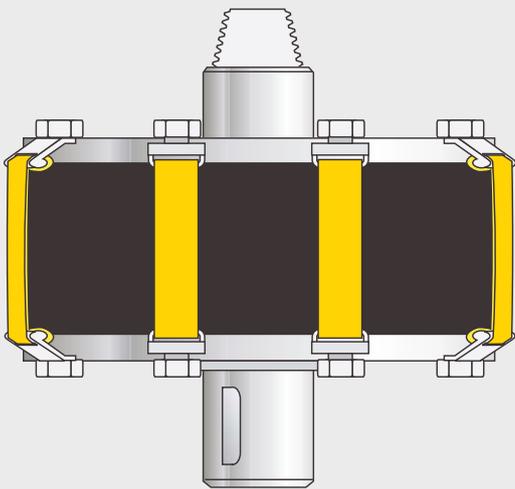
All this to help today's mining and construction drillers face and overcome increasingly competitive global challenges that are complicated by constantly changing requirements.

# The Secoroc rotary drill string



# Shock absorbing sub adaptors

The Smoothdrill™ and the Smoothdrive™ line of drilling shock absorbers bring several benefits to any rotary drilling operation. They not only increase penetration rate, but also enable greater drill rig availability. With significant reduction of vibrations transmitted from drill string to drill head, the need for drill head repairs decreases and also extends life of drill rig.



## Smoothdrill™

The original concept of Smoothdrill™ has not changed. The shock absorbing sub adaptors have been known to provide the following benefits:

- Improved torque control
- Longer rubber element life
- Less maintenance – strapless design
- Better drill string lifting control
- Positive stops for making/breaking connections

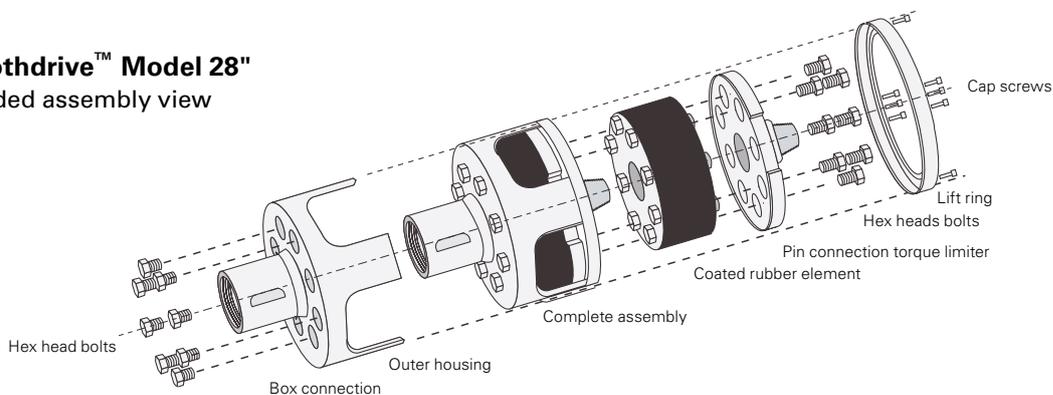
## Smoothdrive™

The new concept of Smoothdrive™ (strapless design) adds more benefits for blast hole drilling.

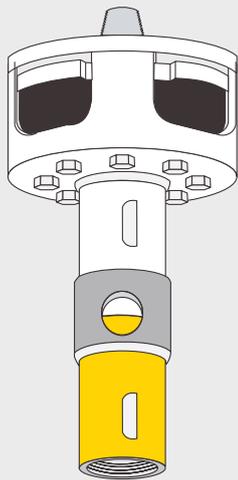
- Increased penetration rate
- Less drive head repairs
- Greater drill availability
- Extended drill life
- Longer bit life
- Less drill mast maintenance

## Smoothdrive™ Model 28"

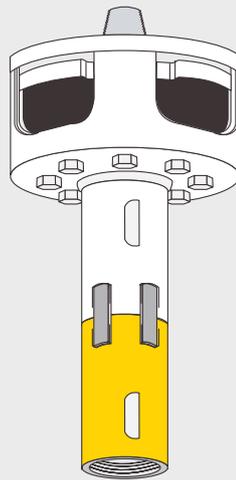
Exploded assembly view



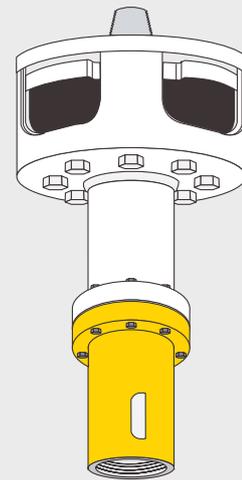
# Thread saver connection methods



Welded shroud  
method



Welded strap  
method



Square drive  
flange method

## Smoothdrill™ specifications

Model size	Load range (Pull down)	Clearance diameter	Shoulder to shoulder length	Assembly weight
28	up to 150 000 lbs	32"	32"	1800 lbs
22	up to 85 000 lbs	25 1/2"	29 3/8"	1000 lbs
18	up to 60 000 lbs	29 3/8"	29 3/8"	650 lbs
15	up to 35 000 lbs	34"	34"	510 lbs

## Smoothdrive™ specifications

Model size	Load range (Pull down)	Clearance diameter	Shoulder to shoulder length	Assembly weight
28	up to 150 000 lbs	34"	36"	2300 lbs
22	up to 85 000 lbs	27"	30"	1275 lbs
18	up to 60 000 lbs	22"	28"	835 lbs
15	up to 35 000 lbs	20"	28"	650 lbs

# Teamalloy™

## blasthole drill pipes

Teamalloy™ is a unique, proprietary specification of alloy tubing used in manufacture of premium drill pipes for blast hole drilling applications, where drill pipes with mild steel bodies have not provided best value and cost effectiveness to the drilling operation.

### Body material

Secoroc drill pipe bodies are manufactured from premium quality, heat-treated seamless Teamalloy™ tubing or Teamsteel™ pipe.

### Tool joint material

All pin and box end tool joints are precision machined from 4145H or 4340 heat-treated alloy steel. All tool joints are then fitted to the body using an interference heat-shrink fit that guarantees axial alignment and concentricity, and then are welded and stress-relieved.

### Wear protection

Duralloy™ is recommended for the bottom section of the drill pipe.

### Quality control

Secoroc stems are straight, rugged and thoroughly reliable. Every drill pipe is carefully inspected during each manufacturing process, and then again before it leaves the shop. Each drill pipe's manufacturing process is documented and certified (being traceable through our serial number system).

### Standard drill pipe sizes

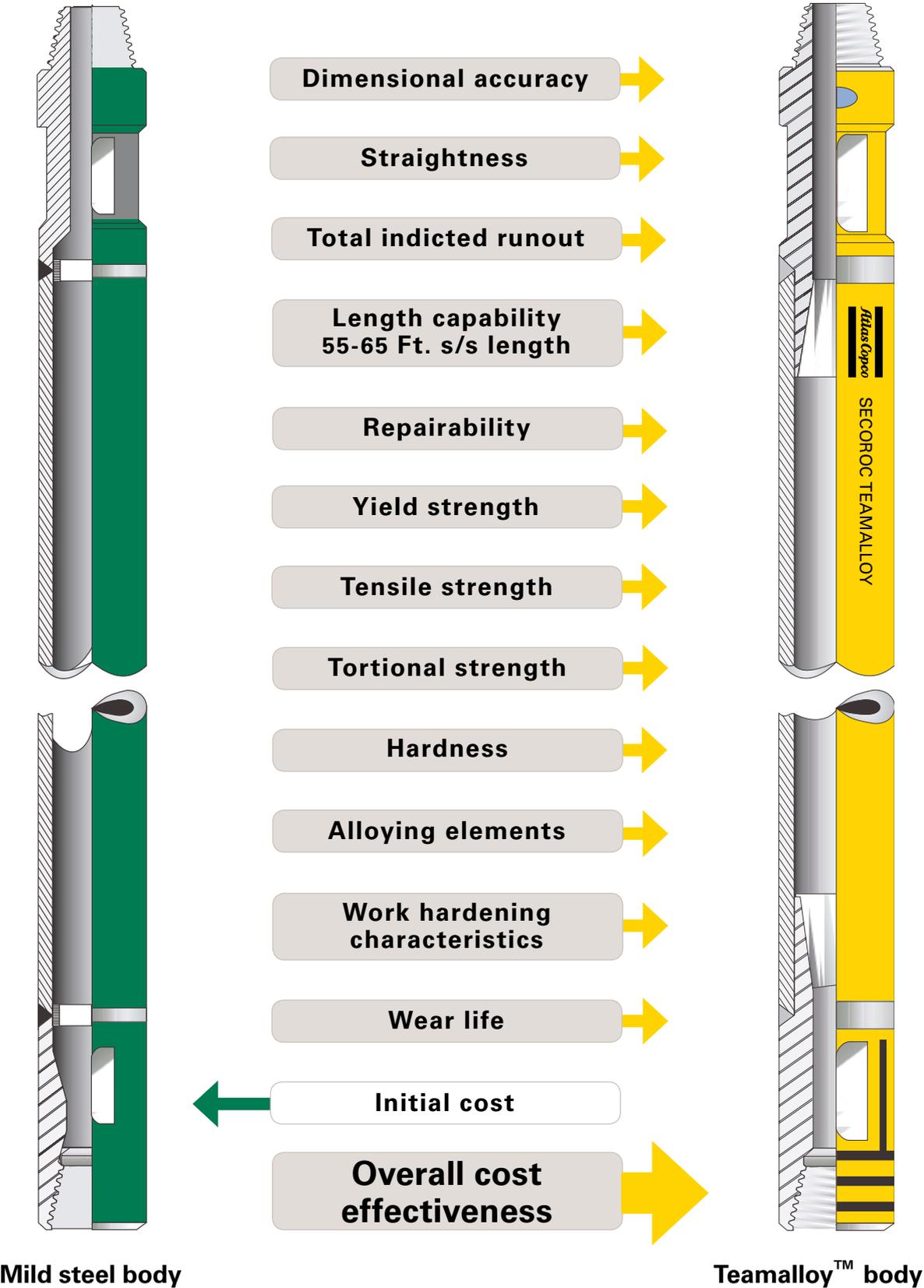
Outside diameter	Wall thickness	Body Wt. per Ft.	Pin/box Wt./set	Recommended connection
5"	0.500"	24 lbs	150 lbs	3 1/2" BECO
5"	0.750"	34 lbs	150 lbs	3 1/2" BECO
5 1/2"	0.500"	27 lbs	180 lbs	3 1/2" BECO
5 1/2"	0.750"	38 lbs	180 lbs	3 1/2" BECO
6"	0.750"	42 lbs	225 lbs	4" BECO
6 1/4"	0.500"	31 lbs	250 lbs	4" BECO
6 1/4"	0.750"	44 lbs	250 lbs	4" BECO
6 1/4"	1.000"	56 lbs	250 lbs	4" BECO
6 5/8"	0.864"	53 lbs	295 lbs	4 1/2" BECO
7"	0.500"	35 lbs	335 lbs	4 1/2" BECO
7"	0.750"	50 lbs	335 lbs	4 1/2" BECO
7"	1.000"	64 lbs	335 lbs	5 1/4" BECO
7 5/8"	0.500"	38 lbs	400 lbs	5 1/4" BECO
7 5/8"	0.750"	55 lbs	400 lbs	5 1/4" BECO
7 5/8"	1.000"	71 lbs	400 lbs	5 1/4" BECO
8 5/8"	0.750"	63 lbs	520 lbs	6" BECO
8 5/8"	0.906"	75 lbs	520 lbs	6" BECO
8 5/8"	1.000"	82 lbs	520 lbs	6" BECO
9 1/4"	1.000"	88 lbs	590 lbs	6" BECO
9 1/4"	1.250"	125 lbs	590 lbs	6" BECO
9 5/8"	1.500"	130 lbs	650 lbs	7" BECO
10 1/4"	1.250"	120 lbs	750 lbs	8" BECO
10 3/4"	1.000"	105 lbs	750 lbs	8" BECO
10 3/4"	1.250"	127 lbs	750 lbs	8" BECO
11 3/4"	1.250"	140 lbs	800 lbs	8" BECO
12 1/4"	1.000"	120 lbs	1050 lbs	8" BECO
13 3/8"	1.250"	162 lbs	1275 lbs	10" BECO
13 3/8"	1.500"	190 lbs	1275 lbs	10" BECO

### Inquiries/how to order

Please specify the following:

- Outside diameter
- Wall thickness
- Shoulder-to-shoulder length of drill pipe
- Size and type of thread connections.
- Drill rig model for break-out configuration

# Drill pipe comparison

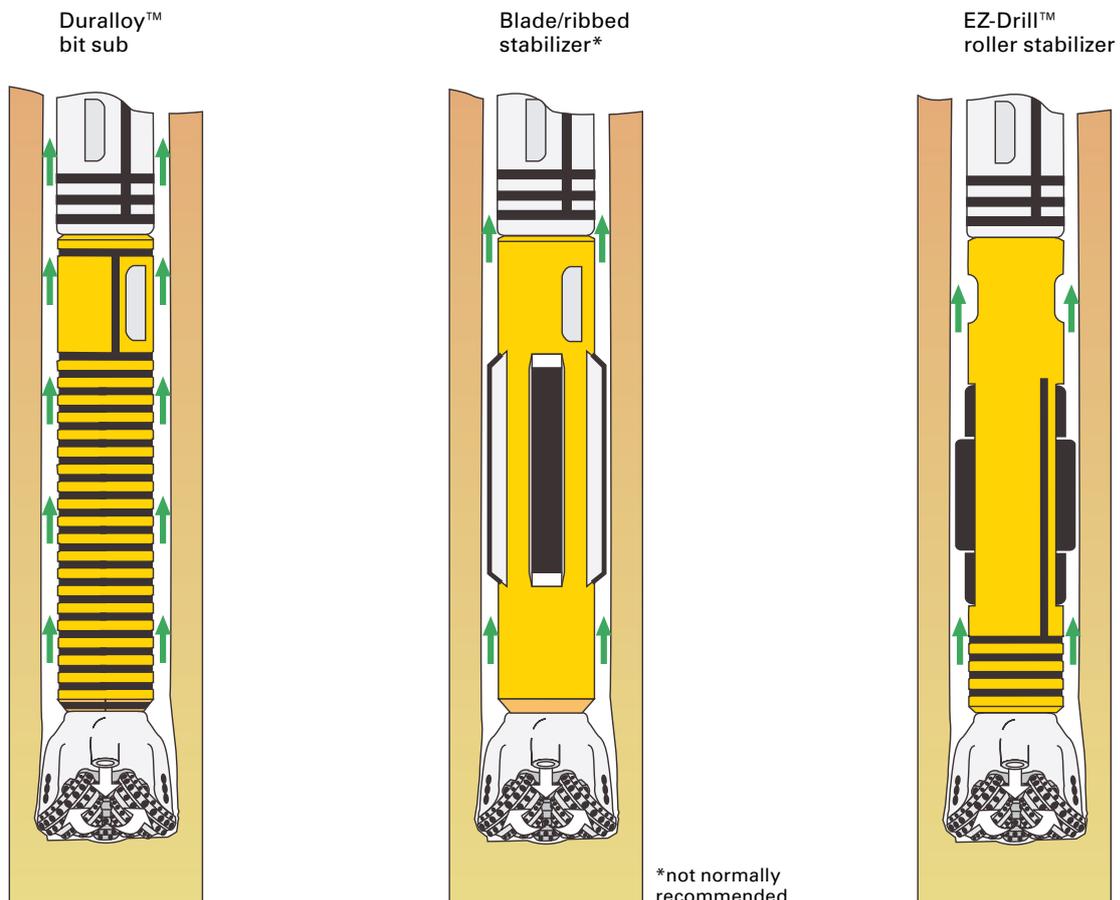


# Rotary sub adaptors

To connect the Tricone drill bit to the drill pipe, a wear protected bit sub adaptor is generally used when the rock formation is relatively flat, competent, and not in need of stabilization within the hole. In some cases (primarily softer rock formations that are dipped or result in sloughing) it is worthwhile to consider the use of a Secoroc EZ-Drill™ roller stabilizer rather than an ordinary bit sub adaptor.



## Drill bit connection options



# Duralloy™ bit sub adaptor

The Secoroc Duralloy™ bit sub adaptors are used when adapting from one thread to another (drill pipe to drill bit); when coupling drill pipes having the same connections on both ends; or as thread savers. Team rotary subs are manufactured from various application-specific, premium quality alloy steels. They are available in various sizes and all required thread connections.



## Material specification

We utilize a variety of application specific grades of alloy steel bar in both heat-treated-stress-relieved and post-heat-treated conditions.

## Duralloy™ wear protection option

Recessed hardface wear strips or hardband wear rings with tungsten carbide hard metal overlay (63-68 Rockwell C hardness).

## Types

- Bottom or bit subs
- Top or spindle subs
- Thread saver subs
- Crossover or adaptor subs

## Special features

- Breakout wrench flats/slots to suit drill model
- Post heat-treated alloy steel
- Hardfacing or hardbanding wear protection
- Low torque thread options
- Neck down outside diameter

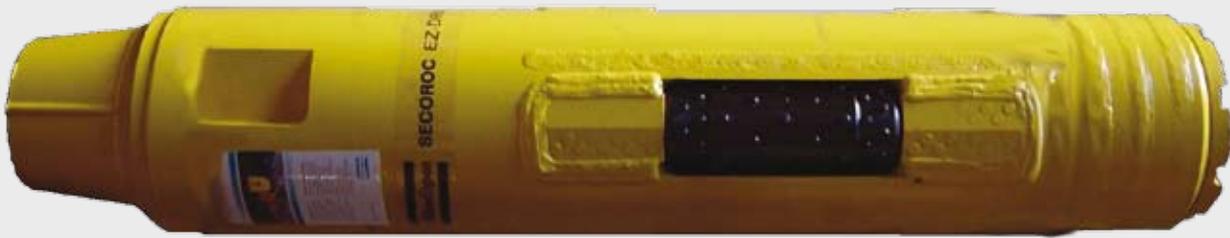
## Inquiries/how to order

Please specify the following:

- Type of sub adaptor
- Shoulder to shoulder length
- Outside diameter(s)
- Inside bore diameter.
- Size and type of upper and lower connections (BECO or API)
- Material specifications
- Any special features

# EZ-Drill™ roller stabilizers

The EZ-Drill™ roller stabilizer contains three roller assemblies, with carbide inserts for wear resistance, which provide support against the hole walls serving to both guide the Tricone drill bit in a straight direction and pack the wall of the hole to prevent sloughing.



The result with EZ-Drill™, besides the straighter hole, less caving in of the hole which leads to the following benefits:

- Less wear on the in-hole drill string components.
- Increased productivity as less material sloughs from the hole wall.
- Less regrinding of rock falling to the bottom of the hole.
- A straighter hole which reduces risk of blasting problems and poor fragmentation.
- Smoother operation of the drill during the drilling operation.

#### **EZ-Drill™ features:**

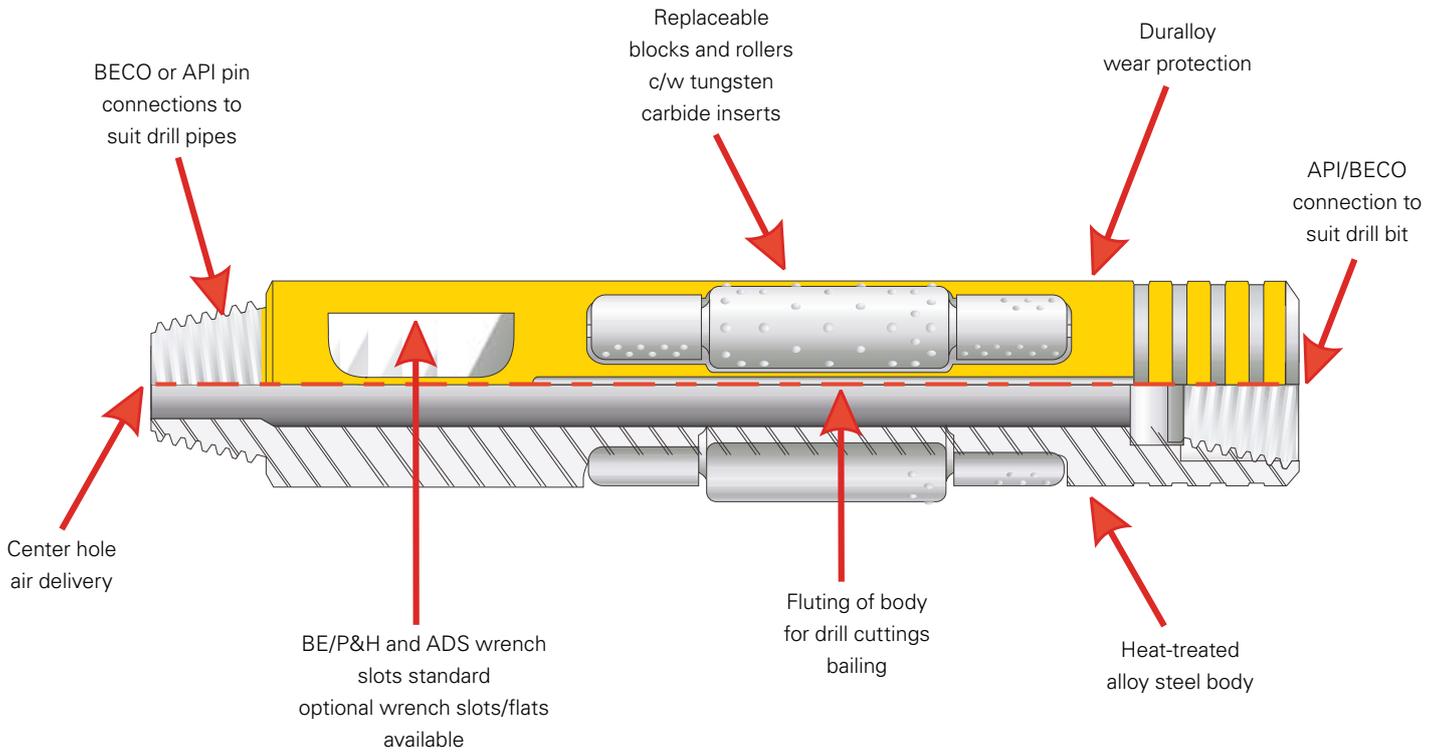
- Efficient air delivery
- Less air loss (bearing)
- Smooth running
- Low torque
- Repairable
- Wear protected
- Reduced vibration
- Straighter holes
- Smoother bore wall
- Alignment spacers  
bit leg/rollers

#### **Inquiries/how to order**

Please specify the following:

- Hole size
- Thread connections
- Model of drill
- Body length
- Body diameter
- Body fluting
- Extra Duralloy™ wear

## Repairable



### Available sizes EZ-Drill™

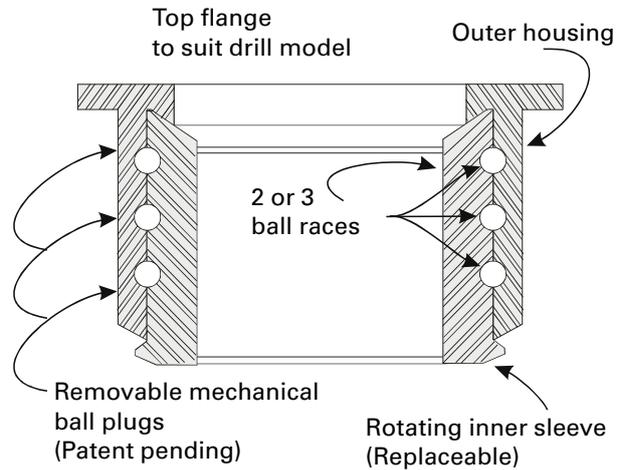
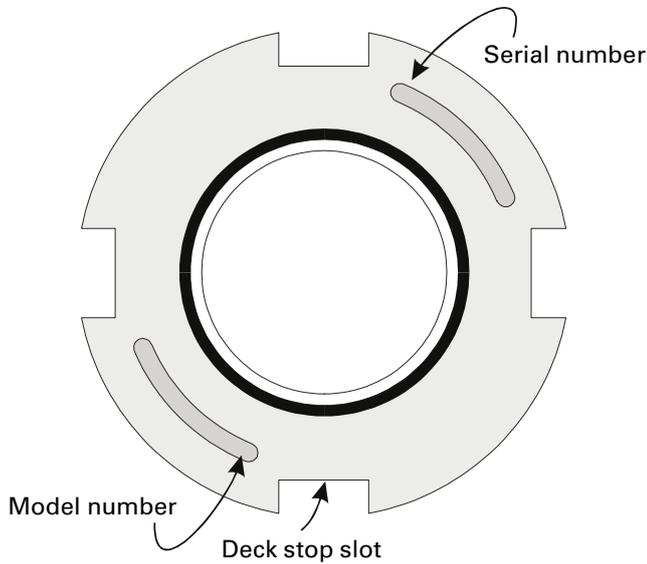
Hole size	Body diameter	s/s length
9"	7", 7 5/8"	32"/42"
9 7/8"	7 5/8", 8 5/8"	32"/42"/50"
10 5/8"	8 5/8", 9 1/4"	32"/42"/50"
11"	8 5/8", 9 1/4"	32"/42"/50"
12 1/4"	8 5/8", 9 1/4", 9 5/8", 10 3/4"	35"/42"/50"
13 3/4"	10 3/4", 11 3/4"	32"/42"/50"
15"	13 3/8"	42"/50"
16"	13 3/8"	42"/50"

### Options

EZ-Drill™ repairable roller stabilizers are available in a variety of body lengths and diameters, as well as a complete selection of break-out wrench slot/flat configurations and thread connections.

# Centeroll™ repairable rotary deck bushing

Our repairable Centeroll™ roller deck bushing is designed and manufactured by incorporating several innovations that result in the Centeroll™ being the most cost-effective roller deck bushing in the industry.



The standard rotary deck bushing originally developed was a vast improvement over the non-rotating friction type deck bushing. It provided such benefits as a rotating inner sleeve for torque reduction under pull-down load and no maintenance as it is a “one time use” (throw away) design. Unfortunately, the standard non-repairable rotary deck bushing tends to wear rapidly on the inner diameter and is consequently run to destruction in an effort to maximize cost effectiveness.

## Centeroll™ features

- Alloy outer housing for longer wear life
- Mechanical ball plug system
- Simple replacement of inner rotating sleeve
- Fully heat-treated inner rotating sleeve
- Repairable for economical secondary life
- Repairable at mine workshop or ours

### Inquiries/how to order

Please specify the following:

- Drill manufacturer
- Drill model
- Deck opening diameter
- Drill pipe diameter
- Top flange dimensions on flange
- Deck stop slot dimensions
- Any special features required
- Lifting ring





#### **Centeroll™ innovations**

Initial field tests (reports available upon request) indicate that the effective first time wear of our Centeroll™ is superior to the standard rotary deck bushing products currently available. Since the Centeroll™ is also easily repairable, its overall economic cost effectiveness is unsurpassed. The Centeroll™ is designed with heat treated alloy steel in outer housing, inner sleeve and in ball race

areas. This ensures a longer service life for the Centeroll™ compared to alternative solutions with mild steel construction.

With the possibility to replace ball plugs and ball bearings as well as inner sleeve, the deck bushings service life is prolonged far beyond that of products made of mild steel and without repairability.

#### **Models available for following drills:**

**Atlas Copco:** DM25, DM30, DM45, DM50, T4BH, DML, DMM 2&3, DMH, PV 271, PV 275, PV 351

**Bucyrus International:** BE-35R, 45R, 47R, 49R, 55R, 59R, 60R, 61R

**P & H/GD:** GD70, GDCL90, GD100, GD120, P&H100XB, P&H120A, GD250XP, GD120A

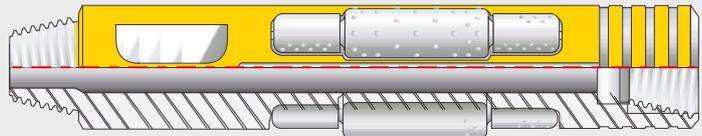
**Tamrock-Drilltech:** D25K, D40K, D245, D45K, D50K, D55SP, D60K, D75K, D90K, 1190E

**Terex-Reeddrill:** SKT, SKF, SKS

Other models on request.

# Teamlube™ bearing lubricant

A special drilling lubricant formulated for blasthole drilling applications using air-cooled bearing; Tricone drill bits and roller stabilizers.

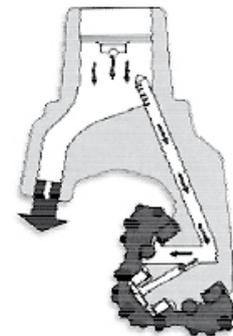


## Teamlube™

- Is environmentally safe
- Is water soluble
- Has high lubricity
- Extends bit life by lubricating bit bearing areas
- Extends roller stabilizer life by lubricating roller bearing areas

## Available in:

- 20 liter pails / 5.2 US gallons
- 200 liter drums / 52.8 US gallons
- 1000 liter totes / 264 US gallons (non-returnable)
- 1125 liter totes / 297 US gallons



# Teamlube™ lubricator

The Teamlube™ positive lubricator is air operated and is time activated. The lubricator is completely self contained and is easy to install. The lubricator can be used to inject Teamlube™.

The pump is designed to deliver a measured amount of product with each injection to insure a proper mixture. The pump is designed with only one moving part to ensure low maintenance.

The Teamlube™ positive lubricator is available for different drilling models and has a one year warranty against manufacture defects from the date of purchase on replacement parts only.

### Pump specifications:

Air supply working pressure	35 psi-120 psi
Pump discharge pressure	Four to one multiplier
Pump discharge volume	10 ml per stroke

### Timer specifications:

Voltages	12 or 24 volt dc, 110 or 220 volt ac
Pump activation time	4-6 sec
Pump delay time	17-38 sec
Tank sizes (shipping dimensions only)	27.5" x 24" x 30" (50.0 gal), 15.5" x 12" x 18" (7.5 gal)

# Teamwrench™ automatic drill pipe wrench

For quick and efficient automatic breaking of threaded connections in drill pipe, bit subs, and Tricone bit from drill string, the Teamwrench™ breakout wrench is the safest, most versatile break out solution available.



The full range of wrench sizes allow for the breakout of components from 3" to 15" (75 mm-381 mm) in diameter. Each Teamwrench™ is suited to a specific drill make and model, and the diameter of the drill pipe and related drill string components utilized on that drill. The wrench can be custom designed to fit any drill rig and customer requirement.

## Operation

To operate, the Teamwrench™ is simply moved from its resting position to engage the drilling components that require breaking out. The Teamwrench™ head grips the drilling component firmly and then turns the component to break the seal of the tightly threaded connection shoulder. The binding force grows with the applied torque which in turn avoids slippage of the Teamwrench™ head on the drill pipe. There is also virtually no gouging of the component by the jaw inserts. The Teamwrench™ is operated completely from within the cab of the drill and is the very safest method of breaking out tightly threaded connections.

## Adjustment to drill string

The Teamwrench™ automatically adjusts to the diameter of the drill pipe (to compensate for drill pipe wear within the size range), grips the stem firmly and then turns the stem. The steel jaws are hardened for long life, and the hydraulic pressure range required is from 2,000 to 3,500 PSI. Pressure is taken from the existing hydraulic system of the drill. The binding force grows with the applied torque, which in turn avoids any slippage of the wrench on the drill pipe.

The wrench can be adjusted vertically for each breakout application and automatically adjusts for eventual diameter wear of the drill string components up to 2" (50 mm) below original diameter of the component. The Teamwrench™ is capable of 400 mm of vertical travel to avoid wear protected areas of drill string components. The operator does not have to leave the cabin to change drill pipes. The two valves are operated from the operator's console.

## Models available for following drills:

**Atlas Copco:** DM25, DM30, DM45, DM50, T4BH, DML, DMM 2&3, DMH, PV 271, PV 275, PV 351

**Bucyrus International:** BE-35R, 45R, 49R, 59R, 60R

**P & H/GD:** GD100, GD120, GD250XP, GD120A

**Tamrock-Drilltech:** D25K, D40K, D45K, D50K, D55SP, D60K, D75K, D80K, D90K, 1190E

New applications are being designed for other drill rig systems with varying drill pipe diameters, depending on available space on the drill deck.

# Secoroc Tricone bits

In today's competitive environment, miners are demanding improved processes and equipment to add value to their mining operations. To increase efficiency and lower drilling costs, blasthole rigs are expected to deliver more and more energy to the drill bit. As a result, drill bits must be carefully designed and manufactured to not compromise the productivity and efficiency of increasingly complex and expensive drilling systems. Bits have become an even more critical and vital component in this process.

## Secoroc HDNT and MAGNT – Time tested technology that makes a difference

To develop our time tested products further, major manufacturing facility investments in plant, equipment and research and development have been made in the Secoroc Tricone bit product offering.

Add to that the concept of “Lean” and “Flow” orientated manufacturing techniques and the end result is MAGNT and HDNT replacing the former MAG and HD product lines.

NT means manufacturing bits using new state of the art machine tools with an obsessive dedication to quality, the elimination of waste and maximum throughput efficiency.

*Investment, Lean, Flow,  
Quality... New Technology...NT.*

### **Designed cutting structures**

The carefully designed cutting structures of the Secoroc HDNT and MAGNT bits are engineered to contribute to higher penetration rates and increased bit life. Redesigned gauge and transition areas are stronger, minimizing tooth breakage. Tungsten carbide grades are tailored to handle abrasive as well as hard formation environments. The HDNT also features a variety of carbide tooth shapes designed to enhance penetration rates in harder and tougher formations. The MAGNT features redesigned lugs, allowing quicker evacuation of cuttings from the bit. The tungsten carbide inserts resist wear and breakage in abrasive environments.

### **Increased shirrtail thickness**

The Secoroc HDNT and MAGNT Tricone bits feature increased shirrtail thickness to enhance bearing life and help prevent early exposure of the outer bearings. The result is increased performance and longer bit life. Bearing elements and the cone mouth have also been redesigned so that the cones are better balanced and there is an improved distribution of cutting



forces to permit increased speed and higher weight on bit (WOB) levels.

### **Contoured shirrtail**

The contoured shirrtail design permits maximum evacuation of cutting materials while minimizing the amount of cuttings packed into the bearing.

### **Increased cone overhang**

The Secoroc MAGNT and HDNT have increased cone overhang between the lug and the hole wall. This design permits easier evacuation of cuttings and results in less shirrtail lip erosion. Bearing life is increased due to reduced frictional drag against the hole wall, which also lowers the bit's overall torque requirements.



## Secoroc $\epsilon$ psilon – Turning science into productivity

Atlas Copco Secoroc product development engineers have spent years studying specific applications in order to optimize drill bit performance. Using the latest 3D design and engineering tools, including Finite Element Analysis, in combination with decades of field experience, they developed the Secoroc *epsilon* line of Tricone bits, now regarded as the ultimate blasthole bit solution.

These premium choice bits are designed specifically for each application. For example, softer applications with higher penetration rates require drill bits with improved cutting structures and carbide cutters that are both wear and fracture-resistant. Bearings must be designed to handle increased loads and the higher cutting speeds associated with today's challenging blasthole drilling environments.

To meet these requirements, Secoroc *epsilon* bits feature an improved cutting structure, with wear and fracture resistant tungsten carbide

inserts, designed to maximize penetration rates. Bearings are refined and strengthened. In fact, all aspects of the Secoroc *epsilon* bits have been carefully engineered to maximize productivity and lower total drilling costs.

- **Optimized cutting structure and bearing geometry to distribute load**
- **More uniformly distributed load over bearings**
  - Smother bit performance
  - Sustained penetration rate over longer periods of time
  - Reduced risk of bearing failure
- **Streamlined lug manages larger drill cuttings**
  - Higher penetration rate
  - Less regrinding of cuttings to smaller pieces
  - Less bit wear
- **Full body armor minimizes wear on bit body and shirrtail.**

# TCI Blasthole Tricone bits

2 15/16" – 7 3/8"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
2 15/16" 75 mm	91001049	161-3075-72-HD-CR-01	7-2-1	HDNT72CR	Conical Inserts	Reg	5.0	2.3	4n-Rod	11,750-23,500 lbs 50-90 RPM
4 3/4" 121 mm	91001741	112-3121-72-VW-CRW-01	7-2-1	WW72CRW	Waterwell, Conical Inserts, Wear Resistant Carbide	Reg	16	7.1	2 7/8" API	19,000-38,000 lbs 50-90 RPM
4 3/4" 121 mm	91001015	112-3121-72-HD-CR-02	7-2-2	HDNT72CR	Conical Inserts, Wear Resistant Carbide	Reg	16	7.3	2 7/8" API	19,000-38,000 lbs 50-90 RPM
5 1/8" 130 mm	91000270	112-3130-52-HD-F-02	5-2-2	HDNT52F	Chisel Inserts	Jet	20	9.1	2 7/8" API	15,375-33,313 lbs 50-150 RPM
5 1/2" 140 mm	91001780	114-3140-73-VW-NWR-01	7-3-1	WW73NWR	Waterwell, Round Top Inserts, Wear Resistant Carbide	Reg	24	11.0	3 1/2" API	22,000-44,000 lbs 50-90 RPM
5 5/8" 143 mm	91000417	114-3143-62-HD-F-02	6-2-2	HDNT62F	Chisel Inserts	Jet	30	13.6	3 1/2" API	22,500-39,375 lbs 50-120 RPM
5 7/8" 149 mm	91000419	114-3149-64-HD-C-02	6-4-2	HDNT64C	Conical Inserts, Wear Resistant Carbide	Jet	37	16.8	3 1/2" API	23,500-41,125 lbs 50-120 RPM
6 1/4" 159 mm	91000425	114-3159-52-HD-F-02	5-2-2	HDNT52F	Chisel Inserts	Jet	38	17.2	3 1/2" API	18,750-40,625 lbs 50-150 RPM
6 1/4" 159 mm	91001107	114-3159-62-HD-F-02	6-2-2	HDNT62F	Chisel Inserts	Jet	38	17.2	3 1/2" API	25,000-43,750 lbs 50-120 RPM
6 1/4" 159 mm	91000329	114-3159-71-HD-F-02	7-1-2	HDNT71F	Chisel Inserts	Jet	38	17.2	3 1/2" API	25,000-50,000 lbs 50-90 RPM
6 3/4" 171 mm	91000438	114-3171-42-MA-SA-02	4-2-2	MAGNT42SA	Super Scoop Inserts, Armor	Jet	50	22.7	3 1/2" API	6,750-33,750 lbs 50-150 RPM
6 3/4" 171 mm	91001876	117-3171-52-eH-CA-02	5-2-2	eH52CA	Chisel Inserts, Armor	Jet	51	23.1	4 1/2" API	20,250-43,875 lbs 50-150 RPM
6 3/4" 171 mm	91000428	114-3171-53-HD-CAW-02	5-3-2	HDNT53CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	51	23.1	3 1/2" API	20,250-43,875 lbs 50-150 RPM
6 3/4" 171 mm	91001582	114-3171-53-eM-CA-02	5-3-2	eM53CA	Conical Inserts, Armor	Jet	50	22.7	3 1/2" API	6,750-33,750 lbs 50-150 RPM
6 3/4" 171 mm	91000445	114-3171-53-MA-CA-02	5-3-2	MAGNT53CA	Conical Inserts, Armor	Jet	53	24.0	3 1/2" API	20,250-43,875 lbs 50-150 RPM
6 3/4" 171 mm	91000427	114-3171-63-HD-CAW-02	6-3-2	HDNT63CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	52	23.6	3 1/2" API	27,000-47,250 lbs 50-120 RPM
6 3/4" 171 mm	91000471	114-3171-63-HD-FAW-02	6-3-2	HDNT63FAW	Chisel Inserts, Armor, Wear Resistant Carbide	Jet	52	23.6	3 1/2" API	27,000-47,250 lbs 50-120 RPM
6 3/4" 171 mm	91000431	114-3171-71-HD-CAW-02	7-1-2	HDNT71CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	51	23.1	3 1/2" API	27,000-54,000 lbs 50-90 RPM
7 3/8" 187 mm	91000418	114-3187-52-HD-FW-02	5-2-2	HDNT52FW	Chisel Inserts, Wear Resistant Carbide	Jet	49	22.2	3 1/2" API	22,125-47,938 lbs 50-150 RPM
7 3/8" 187 mm	91001046	114-3187-62-HD-F-02	6-2-2	HDNT62F	Chisel Inserts	Jet	50	22.7	3 1/2" API	29,500-51,625 lbs 50-120 RPM

# TCI Blasthole Tricone bits

7 7/8" – 9"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
7 7/8" 200 mm	91001776	117-3200-52-eM-CA-02	5-2-2	eM52CA	Conical Inserts, Armor	Jet	67	30.4	4 1/2" API	23,625-51,188 lbs 50-150 RPM
7 7/8" 200 mm	91001639	117-3200-52-eM-CAW-02	5-2-2	eM52CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	72	32.7	4 1/2" API	23,625-51,188 lbs 50-150 RPM
7 7/8" 200 mm	91000454	117-3200-53-MA-C-02	5-3-2	MAGNT53C	Conical Inserts	Jet	67	30.4	4 1/2" API	23,625-51,188 lbs 50-150 RPM
7 7/8" 200 mm	91001236	117-3200-61-HD-CALHW-02	6-1-2	HDNT61CALHW	Conical Inserts, Armor, Streamlined Lug, Wear Resistant Carbide	Jet	72	32.7	4 1/2" API	31,500-55,125 lbs 50-120 RPM
7 7/8" 200 mm	91000443	117-3200-62-HD-FW-02	6-2-2	HDNT62FW	Chisel Inserts, Wear Resistant Carbide	Jet	72	32.7	4 1/2" API	31,500-55,125 lbs 50-120 RPM
7 7/8" 200 mm	91001612	117-3200-71-eH-OAHW-02	7-1-2	eH71OAHW	Ogive Inserts, Armor	Jet	68	30.9	4 1/2" API	31,500-71,000 lbs 50-90 RPM
7 7/8" 200 mm	91000420	117-3200-73-HD-NW-02	7-3-2	HDNT73NW	Round Top Inserts, Wear Resistant Carbide	Jet	71	32.2	4 1/2" API	31,500-71,000 lbs 50-90 RPM
8 1/2" 216 mm	91000811	117-3216-62-HY-CW-02	6-2-2	HY62CW	Hydrothermal, Conical Inserts, Wear Resistant Carbide	Jet	95	43.1	4 1/2" API	34,000-59,500 lbs 50-120 RPM
9" 229 mm	91001888	117-3229-41-eM-CA-02	4-1-2	eM41CA	Conical Inserts, Armor	Jet	92	41.7	4 1/2" API	9,000-45,000 lbs 50-150 RPM
9" 229 mm	91001424	117-3229-42-MA-CALT-02	4-2-2	MAGNT42CALT	Conical Inserts, Armor, Streamlined Lug, Tough Carbide	Jet	94	42.6	4 1/2" API	9,000-45,000 lbs 50-150 RPM
9" 229 mm	91001840	117-3229-43-eM-CA-02	4-3-2	eM43CA	Conical Inserts, Armor	Jet	92	41.7	4 1/2" API	9,000-45,000 lbs 50-150 RPM
9" 229 mm	91001857	117-3229-44-eM-CA-02	4-4-2	eM44CA	Conical Inserts, Armor	Jet	92	41.7	4 1/2" API	9,000-45,000 lbs 50-150 RPM
9" 229 mm	91001816	117-3229-52-eM-CA-02	5-2-2	eM52CA	Conical Inserts, Armor	Jet	92	41.7	4 1/2" API	27,000-58,500 lbs 50-150 RPM
9" 229 mm	91001221	117-3229-53-eH-CAHW-02	5-3-2	eH53CAHW	Conical Inserts, Armor, Streamlined Lug, Hard Nose on Cones, Wear Resistant Carbide	Jet	95	43.0	4 1/2" API	27,000-58,500 lbs 50-150 RPM
9" 229 mm	91001812	117-3229-53-eM-CAWH-02	5-3-2	eM53CAWH	Conical Inserts, Armor, Wear Resistant Carbide, Hard Nose on Cone	Jet	92	41.7	4 1/2" API	27,000-58,500 lbs 50-150 RPM
9" 229 mm	91000421	117-3229-62-HD-FW-02	6-2-2	HDNT62FW	Chisel Inserts, Wear Resistant Carbide	Jet	88	39.9	4 1/2" API	36,000-63,000 lbs 50-120 RPM
9" 229 mm	91000463	117-3229-62-MA-CAW-02	6-2-2	MAGNT62CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	96	43.6	4 1/2" API	36,000-63,000 lbs 50-120 RPM
9" 229 mm	91001222	117-3229-64-eH-OAHW-02	6-4-2	eH64OAHW	Ogive Inserts, Armor, Hard Nose on Cone, Wear Resistant Carbide	Jet	95	43.1	4 1/2" API	36,000-63,000 lbs 50-120 RPM
9" 229 mm	91001167	117-3229-64-HD-OAH-02	6-4-2	HDNT64OAH	Ogive Inserts, Armor, Hard Nose on Cone	Jet	95	43.1	4 1/2" API	36,000-63,000 lbs 50-120 RPM
9" 229 mm	91001595	117-3229-71-eH-OAHW-02	7-1-2	eH71OAHW	Ogive Inserts, Armor	Jet	92	41.7	4 1/2" API	36,000-63,000 lbs 50-120 RPM
9" 229 mm	91001224	117-3229-73-HD-NAW-02	7-3-2	HDNT73NAW	Round Top Inserts, Armor, Wear Resistant Carbide	Jet	88	39.9	4 1/2" API	36,000-72,000 lbs 50-90 RPM

# TCI Blasthole Tricone bits

9 7/8" – 10 5/8"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
9 7/8" 251 mm	91001903	118-3251-43-eM-CA-02	4-3-2	eM43CA	Conical Inserts, Armor	Jet	132	60.0	6 5/8" API	9,875-49,375 lbs 50-150 RPM
9 7/8" 251 mm	91000532	118-3251-44-MA-CA-02	4-4-2	MAGNT44CA	Conical Inserts, Armor	Jet	127	57.6	6 5/8" API	9,875-49,375 lbs 50-150 RPM
9 7/8" 251 mm	91000547	118-3251-52-HD-C-02	5-2-2	HDNT52C	Conical Inserts	Jet	132	60.0	6 5/8" API	29,625-64,188 lbs 50-150 RPM
9 7/8" 251 mm	91001859	118-3251-53-eH-CA-02	5-3-2	eH53CA	Conical Inserts, Armor	Jet	132	60.0	6 5/8" API	29,625-64,188 lbs 50-150 RPM
9 7/8" 251 mm	91001794	118-3251-53-eH-CAW-02	5-3-2	eH53CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	132	60.0	6 5/8" API	29,625-64,188 lbs 50-150 RPM
9 7/8" 251 mm	91001847	118-3251-53-eH-CB-02	5-3-2	eH53CB	Conical Inserts, Backreaming Lug	Jet	132	60.0	6 5/8" API	29,625-64,188 lbs 50-150 RPM
9 7/8" 251 mm	91001860	118-3251-53-eM-CA-02	5-3-2	eM53CA	Conical Inserts, Armor	Jet	132	60.0	6 5/8" API	29,625-64,188 lbs 50-150 RPM
9 7/8" 251 mm	91001843	118-3251-53-eM-CAH-02	5-3-2	eM53CAH	Conical Inserts, Armor, Hardnose on Cone	Jet	132	60.0	6 5/8" API	29,625-64,188 lbs 50-150 RPM
9 7/8" 251 mm	91000435	118-3251-62-HD-CA-02	6-2-2	HDNT62CA	Conical Inserts, Armor	Jet	135	61.3	6 5/8" API	39,500-69,125 lbs 50-120 RPM
9 7/8" 251 mm	91001445	118-3251-64-eH-OAH-02	6-4-2	eH64OAH	Ogive Inserts, Armor, Hardnose on Cone	Jet	132	59.9	6 5/8" API	39,500-69,125 lbs 50-120 RPM
9 7/8" 251 mm	91001492	118-3251-64-eH-OAHW-02	6-4-2	eH64OAHW	Ogive Inserts, Armor, Hardnose on Cone, Wear Resistant Carbide	Jet	132	59.9	6 5/8" API	39,500-69,125 lbs 50-120 RPM
9 7/8" 251 mm	91001779	118-3251-71-eH-OAH-02	7-1-2	eH71OAH	Ogive Inserts, Armor, Hard Nose on Cone	Jet	132	60.0	6 5/8" API	39,500-79,000 lbs 50-90 RPM
9 7/8" 251 mm	91000422	118-3251-73-HD-N-02	7-3-2	HDNT73N	Round Top Inserts	Jet	135	61.3	6 5/8" API	39,500-79,000 lbs 50-90 RPM
10 5/8" 270 mm	91001455	118-3270-42-eM-CA-02	4-2-2	eM42CA	Conical Inserts, Armor	Jet	153	69.4	6 5/8" API	10,625-53,125 lbs 50-150 RPM
10 5/8" 270 mm	91001704	118-3270-42-MA-SA-02	4-2-2	MAGNT42SA	Super Scoop Inserts, Armor	Jet	153	69.4	6 5/8" API	10,625-53,125 lbs 50-150 RPM
10 5/8" 270 mm	91000531	118-3270-43-MA-C-02	4-3-2	MAGNT43C	Conical Inserts	Jet	149	67.6	6 5/8" API	10,625-53,125 lbs 50-150 RPM
10 5/8" 270 mm	91000459	118-3270-44-MA-C-02	4-4-2	MAGNT44C	Conical Inserts	Jet	149	67.6	6 5/8" API	10,625-53,125 lbs 50-150 RPM
10 5/8" 270 mm	91001831	118-3270-52-eM-CAH-02	5-2-2	eM52CAH	Conical Inserts Armor, Hard Nose on Cone	Jet	153	69.4	6 5/8" API	31,875-69,063 lbs 50-150 RPM
10 5/8" 270 mm	91001613	118-3270-53-eH-CAHW-02	5-3-2	eH53CAHW	Conical Inserts, Armor, Hardnose on Cone, Wear Resistant Carbide	Jet	153	69.4	6 5/8" API	31,875-69,063 lbs 50-150 RPM
10 5/8" 270 mm	91001833	118-3270-53-eM-CA-02	5-3-2	eM53CA	Conical Inserts, Armor	Jet	153	69.4	6 5/8" API	31,875-69,063 lbs 50-150 RPM
10 5/8" 270 mm	91001854	118-3270-53-eM-CB-02	5-3-2	eM53CB	Conical Inserts, Backreaming Lug	Jet	153	69.4	6 5/8" API	31,875-69,063 lbs 50-150 RPM
10 5/8" 270 mm	91001832	118-3270-54-eH-CA-02	5-4-2	eH54CA	Conical Inserts, Armor	Jet	153	69.4	6 5/8" API	31,875-69,063 lbs 50-150 RPM
10 5/8" 270 mm	91001286	118-3270-54-HD-CA-02	5-4-2	HDNT54CA	Conical Inserts, Armor	Jet	160	72.6	6 5/8" API	31,875-69,063 lbs 50-150 RPM
10 5/8" 270 mm	91001834	118-3270-63-eH-CA-02	6-3-2	eH63CA	Conical Inserts, Armor	Jet	153	69.4	6 5/8" API	42,500-74,375 lbs 50-120 RPM
10 5/8" 270 mm	91001752	118-3270-63-eH-CAW-02	6-3-2	eH63CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	153	69.4	6 5/8" API	42,500-74,375 lbs 50-120 RPM
10 5/8" 270 mm	91001852	118-3270-63-eH-CB-02	6-3-2	eH63CB	Conical Inserts, Backreaming Lug	Jet	153	69.4	6 5/8" API	42,500-74,375 lbs 50-120 RPM
10 5/8" 270 mm	91001540	118-3270-64-eH-OAH-02	6-3-2	eH64OAH	Ogive Inserts, Armor, Hard Nose on Cone	Jet	153	69.4	6 5/8" API	42,500-74,375 lbs 50-120 RPM

# TCI Blasthole Tricone bits

10 5/8" – 12 1/4"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
10 5/8" 270 mm	91001390	118-3270-64-eH-OAHW-02	6-4-2	eH64OAHW	Ogive Inserts, Armor, Hard Nose on Cone, Wear Resistant Carbide	Jet	153	69.4	6 5/8" API	42,500-74,375 lbs 50-120 RPM
10 5/8" 270 mm	91001614	118-3270-71-eH-OAHW-02	7-1-2	eH71OAHW	Ogive Inserts, Armor, Hard Nose on Cone, Wear Resistant Carbide	Jet	153	69.4	6 5/8" API	42,500-85,000 lbs 50-90 RPM
10 5/8" 270 mm	91001801	118-3270-72-eH-OA-02	7-2-2	eH72OA	Ogive Inserts, Armor	Jet	153	69.4	6 5/8" API	42,500-85,000 lbs 50-90 RPM
10 5/8" 270 mm	91001802	118-3270-72-eH-OAW-02	7-2-2	eH72OAW	Ogive Inserts, Armor, Wear Resistant Carbide	Jet	153	69.4	6 5/8" API	42,500-85,000 lbs 50-90 RPM
10 5/8" 270 mm	91001838	118-3270-72-eH-OWB-02	7-2-2	eH72OWB	Ogive Inserts, Wear Resistant Carbide, Backreaming Lug	Jet	153	69.4	6 5/8" API	42,500-85,000 lbs 50-90 RPM
11" 279 mm	91001086	118-3279-53-MA-CA-02	5-3-2	MAGNT53CA	Conical Inserts, Armor	Jet	166	75.3	6 5/8" API	33,000-71,500 lbs 50-150 RPM
11" 279 mm	91001122	118-3279-62-HD-CA-02	6-2-2	HDNT62CA	Conical Inserts, Armor	Jet	168	76.2	6 5/8" API	44,000-77,000 lbs 50-120 RPM
11" 279 mm	91000277	118-3279-71-HD-C-02	7-1-2	HDNT71C	Conical Inserts	Jet	168	76.2	6 5/8" API	44,000-88,000 lbs 50-90 RPM
11 3/8" 290 mm	91000508	118-3290-43-MA-CA-02	4-3-2	MAGNT43CA	Conical Inserts, Armor	Jet	169	76.7	6 5/8" API	11,420-57,100 lbs 50-150 RPM
12 1/4" 311 mm	91001695	118-3311-42-MA-SA-02	4-2-2	MAGNT42SA	Super Scoop Inserts, Armor	Jet	224	101.8	6 5/8" API	12,250-61,250 lbs 50-150 RPM
12 1/4" 311 mm	91001717	118-3311-53-eH-CA-02	5-3-2	eH53CA	Conical Inserts, Armor	Jet	224	101.8	6 5/8" API	36,750-79,625 lbs 50-150 RPM
12 1/4" 311 mm	91001718	1B6-3311-53-eH-CA-02	5-3-2	eH53CA	Conical Inserts, Armor	Jet	224	101.8	6" BECO	36,750-79,625 lbs 50-150 RPM
12 1/4" 311 mm	91001441	118-3311-53-HD-CA-02	5-3-2	HDNT53CA	Conical Inserts, Armor	Jet	224	101.8	6 5/8" API	36,750-79,625 lbs 50-150 RPM
12 1/4" 311 mm	91001442	118-3311-53-HD-CAW-02	5-3-2	HDNT53CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	224	102.5	6 5/8" API	36,750-79,625 lbs 50-150 RPM
12 1/4" 311 mm	91001443	118-3311-53-MA-CA-02	5-3-2	MAGNT53CA	Conical Inserts, Armor	Jet	224	101.8	6 5/8" API	36,750-79,625 lbs 50-150 RPM
12 1/4" 311 mm	91001440	118-3311-53-MA-CAW-02	5-3-2	MAGNT53CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	224	101.8	6 5/8" API	36,750-79,625 lbs 50-150 RPM
12 1/4" 311 mm	91001499	118-3311-61-eH-CAW-02	6-1-2	eH61CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	224	101.8	6 5/8" API	49,000-85,750 lbs 50-120 RPM
12 1/4" 311 mm	91000480	118-3311-62-HD-OA-02	6-2-2	HDNT62OA	Ogive Inserts, Armor	Jet	224	103.0	6 5/8" API	49,000-85,750 lbs 50-120 RPM
12 1/4" 311 mm	91001479	1B6-3311-62-HD-OA-02	6-2-2	HDNT62OA	Ogive Inserts, Armor	Jet	224	101.8	6" BECO	49,000-85,750 lbs 50-120 RPM
12 1/4" 311 mm	91001642	1B6-3311-63-HD-OA-02	6-3-2	HDNT63OA	Ogive Inserts, Armor	Jet	224	101.8	6" BECO	49,000-85,750 lbs 50-120 RPM
12 1/4" 311 mm	91001725	118-3311-64-eH-OA-02	6-4-2	eH64OA	Ogive Inserts, Armor	Jet	224	101.8	6 5/8" API	49,000-85,750 lbs 50-120 RPM
12 1/4" 311 mm	91001726	1B6-3311-64-eH-OA-02	6-4-2	eH64OA	Ogive Inserts, Armor	Jet	224	101.8	6" BECO	49,000-85,750 lbs 50-120 RPM
12 1/4" 311 mm	91001042	118-3311-64-HD-OA-02	6-4-2	HDNT64OA	Ogive Inserts, Armor	Jet	225	102.0	6 5/8" API	49,000-85,750 lbs 50-120 RPM
12 1/4" 311 mm	91001132	118-3311-71-HD-OA-02	7-1-2	HDNT71OA	Ogive Inserts, Armor	Jet	224	101.8	6 5/8" API	49,000-98,000 lbs 50-90 RPM
12 1/4" 311 mm	91001939	118-3311-72-eH-OA-02	7-2-2	eH72OA	Ogive Inserts, Armor	Jet	224	101.8	6 5/8" API	49,000-98,000 lbs 50-90 RPM
12 1/4" 311 mm	91001474	118-3311-72-eH-OAW-02	7-2-2	eH72OAW	Ogive Inserts, Armor, Wear Resistant Carbide	Jet	224	101.8	6 5/8" API	49,000-98,000 lbs 50-90 RPM
12 1/4" 311 mm	91001242	118-3311-74-HD-OA-02	7-4-2	HDNT74OA	Ogive Inserts, Armor	Jet	230	104.4	6 5/8" API	49,000-98,000 lbs 50-90 RPM

# TCI Blasthole Tricone bits

13 3/4" – 16"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
13 3/4" 349 mm	91001131	118-3349-53-HD-CA-02	5-3-2	HDNT53CA	Conical Inserts, Armor	Jet	308	139.7	6 5/8" API	41,250-89,375 lbs 50-150 RPM
13 3/4" 349 mm	91000324	118-3349-62-HD-CA-02	6-2-2	HDNT62CA	Conical Inserts, Armor	Jet	310	140.7	6 5/8" API	55,000-96,250 lbs 50-120 RPM
13 3/4" 349 mm	91001563	118-3349-72-HD-OA-02	7-2-2	HDNT72OA	Ogive Inserts, Armor	Jet	303	137.0	6 5/8" API	82,500-123,750 lbs 40-80 RPM
15" 381 mm	91000473	132-3381-53-HD-C-02	5-3-2	HDNT53C	Conical Inserts	Jet	368	167.0	7 5/8" API	45,000-97,500 lbs 50-150 RPM
15" 381 mm	91001713	118-3381-53-WW-C-05	5-3-5	BI53C	Conical Inserts	Reg	339	153.9	6 5/8" API	45,000-97,500 lbs 50-150 RPM
15" 381 mm	91000430	132-3381-62-HD-C-02	6-2-2	HDNT62C	Conical Inserts	Jet	368	167.0	7 5/8" API	60,000-105,000 lbs 50-120 RPM
15" 381 mm	91001728	118-3381-62-WW-C-05	6-2-5	BI62C	Conical Inserts	Reg	339	153.9	6 5/8" API	60,000-105,000 lbs 50-120 RPM
15" 381 mm	91000368	132-3381-72-HD-CAW-02	7-2-2	HDNT72CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	348	157.9	7 5/8" API	60,000-120,000 lbs 50-90 RPM
15" 381 mm	91001795	1B7-3381-72-HD-CAW-02	7-2-2	HDNT72CAW	Conical Inserts, Armor, Wear Resistant Carbide	Jet	358	162.2	7" BECO	60,000-120,000 lbs 50-90 RPM
15" 381 mm	91001720	118-3381-73-WW-N-05	7-3-5	BI73N	Roundtop Inserts	Reg	339	153.9	6 5/8" API	60,000-120,000 lbs 50-90 RPM
16" 406 mm	91001385	1B7-3406-62-HD-OA-02	6-2-2	HDNT62OA	Ogive Inserts, Armor	Jet	387	175.7	7" BECO	64,000-112,000 lbs 50-120 RPM
16" 406 mm	91001818	1B7-3406-64-HD-OA-02	6-4-2	HDNT64OA	Ogive Inserts, Armor	Jet	387	175.7	7" BECO	64,000-112,000 lbs 50-120 RPM

# TCI Exploration Tricone bits

All types

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
5 1/4" 133 mm	91000331	112-3133-52-EX-CD-07	5-2-7	EX52CD	Conical Inserts, DSI Lug	Reverse	16	7.3	2 7/8" RC	15,750-34,125 lbs 50-150 RPM
5 3/8" 137 mm	91001700	112-3137-52-EX-CD-07	5-2-7	EX52CD	Conical Inserts, DSI Lug	Reverse	15	6.8	2 7/8" RC	16,125-34,938 lbs 50-150 RPM
5 1/2" 140 mm	91000335	112-3140-53-EX-CD-07	5-3-7	EX53CD	Conical Inserts, DSI Lug	Reverse	15	6.8	2 7/8" RC	16,500-35,750 lbs 50-150 RPM
5 3/4" 146 mm	91000336	114-3146-53-EX-CD-07	5-3-7	EX53CD	Conical Inserts, DSI Lug	Reverse	15	6.8	3 1/2" API	17,250-37,375 lbs 50-150 RPM
6 1/8" 156 mm	91000346	114-3156-53-EX-C-07	5-3-7	EX53C	Conical Inserts	Reverse	30	13.6	3 1/2" API	18,375-39,813 lbs 50-150 RPM
6 1/4" 159 mm	91000347	114-3159-53-EX-C-07	5-3-7	EX53C	Conical Inserts	Reverse	38	17.0	3 1/2" API	18,750-40,625 lbs 50-150 RPM

TCI bits	Cutting structure	TCI bits	Cutting structure
	4-2 to 4-4		7-1 to 7-4
	5-2 to 5-4		8-1 to 8-4
	6-1 to 6-4		

# Steel tooth bits

3 7/8" – 8 1/2"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
3 7/8" 98 mm	91000557	110-0098-31-WW-1R-01	3-1-1	H1R	Waterwell, Conventional Gage Tooth	Reg	8.0	3.6	2 3/8" API	15,500-27,125 lbs 60–80 RPM
4" 102 mm	91000555	110-0102-31-WW-1R-01	3-1-1	H1R	Waterwell, Conventional Gage Tooth	Reg	9.0	4.1	2 3/8" API	16,000-28,000 lbs 60–80 RPM
4 3/8" 121 mm	91000556	110-0121-31-WW-1R-01	3-1-1	H1R	Waterwell, Conventional Gage Tooth	Reg	16.0	7.3	2 7/8" API	19,000-33,250 lbs 60–80 RPM
4 7/8" 124 mm	91000558	112-0124-31-WW-1R-01	3-1-1	H1R	Waterwell, Conventional Gage Tooth	Reg	15.5	7.3	2 7/8" API	19,500-34,125 lbs 60–80 RPM
5 5/8" 143 mm	91000552	114-0143-31-WW-1R-01	3-1-1	H1R	Waterwell, Conventional Gage Tooth	Reg	28.0	12.7	3 1/2" API	22,500-39,375 lbs 60–80 RPM
5 7/8" 149 mm	91000560	114-0149-31-WW-1R-01	3-1-1	H1R	Waterwell, Conventional Gage Tooth	Reg	25.0	11.3	3 1/2" API	23,500-41,125 lbs 60–80 RPM
6" 152 mm	91001101	114-0152-31-WW-1STR-01	3-1-1	H1R	Waterwell, Conventional Gage Tooth, Shirttail Protection	Reg	28.0	12.7	3 1/2" API	24,000-42,000 lbs 60–80 RPM
6 1/4" 159 mm	91000553	114-0159-21-WW-1R-01	2-1-1	M1R	Waterwell, Conventional Gage Tooth	Reg	33.0	15.0	3 1/2" API	18,750-31,250 lbs 60–100 RPM
6 1/4" 159 mm	91000554	114-0159-31-WW-1R-01	3-1-1	H1R	Waterwell, Conventional Gage Tooth	Reg	33.0	15.0	3 1/2" API	25,000-43,750 lbs 60–80 RPM
6 3/4" 171 mm	91000551	114-0171-21-WW-1STR-01	2-1-1	M1R	Waterwell, Conventional Gage Tooth, Shirttail Protection	Reg	32.0	14.5	3 1/2" API	20,250-33,750 lbs 60–100 RPM
7 7/8" 200 mm	91000572	117-0200-11-WW-1-06	1-1-6	SS1	Waterwell, Conventional GageTooth	Reg	66.3	30.1	4 1/2" API	7,875-23,625 lbs 70–120 RPM
8 1/2" 216 mm	91000567	117-0216-22-WW-2STRG-03	2-2-3	M2RG	Waterwell, Tapered Gage Tooth, Shirttail Protection, Gage Inserts	Reg	95.0	43.1	4 1/2" API	25,500-42,500 lbs 60–100 RPM
8 1/2" 216 mm	91000563	117-0216-32-WW-1STR-01	3-2-1	H2RG	Waterwell, Conventional Gage Tooth, Shirttail Protection	Reg	82.0	37.2	4 1/2" API	34,000-59,500 lbs 60–80 RPM
8 1/2" 216 mm	91000568	117-0216-34-WW-5STRG-03	3-4-3	H4RG	Waterwell, Web Gage Tooth, Shirttail Protection, Gage Inserts	Reg	95.0	43.1	4 1/2" API	34,000-59,500 lbs 60–80 RPM

# Steel tooth bits

9 7/8" – 15"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
9 7/8" 251 mm	91001709	118-0251-22-WW-2R-01	2-2-1	M2R	Waterwell, Tapered Gage Tooth	Reg	248.0	112.5	6 5/8" API	29,625-49,375 lbs 60-100 RPM
9 7/8" 251 mm	91001054	118-0251-22-WW-2-01	2-2-1	M2	Waterwell, Tapered Gage Tooth	Jet	248.0	112.5	6 5/8" API	29,625-49,375 lbs 60-100 RPM
12 1/4" 311 mm	91000565	118-0311-12-WW-1R-01	1-2-1	S2R	Waterwell, Conventional Gage Tooth	Reg	210.0	95.3	6 5/8" API	12,250-36,750 lbs 70-120 RPM
12 1/4" 311 mm	91001727	118-0311-13-WW-1R-01	1-3-1	S3R	Waterwell, Conventional Gage Tooth	Reg	210.0	95.3	6 5/8" API	12,250-36,750 lbs 70-120 RPM
12 1/4" 311 mm	91000571	118-0311-13-WW-2R-01	1-3-1	S3R	Waterwell, Tapered Gage Tooth	Reg	210.0	95.3	6 5/8" API	12,250-36,750 lbs 70-120 RPM
12 1/4" 311 mm	91001056	118-0311-22-WW-4R-01	2-2-1	M2R	Waterwell, "L" Gage Tooth	Reg	211.0	95.7	6 5/8" API	36,750-61,250 lbs 60-100 RPM
12 1/4" 311 mm	91001214	118-0311-22-WW-4ST-04	2-2-4	SM2	Waterwell, "L" Gage Tooth, Shirttail Protection	Jet	217.0	98.5	6 5/8" API	36,750-61,250 lbs 60-100 RPM
12 1/4" 311 mm	91000564	118-0311-24-WW-4STR-01	2-4-1	M4R	Waterwell, "L" Gage Tooth, Shirttail Protection	Reg	211.0	95.7	6 5/8" API	36,750-61,250 lbs 60-100 RPM
12 1/4" 311 mm	91000562	118-0311-31-WW-4STRG-03	3-1-3	H1RG	Waterwell, "L" Gage Tooth, Shirttail Protection, Gage Bevel Inserts	Reg	288.0	103.4	6 5/8" API	49,000-85,750 lbs 60-80 RPM
12 1/4" 311 mm	91001102	118-0311-32-WW-4ST-04	3-2-4	SH2	Waterwell, "L" Gage Tooth, Shirttail Protection	Jet	232.0	105.3	6 5/8" API	36,750-61,250 lbs 60-100 RPM
12 1/4" 311 mm	91000566	118-0311-34-WW-5STRG-03	3-4-3	H4RG	Waterwell, Web Gage Tooth, Shirttail Protection, Gage Bevel Inserts	Reg	210.0	95.3	6 5/8" API	49,000-85,750 lbs 60-80 RPM
13 1/2" 343 mm	91001716	118-0343-13-WW-2R-01	1-3-1	S3R	Waterwell, Tapered Gage Tooth	Reg	286.0	130.0	6 5/8" API	13,500-40,500 lbs 70-120 RPM
13 3/4" 349 mm	91001085	118-0349-21-WW-3R-01	2-1-1	M2R	Waterwell, "T" Gage Tooth	Reg	302.0	137.0	6 5/8" API	41,250-68,750 lbs 60-100 RPM
14 3/4" 375 mm	91001710	118-0375-13-WW-5-01	1-3-1	S3R	Waterwell, Web Gage Tooth	Reg	339.0	154.0	6 5/8" API	14,750-44,250 lbs 70-120 RPM
15" 381 mm	91001723	118-0381-13-WW-1R-01	1-3-1	S3R	Waterwell, Conventional Gage Tooth	Reg	339.1	153.9	6 5/8" API	15,000-45,000 lbs 70-120 RPM
15" 381 mm	91001079	132-0381-13-WW-1R-01	1-3-1	S3R	Waterwell, Conventional Gage Tooth	Reg	297.0	134.8	7 5/8" API	15,000-45,000 lbs 70-120 RPM
15" 381 mm	91001060	132-0381-22-WW-4R-01	2-2-1	M2R	Waterwell, "L" Gage Tooth	Reg	322.0	146.1	7 5/8" API	45,000-75,000 lbs 60-100 RPM
15" 381 mm	91001667	118-0381-32-WW-3-01	3-2-1	H2J	Waterwell, "T" Gage Tooth	Jet	339.1	153.9	6 5/8" API	60,000-105,000 lbs 60-80 RPM
15" 381 mm	91001059	118-0381-32-WW-4R-01	3-2-1	H2R	Waterwell, "L" Gage Tooth	Reg	330.0	149.7	6 5/8" API	60,000-105,000 lbs 60-80 RPM
15" 381 mm	91001080	132-0381-32-WW-4R-01	3-2-1	H2R	Waterwell, "L" Gage Tooth	Reg	332.0	150.6	7 5/8" API	60,000-105,000 lbs 60-80 RPM
15" 381 mm	91000561	132-0381-32-WW-3STRG-03	3-2-3	H2RG	Waterwell, "T" Gage Tooth, Shirttail Protection, Gage Bevel Inserts	Reg	327.0	148.4	7 5/8" API	60,000-105,000 lbs 60-80 RPM

# Steel tooth bits

17 1/2"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
17 1/2" 445 mm	91001081	132-0445-13-WW-1R-01	1-3-1	S3R	Waterwell, Conventional Gage Tooth	Reg	454.0	206	7 5/8" API	17,500-52,500 lbs 70-120 RPM
17 1/2" 445 mm	91001063	118-0445-22-WW-4R-01	2-2-1	M2R	Waterwell, "L" Gage Tooth	Reg	454.0	206	6 5/8" API	52,500-87,500 lbs 60-100 RPM
17 1/2" 445 mm	91001064	132-0445-22-WW-4R-01	2-2-1	M2R	Waterwell, "L" Gage Tooth	Reg	494.0	224.1	7 5/8" API	52,500-87,500 lbs 60-100 RPM
17 1/2" 445 mm	91000569	132-0445-22-WW-4STR-01	2-2-1	M2R	Waterwell, "L" Gage Tooth, Shirttail Protection	Reg	332.0	150.6	7 5/8" API	52,500-87,500 lbs 60-100 RPM
17 1/2" 445 mm	91001062	118-0445-32-WW-1R-01	3-2-1	H2R	Waterwell, Conventional Gage Tooth	Reg	454.0	206	6 5/8" API	70,000-122,500 lbs 60-80 RPM
17 1/2" 445 mm	91001061	132-0445-32-WW-1R-01	3-2-1	H2R	Waterwell, Conventional Gage Tooth	Reg	499.0	226.4	7 5/8" API	70,000-122,500 lbs 60-80 RPM
17 1/2" 445 mm	91000570	132-0445-32-WW-1STR-03	3-2-3	H2RG	Waterwell, Conventional Gage Tooth, Shirttail Protection	Reg	332.0	150.6	7 5/8" API	70,000-122,500 lbs 60-80 RPM

# Work over steel tooth bits

2 7/8" – 5 7/8"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
2 7/8" 75 mm	91000579	161-0075-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	4.0	1.8	4n-Rod	11,500-21,125 lbs 60-80 RPM
3 1/8" 79 mm	91000584	161-0079-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	4.5	2.0	4n-Rod	12,500-21,875 lbs 60-80 RPM
3 1/4" 83 mm	91000585	161-0083-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	4.5	2.0	4n-Rod	13,000-22,750 lbs 60-80 RPM
3 3/8" 86 mm	91001962	110-0086-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	4.6	2.1	2 3/8" API	13,500-23,625 lbs 60-80 RPM
3 5/8" 92 mm	91001963	110-0092-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	7.7	3.5	2 3/8" API	14,500-25,375 lbs 60-80 RPM
3 3/4" 95 mm	91000581	110-0095-31-WO-1R-01	3-1-1	OMR	Conventional Gage Tooth	Reg	8.0	3.6	2 3/8" API	15,000-26,250 lbs 60-80 RPM
3 7/8" 98 mm	91000576	110-0098-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	8.0	3.6	2 3/8" API	15,500-27,125 lbs 60-80 RPM
3 7/8" 98 mm	91001971	110-0098-31-FO-1STR-01	3-1-1	OHR	Conventional Gage Tooth, Shirttail Protection	Reg	8.0	3.6	2 3/8" API	15,500-27,125 lbs 60-80 RPM
4" 102 mm	91001161	110-0102-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	9.0	4.1	2 3/8" API	16,000-28,000 lbs 60-80 RPM
4 1/8" 105 mm	91000589	110-0105-31-WO-1STR-01	3-1-1	OHR	Conventional Gage Tooth, Shirttail Protection	Reg	8.0	3.6	2 3/8" API	16,000-28,000 lbs 60-80 RPM
4 1/4" 108 mm	91000588	110-0108-31-WO-1STR-01	3-1-1	OHR	Conventional Gage Tooth, Shirttail Protection	Reg	8.0	3.6	2 3/8" API	17,000-29,750 lbs 60-80 RPM
4 1/2" 114 mm	91000586	110-0114-31-WO-1STR-01	3-1-1	OHR	Conventional Gage Tooth, Shirttail Protection	Reg	10.0	4.5	2 3/8" API	18,000-31,500 lbs 60-80 RPM
4 9/16" 116 mm	91000592	112-0116-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	12.0	5.4	2 7/8" API	18,250-31,938 lbs 60-80 RPM
4 5/8" 118 mm	91000587	112-0118-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	12.0	5.4	2 7/8" API	18,500-32,375 lbs 60-80 RPM
4 3/4" 121 mm	91000575	112-0121-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	14.0	6.4	2 7/8" API	19,000-33,250 lbs 60-80 RPM
4 3/4" 121 mm	91001972	112-0121-31-WO-1STR-01	3-1-1	OHR	Conventional Gage Tooth, Shirttail Protection	Reg	14.0	6.4	2 7/8" API	19,000-33,250 lbs 60-80 RPM
4 7/8" 124 mm	91000577	112-0124-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	15.5	7.0	2 7/8" API	19,500-34,125 lbs 60-80 RPM
5 5/8" 143 mm	91000573	114-0143-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	19.0	8.6	3 1/2" API	22,500-39,375 lbs 60-80 RPM
5 3/4" 146 mm	91000582	114-0146-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	24.0	10.9	3 1/2" API	23,000-40,250 lbs 60-80 RPM
5 7/8" 149 mm	91000583	114-0149-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	25.0	11.3	3 1/2" API	23,500-41,125 lbs 60-80 RPM

# Work over steel tooth bits

6" – 7 7/8"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
6" 152 mm	91000580	114-0152-31-WO-1STR-01	3-1-1	OHR	Conventional Gage Tooth, Shirrtail Protection	Reg	28.0	12.7	3 1/2" API	24,000-42,000 lbs 60-80 RPM
6 1/8" 156 mm	91000578	114-0156-31-WO-1STR-01	3-1-1	OHR	Conventional Gage Tooth, Shirrtail Protection	Reg	28.0	12.7	3 1/2" API	24,500-42,875 lbs 60-80 RPM
6 1/4" 159 mm	91001140	114-0159-21-WO-1R-01	2-1-1	OMR	Conventional Gage Tooth	Reg	31.9	14.5	3 1/2" API	18,750-31,250 lbs 60-100 RPM
6 1/4" 159 mm	91000574	114-0159-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	28.0	12.7	3 1/2" API	25,000-43,750 lbs 60-80 RPM
6 1/2" 165 mm	91001421	114-0165-31-WO-1R-01	3-1-1	OHR	Conventional Gage Tooth	Reg	36.0	16.3	3 1/2" API	26,000-45,500 lbs 60-100 RPM
6 3/4" 171 mm	91000590	114-0171-31-WO-5R-01	3-1-1	OHR	Web Gage Tooth	Reg	32.0	14.5	3 1/2" API	27,000-47,250 lbs 60-80 RPM
7 7/8" 200 mm	91000591	117-0200-31-WO-1STR-01	3-1-1	OHR	Conventional Gage Tooth, Shirrtail Protection	Reg	70.0	31.8	4 1/2" API	31,500-55,125 lbs 60-80 RPM

Steel tooth bits	Cutting structure
	<b>1-1</b>
	<b>2-1 to 2-4</b>
	<b>3-1 to 3-4</b>

# HDD Tricone bits

4 3/4" – 5 1/2"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
4 3/4" 121 mm	91000845	112-3121-11-DD-ZSR-07	1-1-7	STX-1	Shirrtail Protection, Self Sharpening Teeth	Jet	16.1	7.3	2 7/8" API	10,000-22,500 lbs 70-120 RPM
4 3/4" 121 mm	91000848	112-3121-53-DD-CZSR-07	5-3-7	STX-30C	Conical Inserts, Shirrtail Protection	Jet	17.0	7.7	2 7/8" API	12,500-27,500 lbs 50-120 RPM
4 3/4" 121 mm	91000847	112-3121-53-DD-FZSR-07	5-3-7	STX-30	Chisel Inserts, Shirrtail Protection	Jet	17.0	7.7	2 7/8" API	12,500-27,500 lbs 50-120 RPM
4 3/4" 121 mm	91000838	112-3121-63-DD-CZSR-07	6-3-7	STR-50	Conical Inserts, Shirrtail Protection	Jet	17.0	7.7	2 7/8" API	12,500-30,000 lbs 50-120 RPM
4 3/4" 121 mm	91001537	112-3121-73-DD-CZSR-07	7-3-7	STX-70	Conical Inserts, Shirrtail Protection	Jet	17.0	7.7	2 7/8" API	12,500-30,000 lbs 50-90 RPM
5 1/4" 133 mm	91000849	112-3133-54-DD-CZSR-07	5-4-7	STX-30C	Conical Inserts, Shirrtail Protection	Jet	25.1	11.4	2 7/8" API	12,500-32,500 lbs 50-120 RPM
5 1/4" 133 mm	91000850	112-3133-63-DD-CZSR-07	6-3-7	STX-50	Conical Inserts, Shirrtail Protection	Jet	25.1	11.4	2 7/8" API	15,000-32,500 lbs 50-120 RPM
5 1/2" 140 mm	91001172	112-3140-21-DD-ZSR-07	2-1-7	ATJ-S4	Shirrtail Protection, Self Sharpening Teeth	Jet	25.1	11.4	2 7/8" API	10,000-25,000 lbs 60-120 RPM
5 1/2" 140 mm	91001183	112-3140-53-DD-FZSR-07	5-3-7	STX-30H	Chisel Inserts, Shirrtail Protection	Jet	29.1	13.2	2 7/8" API	12,500-27,500 lbs 50-120 RPM
5 1/2" 140 mm	91000981	112-3140-61-DD-FZSR-07	6-1-7	STX-40	Chisel Inserts, Shirrtail Protection	Jet	29.1	13.2	2 7/8" API	15,000-32,500 lbs 50-120 RPM
5 1/2" 140 mm	91001345	112-3140-63-DD-CZSR-07	6-3-7	STX-50	Conical Inserts, Shirrtail Protection	Jet	29.1	13.2	2 7/8" API	15,000-32,500 lbs 50-120 RPM

# HDD Tricone bits

6 1/4" – 7"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
6 1/4" 159 mm	91001415	114-3159-53-DD-FZSR-07	5-3-7	STX-30	Chisel Inserts, Shirrtail Protection	Jet	41.0	18.6	3 1/2" API	15,000-37,500 lbs 50–150 RPM
6 1/4" 159 mm	91000840	114-3159-61-DD-FZSR-07	6-1-7	STR-40	Chisel Inserts, Shirrtail Protection	Jet	41.0	18.6	3 1/2" API	17,500-40,000 lbs 50–120 RPM
6 1/4" 159 mm	91001025	114-3159-63-DD-CZSR-07	6-3-7	STR-50	Conical Inserts, Shirrtail Protection	Jet	41.0	18.6	3 1/2" API	17,500-40,000 lbs 50–120 RPM
6 1/2" 165 mm	91001206	114-3165-11-DD-ZSR-07	1-1-7	STX-1	Shirrtail Protection, Self Sharpening Teeth	Jet	31.1	14.1	3 1/2" API	12,500-27,500 lbs 70–150 RPM
6 1/2" 165 mm	91000358	114-3165-52-DD-CBI-07	5-2-7	BI52C	Conical Inserts, Shirrtail Protection	Jet	47.2	21.4	3 1/2" API	15,000-37,500 lbs 50–120 RPM
6 1/2" 165 mm	91001207	114-3165-52-DD-FZSR-07	5-2-7	STX-30	Chisel Inserts, Shirrtail Protection	Jet	47.2	21.4	3 1/2" API	15,000-37,500 lbs 50–120 RPM
6 1/2" 165 mm	91000359	114-3165-62-DD-CBI-07	6-2-7	BI62C	Conical Inserts, Shirrtail Protection	Jet	47.2	21.4	3 1/2" API	20,000-45,000 lbs 50–120 RPM
6 1/2" 165 mm	91001208	114-3165-63-DD-CZSR-07	6-3-7	STX-50	Conical Inserts, Shirrtail Protection	Jet	47.2	21.4	3 1/2" API	20,000-45,000 lbs 50–120 RPM
6 1/2" 165 mm	91000842	114-3165-73-DD-OZSR-07	7-3-7	STR-70G	Ogive Inserts, Shirrtail Protection	Jet	47.2	21.4	3 1/2" API	20,000-45,000 lbs 50–90 RPM
6 3/4" 171 mm	91000804	114-3171-11-DD-ZSR-07	1-1-7	STX-1	Shirrtail Protection, Self Sharpening Teeth	Jet	45.2	20.5	3 1/2" API	12,500-32,500 lbs 70–150 RPM
6 3/4" 171 mm	91001403	114-3171-53-DD-FZSR-07	5-3-7	STX-30	Chisel Inserts, Shirrtail Protection	Jet	49.2	22.3	3 1/2" API	17,500-42,500 lbs 50–150 RPM
6 3/4" 171 mm	91000844	114-3171-62-DD-CZSR-07	6-2-7	STR-44C	Conical Inserts, Shirrtail Protection	Jet	49.2	22.3	3 1/2" API	20,000-45,000 lbs 50–120 RPM
6 3/4" 171 mm	91001538	114-3171-63-DD-CZSR-07	6-3-7	STX-50	Conical Inserts, Shirrtail Protection	Jet	49.2	22.3	3 1/2" API	20,000-45,000 lbs 50–120 RPM
7" 178 mm	91000353	114-3178-53-DD-FBI-07	5-3-7	HDD53	Chisel Inserts, Shirrtail Protection	Jet	50.0	22.7	3 1/2" API	21,000-45,500 lbs 50–150 RPM
7" 178 mm	91000354	114-3178-72-DD-CBI-07	7-2-7	HDD72	Chisel Inserts, Shirrtail Protection	Jet	50.0	22.7	3 1/2" API	21,000-45,500 lbs 50–100 RPM

# HDD Tricone bits

8 3/4" – 12 1/4"

Bit diam.	Product No.	Product code	IADC	Product	Special features	Circ.	Weight		PIN conn.	Operating suggestions WOB / RPM
							lbs	kg		
8 3/4" 222 mm	91001405	114-3222-11-DD-ZGT-07	1-1-7	GT-PS1	Shirrtail Protection, Self Sharpening Teeth	Jet	90.2	40.9	4 1/2" API	17,500-42,500 lbs 70-150 RPM
8 3/4" 222 mm	91001174	114-3222-53-DD-FZHR-07	5-3-7	HR-S35	Chisel Inserts, Shirrtail Protection	Jet	90.2	40.9	4 1/2" API	25,000-60,000 lbs 50-150 RPM
8 3/4" 222 mm	91001299	114-3222-53-DD-FAZHR-07	5-3-7	HR-PS35	Chisel Inserts, Shirrtail Protection, Wear Pad	Jet	90.2	40.9	4 1/2" API	25,000-60,000 lbs 50-150 RPM
8 3/4" 222 mm	91000343	114-3222-53-DD-FBI-07	5-3-7	HDD53	Chisel Inserts, Shirrtail Protection	Jet	90.2	40.9	4 1/2" API	25,000-60,000 lbs 50-150 RPM
8 3/4" 222 mm	91000349	114-3222-72-DD-CBI-07	7-2-7	HDD72C	Conical Inserts, Shirrtail Protection	Jet	90.2	40.9	4 1/2" API	25,000-60,000 lbs 50-90 RPM
9 7/8" 251 mm	91001201	118-3251-11-DD-ZGT-07	1-1-7	GT-PS1	Shirrtail Protection, Self Sharpening Teeth, Wear Pad	Jet	137.3	62.3	6 5/8" API	20,000-47,500 lbs 70-150 RPM
9 7/8" 251 mm	91001547	118-3251-52-DD-CBI-07	5-2-7	BI52C	Conical Inserts, Shirrtail Protection	Jet	140.2	63.6	6 5/8" API	25,000-65,000 lbs 50-150 RPM
9 7/8" 251 mm	91000937	118-3251-53-DD-FCMX-07	5-3-7	MX-S30	Chisel Inserts, Shirrtail Protection, Metal Seal	Jet	140.2	63.6	6 5/8" API	25,000-65,000 lbs 50-150 RPM
9 7/8" 251 mm	91001202	118-3251-54-DD-FZHR-07	5-4-7	HR-PS35	Chisel Inserts, Shirrtail Protection, Wear Pad	Jet	140.2	63.6	6 5/8" API	27,500-65,000 lbs 50-150 RPM
9 7/8" 251 mm	91000351	118-3251-62-DD-CPBI-07	6-2-7	BI62C	Conical Inserts, Shirrtail Protection, Wear Pad	Jet	140.2	63.6	6 5/8" API	27,500-65,000 lbs 50-150 RPM
12 1/4" 311 mm	91001406	118-3311-11-ZGT-07	1-1-7	GT-PS1	Shirrtail Protection, Self Sharpening Teeth, Wear Pad	Jet	211.4	95.9	6 5/8" API	20,000-50,000 lbs 70-150 RPM
12 1/4" 311 mm	91001204	118-3311-53-DD-FCMX-07	5-3-7	MX-CS30G	Chisel Inserts, Shirrtail Protection, Metal Seal	Jet	224.4	101.8	6 5/8" API	27,500-67,500 lbs 50-150 RPM

# Nozzle size selection

Nozzles should be selected so that the pressure inside the bit is 40-45 psi. The cab operating pressure will be somewhat higher, depending on the type of drill and CFM of air circulated. Typically, on compressors rated at 65 psi, pressure inside the bit will be 8-15 psi lower than what the cab gauge shows. On drills with 80-100 psi rated compressors, bit pressures can be 25-50 psi lower than the cab gauge reading. For further information regarding proper nozzle size selection, please see the Rotary products, Blasthole Drilling Handbook.

Standard jet air nozzles (3 nozzles for each set plus nails)

		Bit size			
		5 1/8" - 5 5/8"	5 7/8" - 8 1/2"	9" - 11 3/8"	12 1/4" - 17 1/2"
Nozzle ID inch	Nozzle ID mm	Product No.	Product No.	Product No.	Product No.
BLANK (No hole drilled)	BLANK (No hole drilled)	91000993	91000148	91000135	91000157
1/4	8	91000143	91000997	91000999	91001003
5/16	10	91000994	91000001	91000003	91001004
11/32	11	91000995	91000998	91001000	91001005
3/8	12	91000144	91000149	91000005	91001006
7/16	14	91000145	91000150	91000168	91000006
1/2	16	91000146	91000151	91000136	91000007
9/16	18	91000147	91000152	91000137	91000009
5/8	20		91000153	91000138	91000170
11/16	22		91000154	91000139	91000158
3/4	24		91000155	91000140	91000159
13/16	26		91000156	91000141	91000160
7/8	28			91000142	91000161
15/16	30			91000949	91000162
1	32			91000167	91000163
1 1/16	34				91000164
1 1/8	36				91000165
1 3/16	38				91000169
1 1/4	40				91000166
1 5/16	42				91001007
1 3/8	44				91001008

Bit size	PIN conn.	Backflow valve Product No.	Retaining ring Product No.	Nozzle nails Product No.	Air/water separator Product No.
5 1/4" - 7 3/8"	3 1/2"	91000175	91000178	91000134	n/a
7 7/8" - 9"	4 1/2"	91000176	91000179	91000134	n/a
9 7/8" - 17 1/2"	6 5/8"	91000177	91000133	91000134	91001009

# Service, support and training – the basis for efficient use of our products!

You can count on us for training, support, service...or just some friendly advice! In addition to offering world-class products, we have created the industry's most complete and comprehensive support program.



**When it comes to products, service, and support, our goal at Atlas Copco Secoroc is not just to meet your expectations, but to exceed them. Because as we see it, in the best of all business worlds, everybody wins. So, if you're in the market for the strongest rock drilling partner, you'll want to read this section very carefully.**

Being in the rock drilling business, you know that drilling costs and productivity are influenced by a host of factors beyond the price and performance of the drill steel or bit. You've learned that rock characteristics and hole deviation significantly impact drilling efficiency. You know that operator experience or misuse and loss of drilling tools can have a significant impact.

You are aware of the tremendous amount of time spent on administration and inventory management that enables you to have the tools to do the job over the next few days. And to top it all off, you are faced with the constant care and maintenance required for a well-tuned drill string.

Of course, your decision to choose world-class rock drilling tools is a good place to begin the

process of improving productivity and reducing costs.

But to get maximum productivity from a drilling operation, many of our customers have learned that it's also vitally important to have access to the value-added support and extensive world-wide practical know-how that is exclusively available through Atlas Copco Secoroc.

#### **Lowering your Total Drilling Cost (TDC)**

For dozens of years, Atlas Copco Secoroc has been known for a consistent dedication to finding ways to reduce total drilling costs while maintaining the highest standards of quality. In fact, over the years, we have helped hundreds of customers realize that a more productive bit, though sometimes more expensive, will substantially reduce the cost of the drilled hole. When you take into account the total cost-per-hour of a drill's operation, we've proven beyond doubt that the simplest way to cut costs is to be able to make holes faster. For this reason, refining the technology to make faster holes has been the constant focus of our product development. And we're proud to note that the industry recognizes that we maintain the lead in this area today.

**When you look at our whole program of service and support, it's pretty impressive. As stated at the outset, we offer the industry's most complete and comprehensive support and training program. When this is coupled with our recognized leadership in product performance and reliability, it's understandable why so many successful drillers choose Atlas Copco Secoroc.**



### **Technical support**

As one of our customers, you'll discover that Atlas Copco Secoroc sales technicians and engineers are available to work closely with you to provide optimum solutions to your drilling needs. How do we do this? It's simple. We give you access to the industry's most knowledgeable technical sales force. And we tailor our tools and services to your specific applications.

Our experience and network stretches into every mining market in the world, and all of this technical knowledge is on call to apply to your application.

Whether it's developing bits, monitoring on-site product performance, performing failure analysis, or calculating product performance, our highly trained technical staff is available to apply their expertise to your drilling applications.

We also maintain a series of thorough and systematic product failure analysis systems to insure that our products are constantly improved. Frequently updated performance information is quickly fed into our design and production loop. We're driven to constantly look for ways to make our products drill faster and more efficiently.

It's all part of our commitment to continuous improvement.

- **Drilling equipment overview**  
We help you optimize your choice of rock drilling tools.
- **Bit selection**  
We help you evaluate your conditions, and then assist in your selection of just the right bit for your application.
- **Application trouble shooting**  
Using the experience we've gained from at mines and quarries throughout the world, we'll help you learn to drill better and faster.
- **Operating parameter analysis**  
By slightly changing operating parameters, you can often get more out of each drill bit. Again – let our experience help you succeed.
- **Rock strength analysis and drillability**  
We perform the Handewith Indenter Test on samples, producing a report showing: estimated rock strength (UCS) and specific gravity; suggested bit type(s) and operating parameters; expected rate of penetration and bit life.



■ **Drill operations audits**

We have developed a drill audit database for internal and external use. Collected data efficiently records a visual inspection of a drill and its drilling tools in order to monitor the condition of the drill. You can access individual drill audits for internal use, in either printed or electronic format.

■ **Drill air compressor testing**

Since air volume and pressure are critical to drilling and drill bit performance, Atlas Copco Secoroc personnel are trained and available to perform air volume and pressure tests on your drill air compressors. These tests will determine the delivered volume of air and the air pressure at the drill bit or hammer. This calculation is then used to evaluate and optimize hole bailing performance.

■ **Drill pulldown force testing**

This test evaluates the amount of weight actually being applied to a drill bit.

■ **On-site training**

Local sales personnel and product company representatives can provide on-site training programs designed to enhance mine personnel skill levels. Training can be provided at regularly scheduled intervals, or on a “where needed, when needed” basis.

■ **Seminars**

In addition to on-site training, we also offer access to the most comprehensive drilling seminars in the industry covering topics such as:

- Theory and design of rock drilling tools
- Optimal operating conditions
- Trouble shooting and failure analysis
- Dull bit grading (Tricone bits)
- How to select the optimal rock drilling tools

**Call us today. We'd like to include you in the best of all business worlds. Because in our world, everybody wins.**

# Total drilling cost

A careful study of bit performance records can be of considerable help toward reducing operating costs. The goal is to determine the most economical bit types to use for each operating condition.



Rock drill bit performance has traditionally been evaluated by tracking meters drilled and penetration rates for an individual bit. Unfortunately, many erroneous conclusions can be drawn from looking at these two factors separately. However, when these two measurements are combined, the resulting total drilling cost per meter (TDC/meter) is a much more accurate performance measurement.

Total drilling cost is the cost of the bit plus the cost of operating the drill. The traditional and simplistic cost/meters drilled makes up one half of the TDC/meter equation. The speed at which the bit drills is included by dividing the cost of the drill/hour by the penetration rate of the bit. Hence total drilling cost expressed in dollar cost per meter drilled depends on bit life and productivity and can be expressed as:

$$\text{Total drilling cost} = \frac{\text{Cost of drill bit}}{\text{Meters drilled}} + \frac{\text{Drill cost per hour}}{\text{Meters drilled per hour}}$$



## Drill bit grading

**Examining and grading the condition of a dull rock bit when it comes out of the hole is an important field operation that is often overlooked.**

At many mines, the decision regarding when to change the bit is left up to the driller, with very little guidance given. This results in most bits being changed only after they have been completely worn out, and when they have been operating at low efficiency for a length of time. You can save a great deal of money by establishing a program of close examination and grading of your used bits, and by applying some simple rules based on this information.

At the end of a bit's life, penetration rate is significantly reduced as the cutting structure becomes ineffective either through breakage or wear. Bit grading provides an evaluation of the performance and dulling characteristics of the bit based on the drilling practices used. When done as a matter of routine, this simple procedure yields data that can significantly lower drilling costs and increase efficiency.

Dull bit valuations can be made quickly, but it is important that this data be gathered by someone with reasonable judgment and accuracy. Examinations include consideration of both the cutting structure and the bearings. Bit life does not need to be totally exhausted before grading occurs. The purpose of grading is to both determine the condition of the dull bit and to assess what is happening to the bit while it is in use.

In grading a dull bit, its condition is best recorded using a simple but accurate code that has been developed by Atlas Copco engineers. This easy-to-use system measures the life of both the teeth and the bearings, permitting anyone to later visualize the dull bit with reasonable accuracy. Contact your Atlas Copco representative for information.

The bottom line: when properly collected and recorded, data gathered from dull rock drill bits yields exceptionally valuable information about what should be done to correct unprofitable practices, including helping to choose proper bits in the future.







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