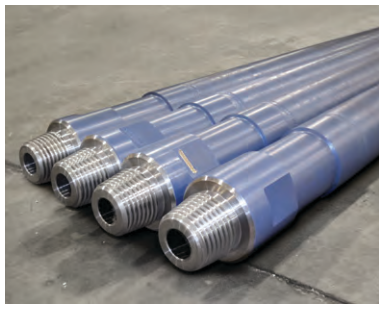


Mincon™

PRODUCT CATALOG

ROTARY BLAST HOLE CONSUMABLES

INNOVATION & PERFORMANCE

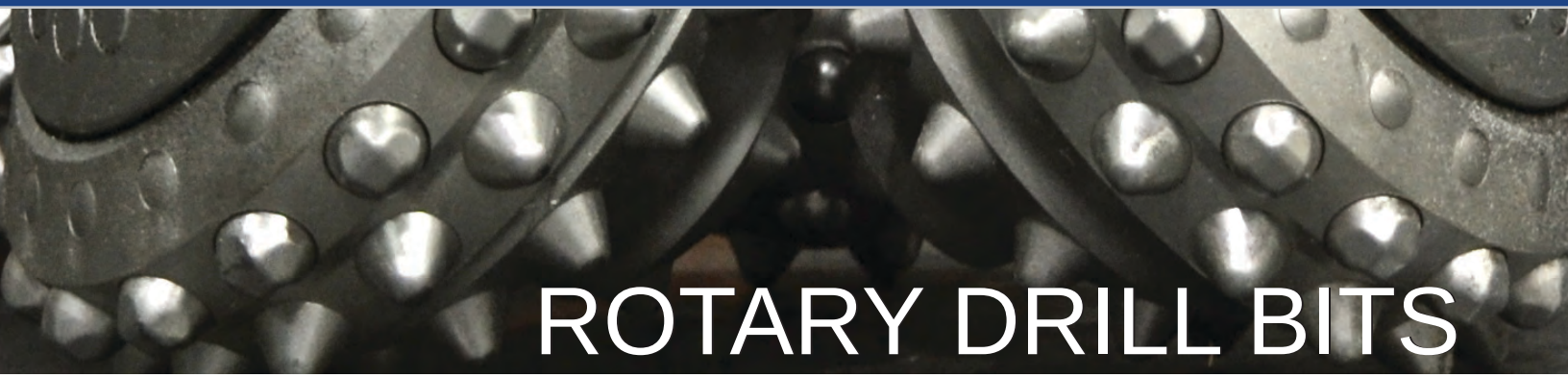
Mincon is a Mining Supply Company specializing in Rotary Blast Hole drilling consumables. “Innovation and Performance” are the foundation of our efforts to produce rugged, dependable products providing optimal drilling performance for our customers. We are a customer focused company and recognize that our customer’s satisfaction guarantee’s our success.

Our ability to work directly with our customers to generate customized solutions for their tough and varied drilling conditions is our competitive advantage in the mining industry.

Our Industry.

Mincon is very proud to be a recognized supplier to the Open Pit Mining Industry. As the name implies an open pit mine is one that is “open” or exposed at ground level. Common materials accessed and extracted using open pit mining methods include gold, copper, iron, coal, and diamonds to name a few. Critical components in the production process for open pit mines are drilling and blasting. Very large Rotary drilling equipment is utilized to turn the drill string while applying down pressure thereby enabling the attached rotary bit to create a hole in the rock. Mine engineers establish the number and spacing of the drilled holes required for each blast. Once an entire pattern has been drilled the equipment is relocated away from the area and the holes are loaded with explosives for blasting.

Mincon designs, manufactures, supplies, and services, a broad range of drilling consumables specifically for open pit mining applications using innovation and performance criteria specifically tailored to each customer.



ROTARY DRILL BITS

Mincon Advanced Performance (AP) rotary drill bits are manufactured using aircraft quality steel and premium carbide grades developed to suit the toughest application. Computerized designs using solid modeling, computerized manufacturing processes using the latest in CNC equipment and process controlled heat treatment ensure consistent, high quality drill bits.

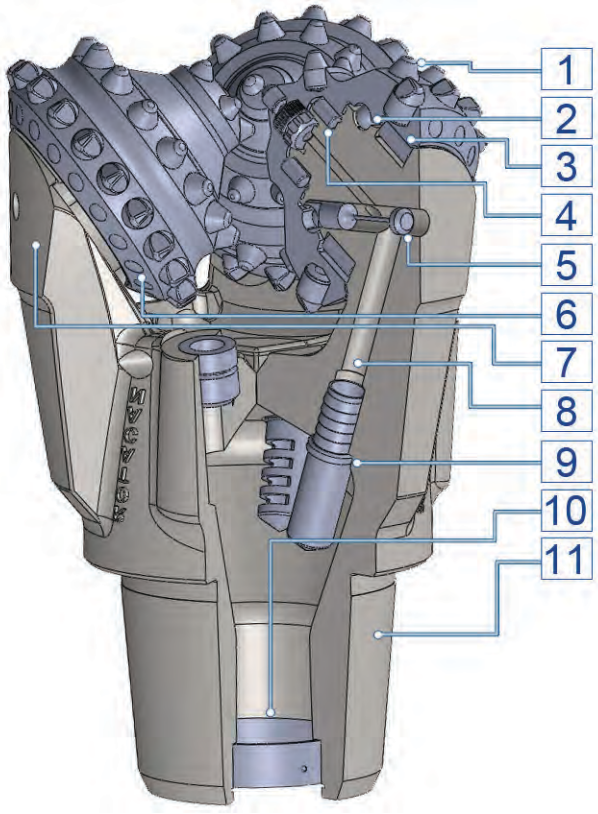
Mincon field staff and engineering work directly with our customers to test, report, and analyze, critical performance criteria for each drilling condition. Using this data in cooperation with feedback from the driller and Operations management, Mincon provides a level of customization unique in the industry. Mincon recognizes, as all drillers do, that all rock is not created equal.

AP SERIES

Advanced Performance – Mincon AP drill bits are available in four distinct series or ranges from AP4 through AP7 to provide rock drilling capabilities ranging from coal to iron. See full chart on page #.

ROCK TYPE	SOFT	MEDIUM	HARD	VERY HARD
MODEL NO.	AP4	AP5	AP6	AP7
PCI UCS	< 12,000	8,000 - 30,000	15,000 - 44,200	30,000 - 60,000
BIT WEIGHT	1,000 to 5,000 lbs/inch of diameter	3,000 to 6,600 lbs/inch of diameter	4,000 to 7,000 lbs/inch of diameter	5,000 to 8,000 lbs/inch of diameter
RPM	50 to 140	50 to 120	50 to 110	50 to 80
IADC CODE	4.1 - 4.4	5.1 - 5.4	6.1 - 6.4 = 622	7.1 - 7.4
ROCK FORMATIONS EXAMPLES	Designed for soft formations including shale, siltstone, soft limestone and alluvial formations.	Designed for medium to medium hard formations including sulfide and oxide copper ores, soft iron formations, medium-hard sandstone, dolomite and limestone.	Designed for medium hard to hard abrasive formations; hard copper ores, hard sandstone, medium hard iron ore, schist, gneiss, metamorphic formations; granite and medium hard igneous rock.	Designed for hard and very abrasive formations; hard copper ores, hard iron, quartz and the hardest igneous formations.

FEATURES



Mincon Advanced Performance (AP) Rotary Drill Bits are tailor designed in close cooperation with our customers to suit their specific, often harsh drilling conditions using their drill rigs and compressors.

Design parameters affecting bit life and penetration rates include the **Cone Profile** wherein the Diameter, Quantity, Geometry, Extension, Spacing, and Grade, of premium grade tungsten carbide inserts are utilized to break the rock. The variables noted are collectively referred to as the bit Cutting Structure. A tailor made cutting structure provides our customer with the best combination of bit life and rate of penetration to yield the lowest cost per meter. In very harsh or abrasive conditions additional protection is offered by applying hard facing alloy material to reinforce critical wear areas of the bit. The cone surface directly behind the gauge row will have one or two rows of carbide gauge inserts to prevent early erosion of the steel. To prevent dirt and water contamination of the bearings in wet drilling conditions an optional **backflow Valve** is installed. To ensure efficient removal of the rock cuttings **nozzles** are properly sized to direct adequate air to lift the cuttings out of the hole while supplying sufficient air through the bearings and cones to keep them cool and prevent debris from contaminating the critical bearing area.

1	Tungsten Carbide Inserts	**4**	Roller Bearing	**7**	Shirt Tail Protection	**10**	Backflow Valve
2	End Roller Bearing	**5**	Ball Plug	**8**	Air Passage	**11**	Threaded Pin Connection
3	Ball Bearing	**6**	Gage Protective Inserts	**9**	Air Jet Nozzle	**12**	Extra spot

BIT SIZES

- 9 in (228 mm)
- 9 7/8 in (250 mm)
- 10 5/8 in (270 mm)
- 12 1/4 in (311 mm)
- 13 3/4 in (350 mm)

ROCK UCS CHART PER AP BIT SERIES

AP BIT RANGE VS. ROCK HARDNESS

Rock UCS	AP4	AP5	AP6	AP7	Applicable Rock Type
Lower					Claystone, Mudstone
2000					Chalky Limestone
4000					Soft Shale
6000					Semi Consolidated Sandstone
8000					Limestone Siltstone
10000					Consolidated Sandstones
12000					Medium Shales
14000					Tuff, Soft Schist
16000					Andesite, Rhyolite
18000					Quartzite (Sand Silt)
20000					Limestone, Marble
22000					Monzonite, Granite
24000					Geneiss
26000					Diorite Diabase
28000					Hard Shale, Slate
30000					Limestone, Dolomite
32000					Basalt
34000					Tactite, Skarn
36000					Granodiorite
38000					Taconite
40000					Quartzite
42000					Senite
44000					Gabbro
46000					
48000					
50000					Banded Iron Formation
52000					Taconite
54000					Chert
56000					
58000					Quartzite
60000					
62000					Amphibolite
64000					Hornfeis
68000					Hematite Ore
70000					"Lava" Basalt, Biwabic
Higher					Quartzite

- Effective Drilling
- Bit Life Weakened
- Bit Life Compromised

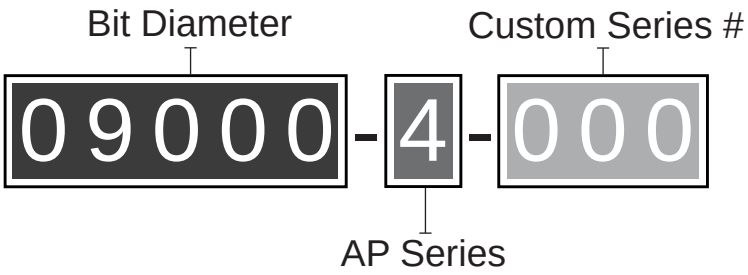
AP	IADC Code	Bit Weight lbs/in	RPM
AP4	4.1 - 4.4	1000 - 5000	50 - 140
AP5	5.1 - 5.4	3000 - 6600	50 - 120
AP6	6.1 - 6.4	4000 - 7000	50 - 110
AP7	7.1 - 7.4	5000 - 8000	50 - 80

*Please use this chart as a guideline, as drilling conditions will vary site to site and Rock (UCS) hardness (Unconfined Compressive Strength) is only one factor that contributes to “drillability” of any rock.

DRILLING FACTORS & VARIABLES

Rock (UCS) hardness (Unconfined Compressive Strength) is only one factor that contributes to “drillability” of any rock. Other factors strongly influencing drillability are: Fracture Toughness, Shear Strength, Young’s Modulus of Elasticity, Poisson’s Ratio of stress vs strain, Internal Angle of Friction. Rock variables must be considered when attempting to determine the best bit for overall life at optimum penetration rates. Other equally important factors affecting drilling performance are specific to the drilling equipment and operator. Notable items include: Driller experience and training, Compressor size and condition, Mechanical condition of the drill, Pipe size and straightness, Stabilizer size and condition, Deck bushing size and condition, Surface condition and overburden, Sub surface blast fracturing, Angle drilling, Revolutions per minutes utilized, Weight applied to bit, Hole cleaning, Water applied for dust control, Lubrication provided for bit bearings, etc.

PART NUMBER SELECTION - ROTARY BITS



Bit Diameter	
9" (228MM)	09000
9 7/8" (250MM)	09875
10 5/8" (270MM)	10625
12 1/4" (311MM)	12250
13 3/4" (350MM)	13750
15" (381MM)	15000
16" (406MM)	16000

AP Series			
AP4	4	AP6	6
AP5	5	AP7	7

Custom Series Number

Custom number, specific to your designed bit.

Description	IADC	Pin Conn.	PSI/UCS	RPM	WOB (lbs)	Part Number
AP4 Tri-Cone 9" (228MM)	4.3.2					09000-4-000
AP5 Tri-Cone 9" (228MM)	5.3.2	6 5/8" API	8,000 - 30,000	50 - 120		09000-5-000
AP6 Tri-Cone 9" (228MM)	6.3.2	6 5/8" API	15,000 - 44,200	50 - 110		09000-6-000
AP7 Tri-Cone 9" (228MM)	7.3.2	6 5/8" API	30,000 - 60,000	50 - 100		09000-7-000
AP4 Tri-Cone 9 7/8" (250MM)	4.3.2					09875-4-000
AP5 Tri-Cone 9 7/8" (250MM)	5.3.2	6 5/8" API	8,000 - 30,000	50 - 120		98750-5-000
AP6 Tri-Cone 9 7/8" (250MM)	6.3.2	6 5/8" API	15,000 - 44,200	50 - 110		98750-6-000
AP7 Tri-Cone 9 7/8" (250MM)	7.3.2	6 5/8" API	30,000 - 60,000	50 - 100	49,375 - 79,000	98750-7-000
AP4 Tri-Cone 10 5/8" (270MM)	4.3.2					10625-4-000
AP5 Tri-Cone 10 5/8" (270MM)	5.3.2	6 5/8" API	8,000 - 30,000	50 - 120		10625-5-000
AP6 Tri-Cone 10 5/8" (270MM)	6.3.2	6 5/8" API	15,000 - 44,200	50 - 110		10625-6-000
AP7 Tri-Cone 10 5/8" (270MM)	7.3.2	6 5/8" API	30,000 - 60,000	50 - 100		10625-7-000
AP4 Tri-Cone 10 5/8" (270MM)	4.3.2					11000-4-000
AP5 Tri-Cone 10 5/8" (270MM)	5.3.2	6 5/8" API	8,000 - 30,000	50 - 120	32,000 - 70,000	11000-5-000
AP6 Tri-Cone 10 5/8" (270MM)	6.3.2	6 5/8" API	15,000 - 44,200	50 - 110	43,000 - 75,000	11000-6-000
AP7 Tri-Cone 10 5/8" (270MM)	7.3.2	6 5/8" API	30,000 - 60,000	50 - 100	53,000 - 86,000	11000-7-000
AP4 Tri-Cone 12 1/4" (311MM)	4.3.2					12250-4-000
AP5 Tri-Cone 12 1/4" (311MM)	5.3.2	6 5/8" API	8,000 - 30,000	50 - 120	37,250 - 80,000	12250-5-000
AP6 Tri-Cone 12 1/4" (311MM)	6.3.2	6 5/8" API	15,000 - 44,200	50 - 110		12250-6-000
AP7 Tri-Cone 12 1/4" (311MM)	7.3.2	6 5/8" API	30,000 - 60,000	50 - 100	61,000 - 99,000	12250-7-000
AP4 Tri-Cone 13 3/4" (350MM)	4.3.2					13750-4-000
AP5 Tri-Cone 13 3/4" (350MM)	5.3.2	6 5/8" API	8,000 - 30,000	50 - 120	41,250 - 90,750	13750-5-000
AP6 Tri-Cone 13 3/4" (350MM)	6.3.2	6 5/8" API	15,000 - 44,200	50 - 110	56,000 - 97,000	13750-6-000
AP7 Tri-Cone 13 3/4" (350MM)	7.3.2	6 5/8" API	30,000 - 60,000	50 - 100		13750-7-000
AP4 Tri-Cone 15" (381MM)	4.3.2					15000-4-000
AP5 Tri-Cone 15" (381MM)	5.3.2	6 5/8" API	8,000 - 30,000	50 - 120		15000-5-000
AP6 Tri-Cone 15" (381MM)	6.3.2	6 5/8" API	15,000 - 44,200	50 - 110		15000-6-000
AP7 Tri-Cone 15" (381MM)	7.3.2	6 5/8" API	30,000 - 60,000	50 - 100		15000-7-000
AP4 Tri-Cone 16" (406MM)	4.3.2					16000-4-000
AP5 Tri-Cone 16" (406MM)	5.3.2	6 5/8" API	8,000 - 30,000	50 - 120		16000-5-000
AP6 Tri-Cone 16" (406MM)	6.3.2	6 5/8" API	15,000 - 44,200	50 - 110		16000-6-000
AP7 Tri-Cone 16" (406MM)	7.3.2	6 5/8" API	30,000 - 60,000	50 - 100		16000-7-000

ROTARY DRILL PIPE

Mincon rotary drill pipe is manufactured to customer requirements for outside diameter (O.D.), wall thickness, length, and specific drill rig wrenching configurations. Tool joints are precision machined from premium quality materials and then reinforced with ultra-hard materials to withstand premature wear from the most abrasive rock and drilling conditions.

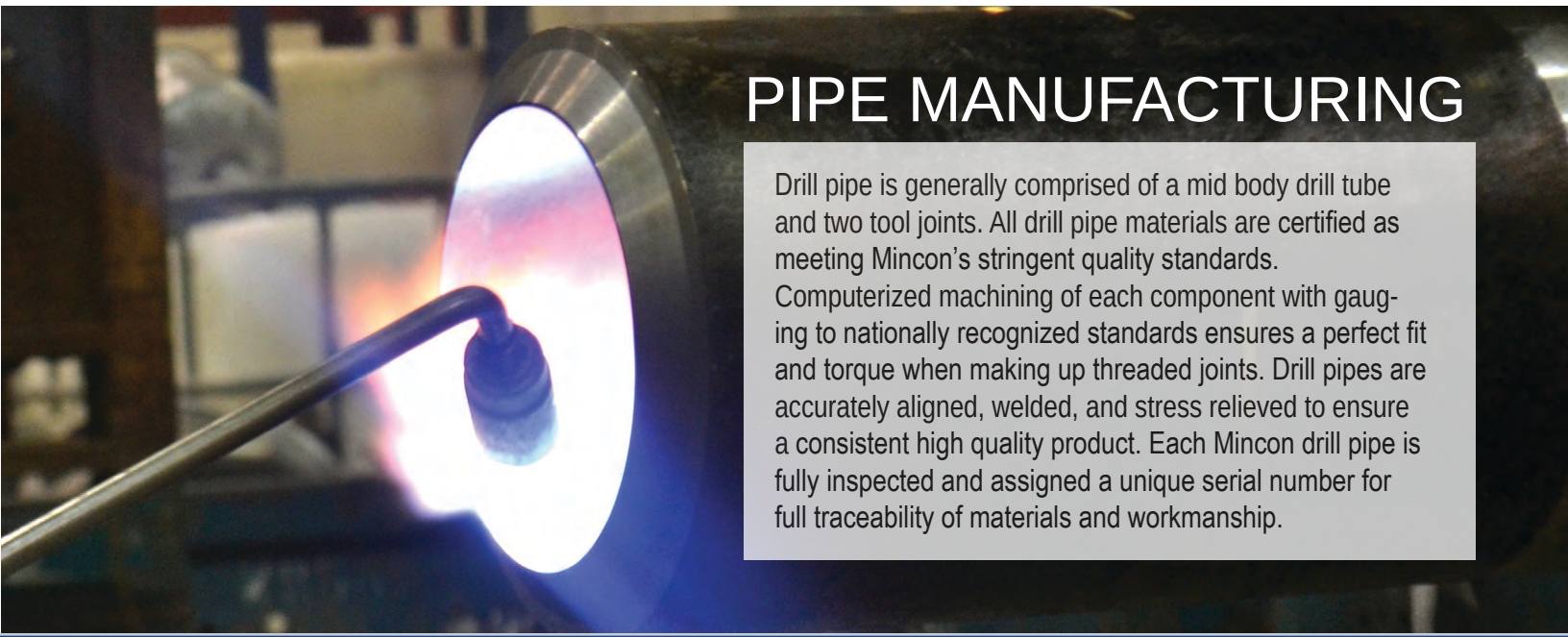
Lengths to 50 feet measured shoulder to shoulder with thread connections and wrenching details to suit your specific drilling equipment.

FEATURES

O.D. Inch (MM)	Recommended Connection
7” (178MM)	4 1/2 Beco
7 5/8” (194MM)	5 1/4” Beco
8” (203MM)	5 1/4” Beco
8 5/8” (219MM)	6” Beco
9 1/4” (235MM)	6” Beco
10 3/4” (273MM)	8” Beco
11 3/4” (299MM)	8” Beco
12 1/4” (311MM)	8” Beco

When Ordering, Please Provide the Following:

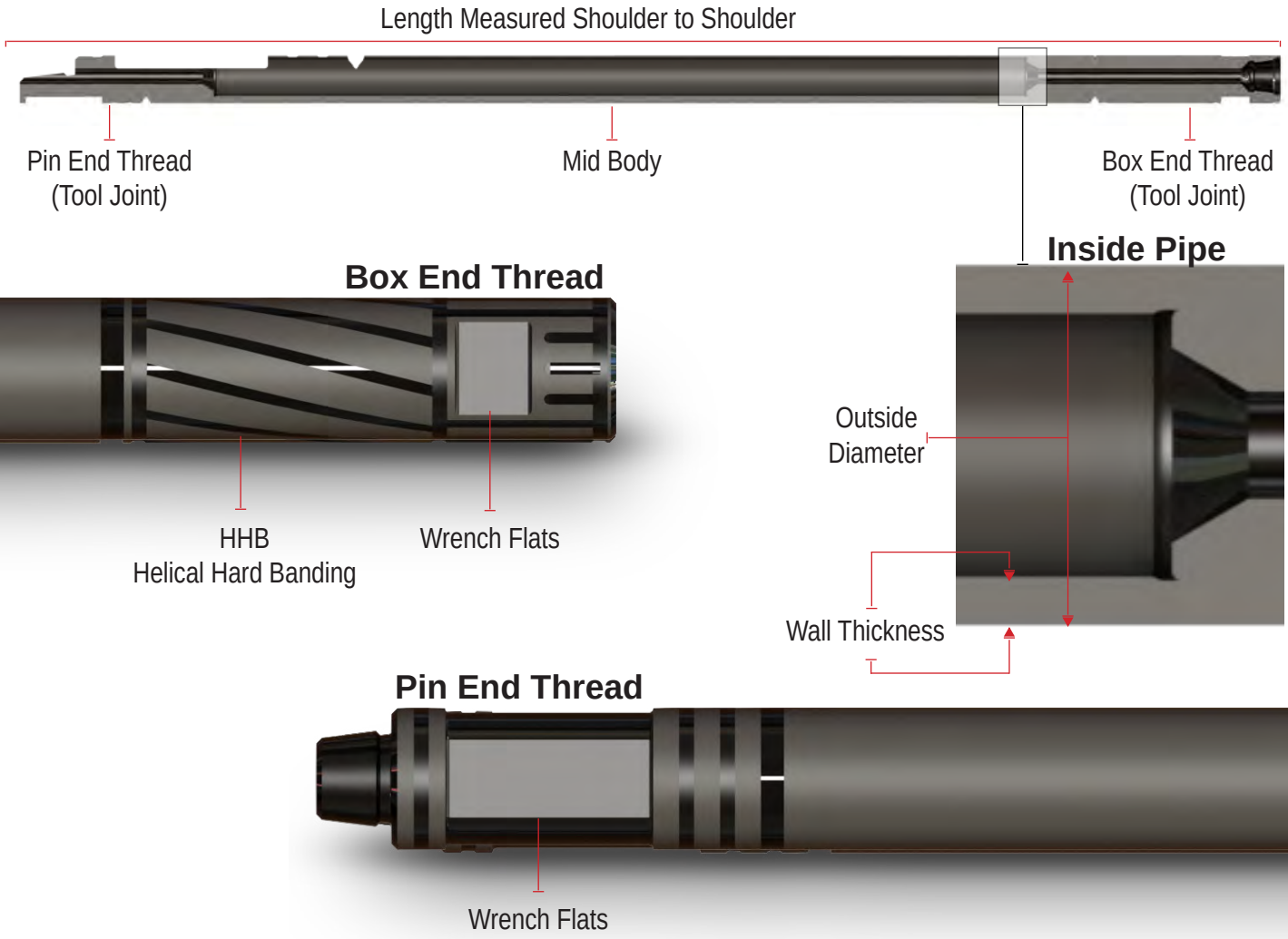
- Outside diameter (O.D.)
- Shoulder to shoulder length
- Wall thickness of tube portion
- Thread sizes (box - pin)
- Make & model of drill, (wrenching details)
- With or without helical hard band wear protection



PIPE MANUFACTURING

Drill pipe is generally comprised of a mid body drill tube and two tool joints. All drill pipe materials are certified as meeting Mincon’s stringent quality standards. Computerized machining of each component with gauging to nationally recognized standards ensures a perfect fit and torque when making up threaded joints. Drill pipes are accurately aligned, welded, and stress relieved to ensure a consistent high quality product. Each Mincon drill pipe is fully inspected and assigned a unique serial number for full traceability of materials and workmanship.

DRILL PIPE RENDERING



PIPE MANUFACTURING

Rotacan drill pipe is generally comprised of a mid body drill tube and two tool joints. All drill pipe materials are certified as meeting Rotacan's stringent quality standards. Computerized machining of each component with gauging to nationally recognized standards ensures a perfect fit and torque when making up threaded joints. Drill pipes are accurately aligned, welded, and stress relieved to ensure a consistent high quality product. Each Rotacan drill pipe is fully inspected and assigned a unique serial number for full traceability of materials and workmanship.

ACCESSORIES

BIT SUBS

Mincon Bit Subs are manufactured from premium alloy steels with specific sizes, lengths, thread connections, and hard facing materials tailored to meet individual customer requirements. Each thread is verified using certified, hardened and ground, gauges thus ensuring proper make up of all connections.

O.D. Inch (MM)	Recommended Connection
7 5/8” (194MM)	5 1/4” Beco
8” (203MM)	5 1/4” Beco
8 5/8” (219MM)	6” Beco
9 1/4” (235MM)	6” Beco
10 3/4” (273MM)	8” Beco
11 3/4” (299MM)	8” Beco
12 1/4” (311MM)	8” Beco

BIT ADAPTERS

O.D. Inch (MM)	Recommended Connection
7 5/8” (194MM)	5 1/4” Beco
8” (203MM)	5 1/4” Beco
8 5/8” (219MM)	6” Beco
9 1/4” (235MM)	6” Beco
10 3/4” (273MM)	8” Beco
11 3/4” (299MM)	8” Beco
12 1/4” (311MM)	8” Beco

NOTES

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