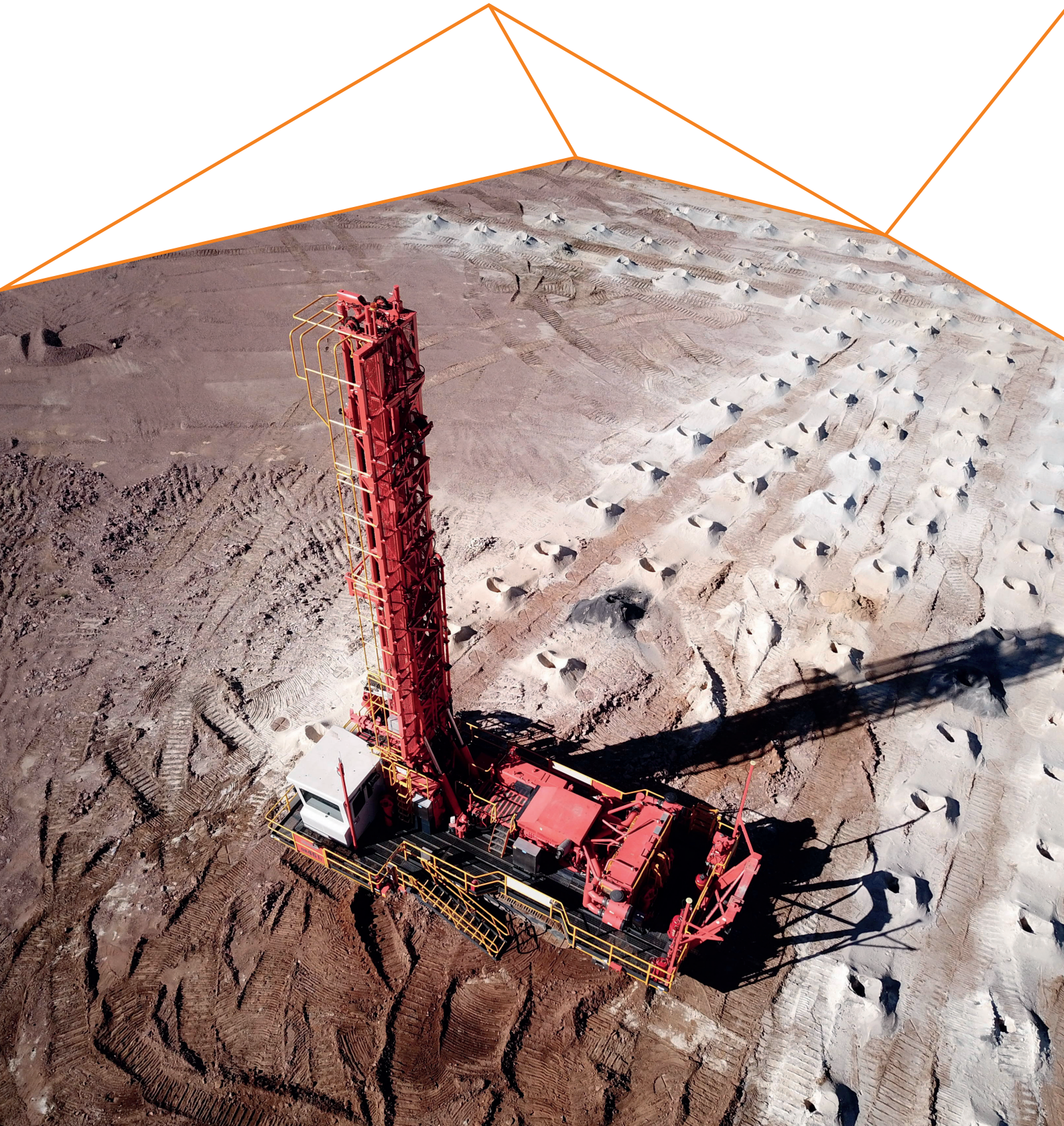
SANDVIK

ROTARY DRILLING
BITS AND DRILL STRING TOOLS



HEALTH AND SAFETY INFORMATION

Safety is fundamental to us at Sandvik. Please make sure that you read and follow this information in order to stay within safety guidelines.

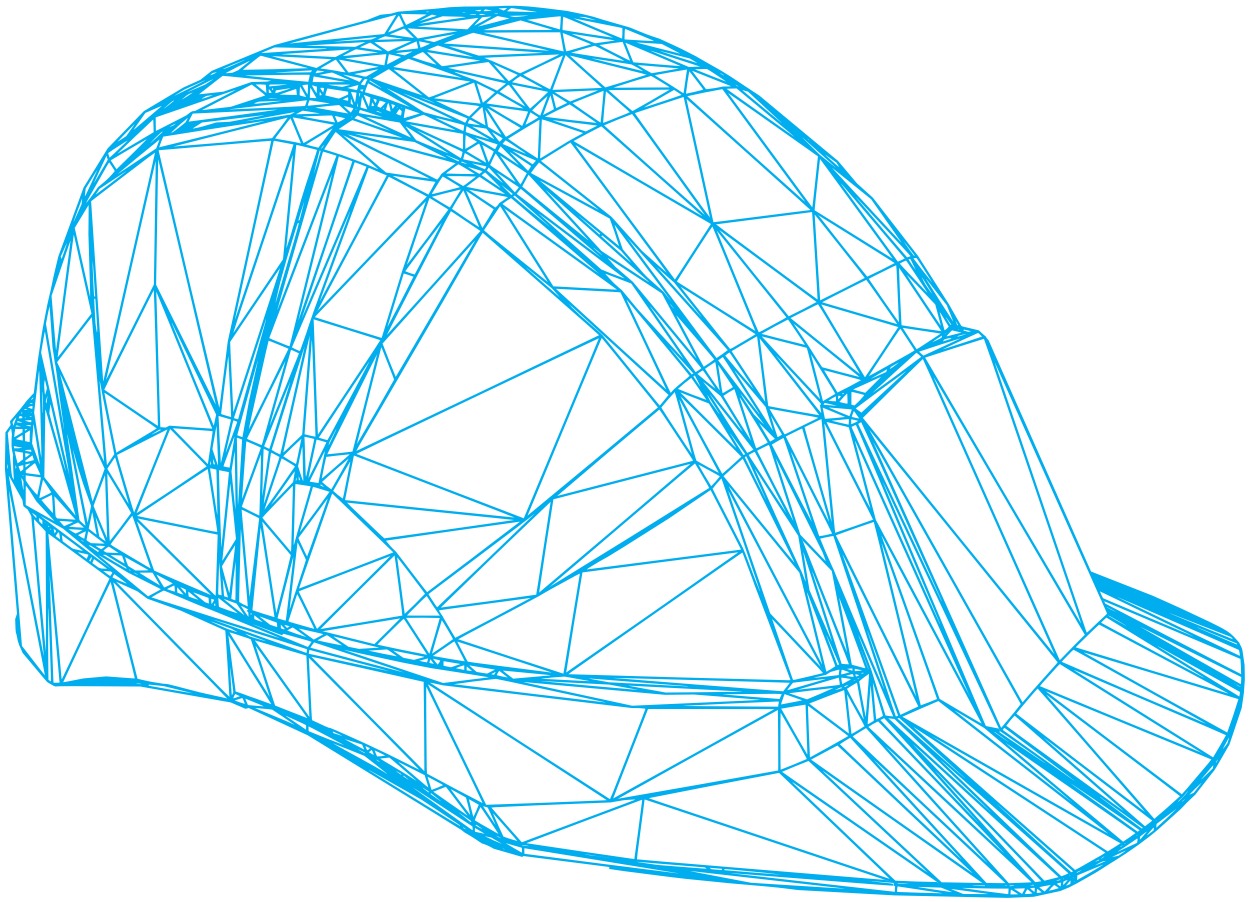
SAFE WORK PROCEDURES

Appropriate personal protective equipment (PPE) should be worn when working with or around rotary tools or rock drilling. These include:

- Safety helmet
- Hearing protection
- Safety glasses
- Protective and high visibility clothing
- Safety boots
- And any site-specific PPE as required

Consider safety when planning your schedule. Take five minutes before the start of a task to consider the possible hazards. Perform a quick risk assessment. Plan and apply the appropriate control measures. Ensure that you have the correct resources to perform the task.

Go to App store on your iOS device and search for: Sandvik Mining & Rock Technology Take Five then download the app for your own safe convenient use.



ROUTES OF EXPOSURE

Grinding or heating hardmetal blanks or hardmetal products will produce dust or fumes with dangerous ingredients that can be inhaled or swallowed, or which might come in contact with the skin or eyes.

ACUTE TOXICITY

The dust is toxic by inhalation. Inhalation may cause irritation and inflammation in the airways. Skin contact can cause irritation and rash. Sensitized people may experience an allergic reaction.

CHRONIC TOXICITY

Repeated inhalation of aerosols containing cobalt may cause obstruction in the airways. Prolonged inhalation of increased concentrations may cause lung fibrosis or lung cancer. Cobalt is a potent skin sensitizer. Repeated or prolonged contact can cause sensitization.

CLASSIFICATION

Following hazard classification according to GHS/CLP applies to the hardmetal powder (3 % ≤ Co < 10 %):

- Acute Inhalation 3, H331: Toxic if inhaled
- Carcinogenicity 1B, H350i, May cause cancer by inhalation
- Repr. 2, H361f; Suspected of damaging fertility
- STOT RE 1, H372: Causes damage to lungs through prolonged or repeated exposure through inhalation
- Resp. Sens. 1B, H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled
- Skin Sens.1, H317: May cause an allergic skin reaction.
- Aquatic Acute 1, H400: Very toxic to aquatic life
- Aquatic Chronic 2, H411: Toxic to aquatic life, with long lasting effects.

PRECAUTIONARY STATEMENTS

- Do not breathe the dust
- Wear protective gloves/protective clothing/eye protection
- In case of inadequate ventilation, wear respiratory protection
- Avoid release into the environment

IF INHALED: If breathing is difficult, remove the victim to fresh air and keep them at rest in a position comfortable for breathing. If they are experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.

DISASSEMBLY OF HOT BIT, ROD, COUPLING, SLEEVE, SHANKADAPTER AND INTERGRAL STEEL

- Ensure that products have cooled down before disassembling
- Never work on hot parts
- Consider the appropriate hand protection (gloves) for the handling of warm parts

CLEANING OF RODS

A particular hazard exists with cleaning rods if the rods contain explosives. Sandvik rock tools should never be used in a hole that has been filled with explosives.

DEALING WITH WORN PARTS

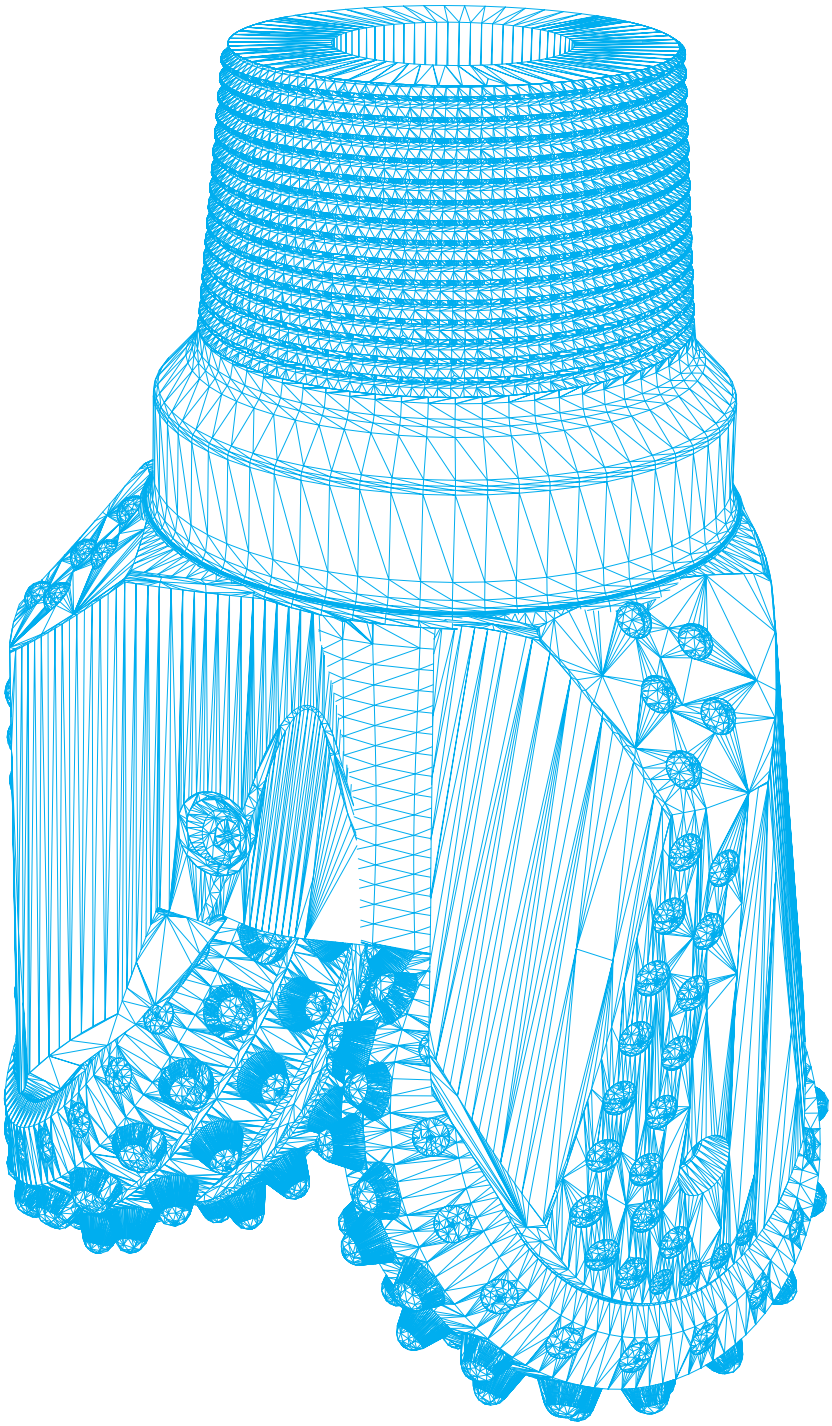
Worn parts should be removed and disposed of appropriately. Consider recycling any used drill bits. Please contact your local Sandvik representative for support and further information regarding the recycling process.

STORING

All products should be stored in a dry place and in their original packaging until they are required for use.

GENERAL

The products in this catalog are designed for drilling holes in rock, and should only be used for this purpose.



CONTENTS

SANDVIK A TOTAL SOLUTION PROVIDER

MORE THAN JUST BITS

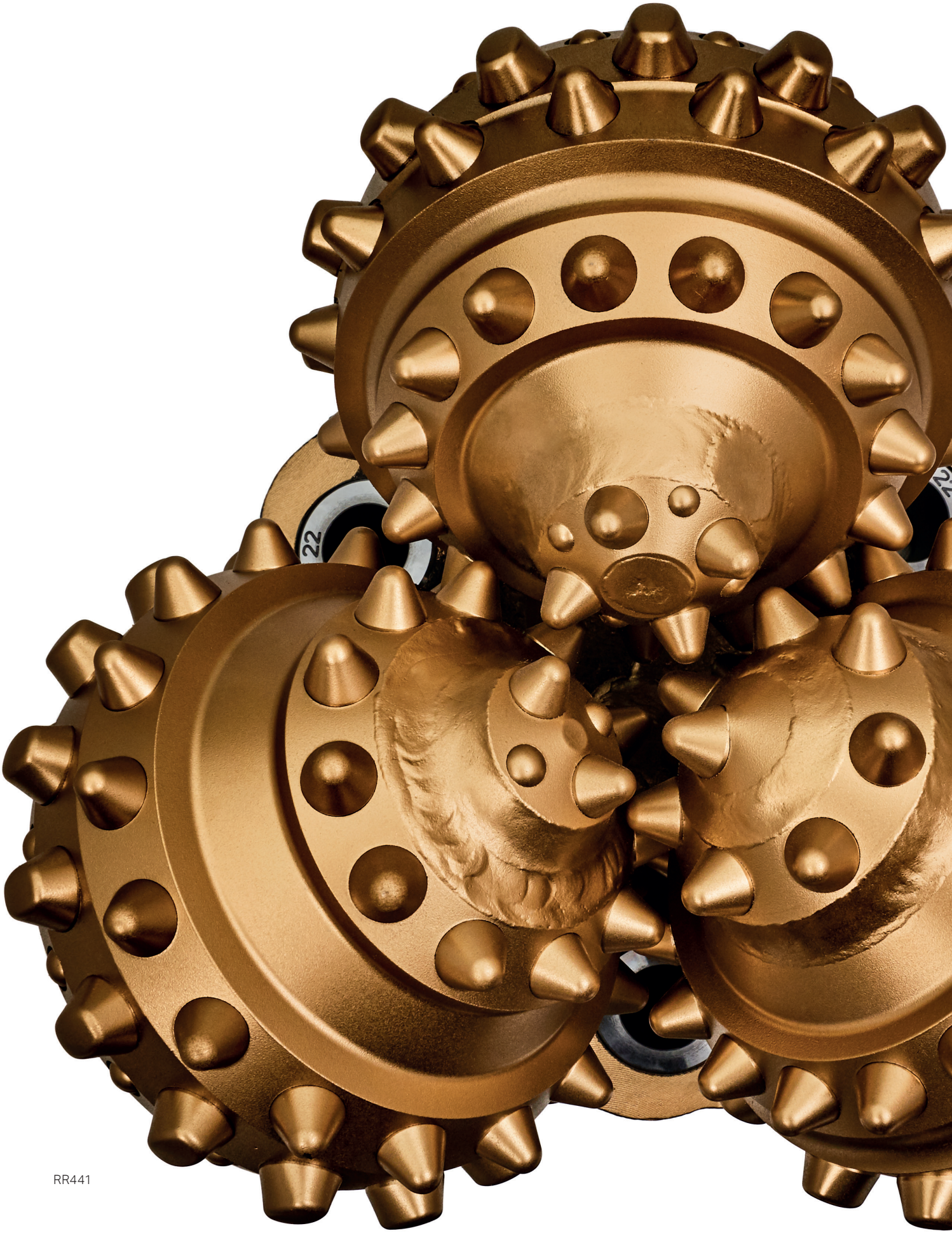
We pride ourselves on being your total solutions provider and preferred partner of choice. In line with this value, our high performance drilling tools provide longer life and the lowest overall operating costs. Great performing products backed by our global reach of experienced and dedicated personnel make us the natural choice as your drilling solutions provider.

We offer a variety of services designed to improve your drilling process. These include:

- Drilling performance audits and recommendations
- On-site support and services
- Drill rig audits including air, weight and rotation speed measurement
- Product selection and a staged plan of product development and improvement
- Dull bit evaluation
- Classroom training
- Performance feedback

We are pleased to offer customers on site support including training for the appropriate use of all our products for your application.

When you purchase our products you receive much more than a drill bit or a drill string tool. The Sandvik experience includes service and support during and after the sale. Although we have a global footprint, our service is local by design. Our sales and product specialists are stationed in your communities so we can understand your needs and deliver solutions efficiently and responsively. Your local Sandvik team is supported by applications engineers / drillmasters who work together with a focus to improve your drilling operation.



RR441

ROTARY DRILL BITS OFFERING

Our bits are built for rock breaking. Choosing the correct drill bit is fundamental to successful and economical drilling. Important factors to consider include the rock compressive strength, abrasiveness, homogeneity, the desired penetration rate, the capabilities and characteristics of the drill rig, and previous drilling experience at the mine.

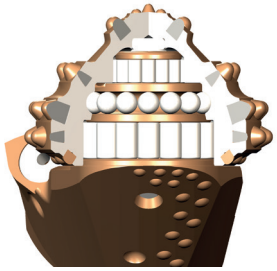
Our roller cone bits are optimized for service life at the maximum possible penetration rate for the drilling conditions. Carbide insert grade, shape & size, and cutting structure designs are selected to achieve the optimal balance between productivity and bit life. There is never a compromise on quality. To achieve long life, the bearings must withstand the high axial and radial forces that are generated during drilling. The bearing design, geometry and material selection are critical factors that go into the development of new bits.

RR221 & RR222

The RR221 & RR222 bearing system has evolved from one of the best performing air bearing bits in the surface mining industry. Both bit ranges have been designed to maximize life and operational penetration rates in challenging environments. Cutting structures have been fine tuned at key customer sites globally, to ensure maximum penetration rates and total drilled meters per bit. New MT-1 milltooth bit designs are now also available.

AIR-BEARING TECHNOLOGY

Patented air bearing technology is optimized for high hours and maximum durability by using advanced materials and metallurgy. This yields higher load capacity, longer bit life, and lower cost per meter drilled.



RR221 & RR222 AIR BEARING

RR221 & RR222 AVAILABILITY SELECTION CHART

Softest Formation
Most Aggressive Bit

CUTTING STRUCTURE TYPE

Hardest Formation
Least Aggressive Bit

BIT SIZE mm	inch	APPROX. WT. kg / lb	MT-1	X05	X10	X20	X30	X40	X47	X50	X60	X70
171	6 ¾"	22 / 49		X	X		X			X		X
187	7 ⅜"	25 / 56							X			
200	7 ⅞"	35 / 78	X	X	X	X	X	X		X	X	X
216	8 ½"	36 / 81			X	X	X	X		X		
229	9"	43 / 96	X	X		X	X		X	X	X	
251	9 ⅞"	60 / 134		X	X	X	X	X		X	X	X
270	10 ⅝"	67 / 150		X		X	X		X	X		
311	12 ¼"					X	X	X		X	X	X

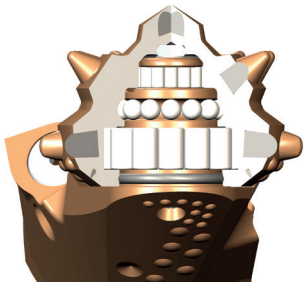
Note:
1. Working ranges of bit types overlap, please consult your Sandvik product specialist for recommendations.
2. The sizes and types listed in the table above reflect the standard bits that were available at the time we published this brochure.
Because we are continually adding new bit sizes and types to our product line, please consult with your Sandvik representative for the most current offerings.

RR330 SEALED ROLLER BEARING BITS

All new for 2018, our RR330 range of sealed roller bearing bits. Based on the class leading RR321 range, but now with sealed roller bearing technology for longer bearing life and improved durability, particularly in applications where water is used for dust suppression. Cutting structures have been optimized for maximum penetration rates in all rock types.

NEW SEALED ROLLER BEARING TECHNOLOGY

Patented roller bearing technology combined with improved sealing and grease lubrication delivers significant bit hours increase over standard air bearing bits. The sealed bearing design with no air to the bearing avoids contamination from water and rock cuttings. Grease lubrication maximizes cooling and improves bit durability. This yields higher load capacity, longer bit life, and lower cost per meter drilled.



RR330 SEALED ROLLER BEARING

RR330 AVAILABILITY SELECTION CHART

Softest Formation
Most Aggressive Bit

CUTTING STRUCTURE TYPE

Hardest Formation
Least Aggressive Bit

BIT SIZE mm	inch	APPROX. WT. kg / lb	S05s	S10s	S15s	S17s	S30s	S37s	S40s	S47s	S50s	S60s
171	6 ¾"	22 / 49					X					
200	7 ⅞"	35 / 77		X							X	X
216	8 ½"	36 / 80									X	
229	9"	43 / 94	X	X	X					X		X
251	9 ⅞"	59 / 130	X						X		X	X
270	10 ⅝"	67 / 148				X	X			X	X	
311	12 ¼"	98 / 216					X		X		X	X
349	13 ¾"	133 / 294					X		X			
406	16"	213 / 470						X	X			

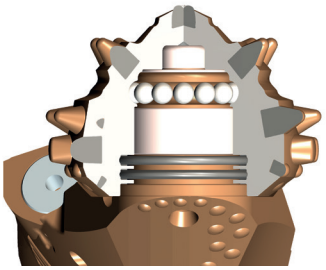
Note:
1. Working ranges of bit types overlap, please consult your Sandvik product specialist for recommendations.
2. Product offering was correct at time of publishing. As the RR330 range is new, further new designs are still being created. Consult with your Sandvik representative for the most suitable bit type for your application.
3. The sizes and types listed in the table above reflect the standard bits that were available at the time we published this brochure. Because we are continually adding new bit sizes and types to our product line, please consult with your Sandvik representative for the most current offerings.

RR441

For 20 years, the Charger bearing has been a benchmark of the mining industry. In 2018 we have launched the all new RR441 range. It is powered by improved Charger™ bearing technology, cutting structure improvements and feature optimization to maximize performance in the most challenging drilling applications.

RR441 CHARGER QX3 DUAL-SEAL BEARING TECHNOLOGY

The patented QX3 bearing uses "dual seal" technology combined with Phinodal bearing sleeves to dramatically increase weight and rotation speed capacities. Kevlar™ coated excluder seal protects the primary seal from cuttings and debris, making this system virtually bulletproof. The QX3 bearing delivers class leading bearing performance, allowing drillers to to apply more weight and drill faster, lowering your total drilling costs.



RR441 SEALED JOURNAL BEARING

RR441 AVAILABILITY SELECTION CHART

Softest Formation
Most Aggressive Bit

CUTTING STRUCTURE TYPE

Hardest Formation
Least Aggressive Bit

BIT SIZE mm	BIT SIZE inch	APPROX. WT. kg/lb	05QX3	07QX3	17QX3	20QX3	25QX3	30QX3	35QX3	37QX3	39QX3	40QX3	45QX3	50QX3	60QX3
171	6 ¾	22 / 49						X						X	
200	7 ⅞	35 / 77					X				X				X
229	9	43 / 94	X	X		X						X			X
251	9 ⅞	60 / 130		X				X	X		X	X		X	X
270	10 ⅝	67 / 148	X	X	X		X	X	X		X	X			X
311	12 ¼	98 / 216						X		X	X	X	X	X	X
349	13 ¾	133 / 294											X	X	
406	16	213 / 470								X					

Note:
1. Working ranges of bit types overlap, please consult your Sandvik product specialist for recommendations.
2. The sizes and types listed in the table above reflect the standard bits that were available at the time we published this brochure. Because we are continually adding new bit sizes and types to our product line, please consult with your Sandvik representative for the most current offerings.
3. Bit type MTX-1 not included in the above table, availalbe in 9" size only currently.

BENEFITS BY APPLICATION

INTERIOR ROW INSERTS

Interior row inserts are critical for high bit life and sustained penetrations rate. We select the best inserts for your application specific products.

	RR221 & RR222	RR330	RR441
Chisel TCI (tungsten carbide insert) provides durability and faster cutting action for soft and medium-soft formations.	✓	✓	✓
The unique geometry of the vector shaped interior row inserts attack the rock at the angle of cone rotation to maximize insert penetration in soft and medium-soft formations		✓	✓
Sculptured inserts increase the strength by increasing cross-sectional area and by eliminating sharp edges that cause stress risers which can lead to insert breakage. Ideal for soft and medium-soft formations.		✓	✓
Tough conical top inserts in hard rock formations and abrasive rock conditions have a geometrical shape that optimizes both strength and wear resistance.	✓	✓	✓

GAGE ROW INSERTS

We offer a range of gage row insert shapes suited to all drilling applications. Insert selection is optimized for all bits in our product range.

	RR221 & RR222	RR330	RR441
The chisel gage insert performs well in soft homogenous drilling conditions.	✓	✓	✓
Radial Bow chisel is a good choice in soft to medium-soft formations.	✓	✓	✓
The crest geometry of QX gage inserts present a large cross-sectional area to the rock, creating large bottom-hole craters at the bit gage maximzing life and penetration rates.			✓
The SWIC shape coupled with proprietary TCI grades increases gage contact in medium hard abrasive drilling conditions.	✓	✓	✓
Ollon, double conical and relief gage SWIC are shapes for medium-hard to hard formations.	✓	✓	✓
Conical inserts offer both strength and wear resistance in hard, abrasive rock.	✓	✓	✓

PATENTED TRUCUT GAGE CUTTING TECHNOLOGY

Trucut gage cutting technology uses a combination of SRT semi-round top inserts on the gage, and patented off gage inserts. These inserts cut the wall more efficiently, minimizing breakage and extending bit life and penetration rates.

	RR221 & RR222	RR330	RR441
Trucut gage cutting technology		✓	✓

HEEL ROW CUTTING AND REAMING TECHNOLOGY

A range of heel row configurations are available depending on the bit design and application. These reduce gage wear and extend bit life.

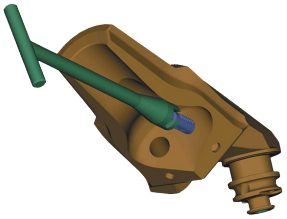
	RR221 & RR222	RR330	RR441
Standard	✓	✓	✓
Shot-gunned	✓	✓	✓
Dual Heel	✓	✓	✓

Standard Shotgunned Dual heel row

REMOVABLE AIR TUBES

Non-metallic removable air tubes allow cleaning of formation from the air passages, if needed. This extends bit life and reduces costs.

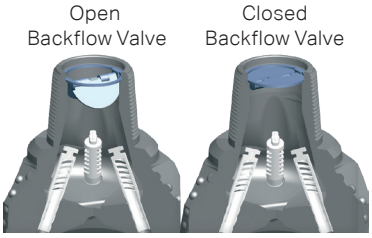
	RR221 & RR222	RR330	RR441
Non-metallic removable air tubes	✓		



BACKFLOW VALVES

Backflow valves are a check valve limiting ingress of water and cuttings to the bit body. This increases bit life and reduces the incidences of bearing failure.

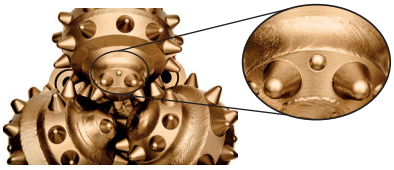
	RR221 & RR222	RR330	RR441
Back Flow Valve	✓	✓	✓



CONE WEAR PROTECTION, PATENTED RIDGE CUTTER TECHNOLOGY

Cone wear protection and patented ridge cutter features are used to prevent excessive cone erosion and remove un-cut rock ridges where needed in specific bit types.

	RR221 & RR222	RR330	RR441
Patented process applies special material to minimize cone wear.	✓	✓	✓
Ridge cutter cutters are rows of small diameter inserts positioned between the main cutting inserts.		✓	✓



LEG AND SHIRTAIL PROTECTION

Leg protection can be customized to drilling conditions, extending bit life and increase your productivity. 3/3 leg protection is designed for drilling wet and or dirty hole conditions where unstable hole conditions require backreaming.

	RR221 & RR222	RR330	RR441
Full 3/3 leg protection for maximum wear life and product performance in all applications	✓	✓	✓

ASYMMETRIC LEG DESIGN

Asymetrical design of leg forgings protects the key bit components and allows for improved bailing of drill cuttings. Combined with the preferential orientation of the nozzles, results in highly efficient bottom hole cleaning, increasing your bit life and penetration rates.

	RR221 & RR222	RR330	RR441
Optimized Leg design	✓	✓	✓

PIN VENT PRESSURE COMPENSATION SYSTEM

The pin vent pressure compensation system equalizes the internal bit pressure and external ambient pressure to prevent the ingress of cuttings and loss of lubricant. This optimizes seal life, extends bit life, and reduces your downtime.

	RR221 & RR222	RR330	RR441
Pin Vent pressure compensation system			✓

HARD FACED HEEL ROW

On selected products, mainly for softer applications, a new hard faced heel row configuration is used. This feature provides superior wear resistance in softer but abrasive applications. It is especially effective in rock types where heel row insert loss is primary failure mode.

	RR221 & RR222	RR330	RR441
Hard Faced Heel Row	✓	✓	✓

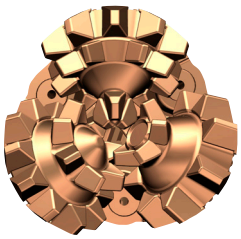
JET NOZZLES

Nozzles are used to regulate air flow, directing sufficient air to the bearings, whilst ensuring good bottom hole cleaning and an acceptable bailing velocity for the drilling environment. With correct nozzle selection, about 30 % of the air will be directed to the bearings (air bearing bits only) with the remainder used for hole cleaning. To achieve this, Sandvik recommends that the internal air pressure should be between 35–40 PSI in all our rotary bits.

	RR221 & RR222	RR330	RR441
Optimized nozzle design & location	✓	✓	✓

ADVANCED MILLTOOTH CUTTING STRUCTURE DESIGNS

Milled teeth cutting structure bit designs are for maximizing penetration rates in very soft formations. These designs use advanced hard facing materials for optimal tooth life, bit durability and superior wear resistance. These products have a new bit type designation, MT-1 for the RR222 model, and MTX-1 for the RR441 version.



	RR221 & RR222	RR330	RR441
Advanced milltooth bit designs	✓		✓

BIT THREAD CONNECTION OPTIONS

Rotary bit sizes are supplied with a default thread type which is size dependent and consistent globally. Sandvik also supplies key bits with an alternative BECO thread option when required.

BIT SIZE mm	BIT SIZE inch	STANDARD PIN CONNECTION	ALTERNATIVE PIN CONNECTION*
159	6 ¼	3 ½" API	n/a
171	6 ¾	3 ½" API	n/a
187	7 ⅜	3 ½" API	n/a
200	7 ⅞	4 ½" API	4 ½" BECO
216	8 ½	4 ½" API	n/a
229	9	4 ½" API	4 ½" BECO
251	9 ⅞	6 ⅝" API	6" BECO
270	10 ⅝	6 ⅝" API	6" BECO
311	12 ¼	6 ⅝" API	6" BECO
349	13 ¾	6 ⅝" API	6" BECO
406	16	7" BECO	n/a

* Alternative pin connection options are only available on selected bits. Consult with your Sandvik representative for further details.

CUTTING STRUCTURE SELECTION GUIDE

SHALE, SILTSTONE
SANDSTONE
LIMESTONE, DOLOMITE
GNEISS
SLATE
GRANITE, MARBLE
BASALT
DIABASE
DIORITE, GABBRO, QUARTZITE
RHYOLITE, TACONITE, BANDED IRON FORMATIONS

STEPS

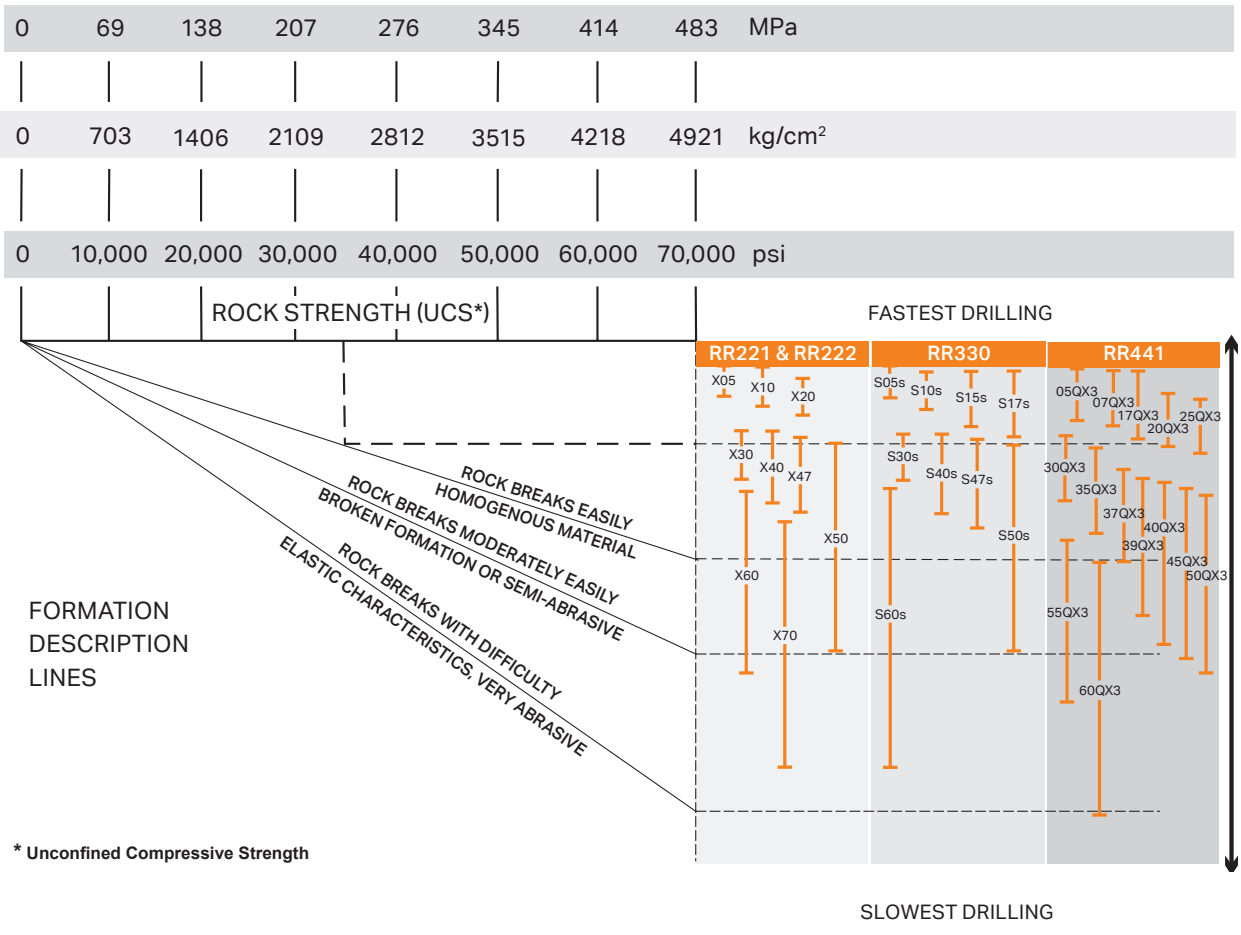
1. Locate ROCK COMPRESSIVE STRENGTH value.
2. Move vertically down to the FORMATION DESCRIPTION LINE that best describes the rock formation.
3. Move horizontally across to the ROCK BIT TYPE.

NOTE

For faster drilling, use the next smaller bit number. If insert breakage is encountered, use the next larger bit number.

EXAMPLE

Rock compressive strength 35,000 pounds per square inch and rock breaks easily – an S40s rock bit type is the best first selection.



* **Unconfined Compressive Strength**

SPECIFICATIONS

RR221 & RR222 & RR330 GUIDELINES FOR WEIGHT-ON-BIT AND ROTATION SPEED*

BIT SIZE mm (inches)	WOB/RPM	MT-1	X05/S05s	X07/S07s	X10/S10	S15S/S17s	X20/S20
171 - 187 (6 ¾" - 7 ⅜")	lb (1 000's)		4 - 16		8 - 16		
	tonnes		2 - 7		4 - 7		
	rpm		80 - 180		80 - 160		
200 - 229 (7 ⅞" - 9")	lb (1 000's)	8 - 16	8 - 16	8 - 16	10 - 24	12 - 33	12 - 33
	tonnes	4 - 7	4 - 7	4 - 7	5 - 11	5 - 15	6 - 15
	rpm	90 - 160	90 - 180	90 - 160	80 - 150	80 - 150	80 - 150
251 (9 ⅞")	lb (1 000's)		8 - 20	10 - 24	13 - 27	13 - 33	18 - 45
	tonnes		4 - 10	5 - 11	6 - 12	6 - 15	8 - 21
	rpm		90 - 180	80 - 160	80 - 150	80 - 140	80 - 130
270 (10 ⅝")	lb (1 000's)		8 - 20		13 - 27	13 - 33	18 - 45
	tonnes		4 - 10		6 - 12	6 - 15	8 - 21
	rpm		90 - 180		80 - 150	80 - 140	80 - 130
311 (12 ¼")	lb (1 000's)				15 - 38		20 - 70
	tonnes				7 - 17		9 - 31
	rpm				80 - 150		70 - 120
349 (13 ¾")	lb (1 000's)						
	tonnes						
	rpm						
406 (16")	lb (1 000's)						
	tonnes						
	rpm						

* Consult with your Sandvik representative for the best operating parameters for your site conditions.

RR441 GUIDELINES FOR WEIGHT-ON-BIT AND ROTATION SPEED*

BIT SIZE mm (inches)	WOB/RPM	MTX-1	05QX3	07QX3	17QX3	20QX3	25QX3
171 to 187 (6 ¾" - 7 ⅜")	lb (1 000's)						
	tonnes						
	rpm						
200 to 229 (7 ⅞" - 9")	lb (1 000's)	9 - 20	9 - 20	9 - 30		14 - 37	14 - 39
	tonnes	4 - 9	4 - 9	4 - 14		6 - 17	6- 18
	rpm	90 - 160	90 - 180	90 - 160		80 - 150	80 - 130
251 to 270 (9 ⅞" - 10 ⅝")	lb (1 000's)		14 - 37	14 - 37	20 - 50		20 - 55
	tonnes		6 - 17	6 - 17	9 - 22		9 - 25
	rpm		80 - 160	80 - 160	80 - 150		80 - 130
311 (12 ¼")	lb (1 000's)						
	tonnes						
	rpm						
349 (13 ¾")	lb (1 000's)						
	tonnes						
	rpm						
406 (16")	lb (1 000's)						
	tonnes						
	rpm						

* Consult with your Sandvik representative for the best operating parameters for your site conditions.

X30/S30s	S35/S37s	X40/S40s	X47/S47s	X50/S50s	X60/S60s	X70
10 - 33			12 - 42	12 - 42		20 - 45
5 -15			5 - 19	5 - 19		9 - 21
75 - 120			60 - 110	60 -110		60 - 100
16 - 35		20 - 40	20 - 40	20 - 50	25 - 55	25 - 55
7 - 16		9 - 18	9 - 18	9 - 23	11 - 25	11 - 25
75 - 120		70 - 110	60 - 110	60 - 110	60 - 100	60 - 100
18 - 50		20 - 55		25 - 75	25 - 75	25 - 80
8 - 23		9 - 25		11 - 34	11 - 34	11 - 36
75 - 120		60 - 110		60 - 90	60 - 90	60 - 90
18 - 50		25 - 60	30 - 80	25 - 85		
8 - 23		11 - 27	14 - 36	11 - 39		
75 - 120		60 - 110	60 - 100	60 - 90		
25 - 75		27 - 85		40 - 95	40 - 110	
11 - 34		12 - 38		18 - 50	18 - 50	
70 - 120		60 - 110		60 - 90	60 - 90	
23 - 80		30 - 90		40 - 110	50 - 120	
10 - 36		14 - 40		18 - 50	23 - 54	
70 - 120		60 - 110		60 - 90	50 - 85	
	30 - 90	40 - 100			50 - 120	
	14 - 41	18 - 44			23 - 54	
	75 - 120	60 - 100			50 - 85	

30QX3	35QX3	37QX3	39QX3	40QX3	45QX3	50QX3	60QX3
10 - 40						18 - 47	
4 - 18						8 - 21	
75 - 120						60 - 110	
			20 - 50	20 - 50			20 - 65
			9 - 23	9 - 23			9 - 30
			60 - 120	60 - 120			60 - 100
20 - 60	25 - 70		25 - 75	30 - 85		35 - 85	40 - 95
9 - 27	11 - 31		11 - 34	14 - 38		16 - 38	18 - 43
70 - 120	70 - 120		65 - 110	65 - 100		60 - 100	60 - 90
25 - 75		27 - 85	30 - 95	30 - 100	30 - 100	40 - 110	50 - 120
11 - 34		12- 38	14 - 43	14 - 44	14 - 44	18 - 50	23 - 54
75 - 125		70 - 120	65 - 110	60 - 110	60 - 110	60 - 90	60 - 90
	25 - 85				30 - 100	40 - 110	
	11 - 38				14 - 44	18 - 50	
	70 - 120				60 - 110	60 - 90	
		40 - 120		40 - 120			
		18 - 54		18 - 54			
		70 - 110		60 - 100			

THE RIGHT DRILL STRING FOR ALL YOUR NEEDS

ENGINEERED FOR EFFICIENCY

Our rotary drill string products and services maximize productivity and minimize operating costs. Longer tool service life means less downtime for you.

HIGH PERFORMANCE FOR APPLICATION EXCELLENCE

Our high-performance drill string components withstand extreme torsional and axial loads, efficiently handling the hard rock and abrasive formations in surface mines.

We offer:

- Extensive in-house engineering expertise
- Leading technology and intellectual property developments
- State-of-the-art manufacturing with premium quality materials
- Certified quality process with rigorous product testing
- Efficient and reliable delivery times
- A thorough understanding of drilling and applications

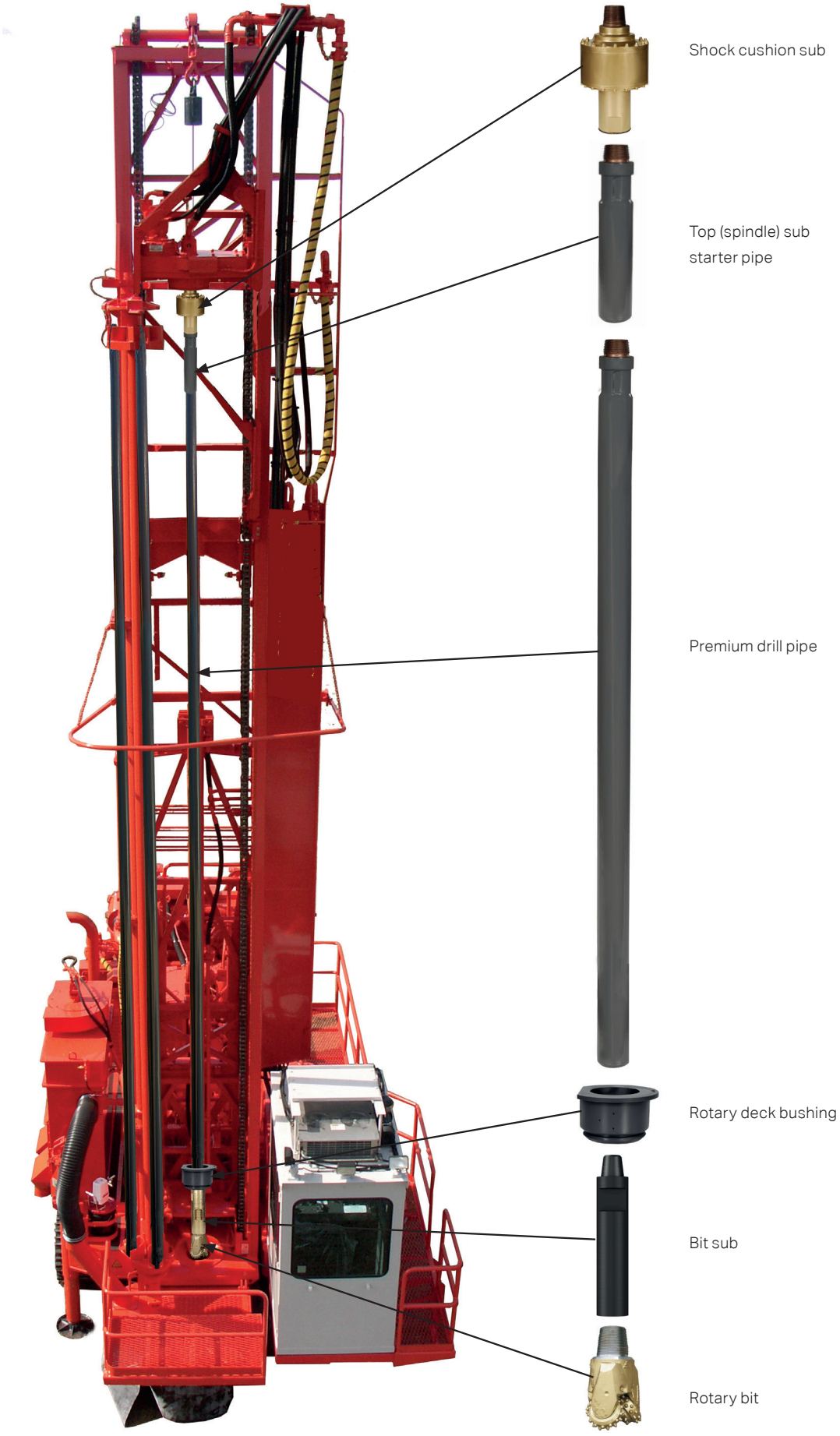
HIGH QUALITY ASSURANCE STANDARDS

Our Quality Assurance program is committed to maintaining the highest standards in our manufacturing process, delivering only superior products.

- Stringent material specifications and verification
- Welding process control and ultrasonic weld inspection
- Precise pipe straightness specifications and verification
- Thorough inspections and product testing by highly skilled product specialists
- Raw material traceability

MATERIALS AND RELIABILITY TESTING

Our engineers are industry-leading materials experts who excel in the science of maximizing product reliability at materials and reliability labs in key locations around the world.


Shock cushion sub
Top (spindle) sub
starter pipe
Premium drill pipe
Rotary deck bushing
Bit sub
Rotary bit

HIGH PERFORMANCE DRILL STRING TOOLS

SANDVIK DRILL PIPE

DESCRIPTION
The drill pipe transmits extreme torsional and axial loads to the drilling tools. Because it encounters various abrasive and hardness conditions, the drill pipe's durability and reliability are crucial to the drilling operation.

BENEFIT
- Complete product traceability
- Versatility in various pipe sizes
- Manufactured to the highest quality assurance standards
- Optimized combination of design, tube quality and hard facing materials
- Available in a variety of lengths

SEAM-LESS TUBING

DESCRIPTION
Sandvik drill pipe bodies are manufactured from an optimum combination of premium quality, heat-treated seamless tubing and hard facing material.

BENEFIT
- The best value grades for specific applications
- Available in a range of high quality material grades to optimize your applications

RP416 & RP412

DESCRIPTION
The RP416 series is designed for hard abrasive formations that cause the body of the pipe to wear out before the tool joints

Sandvik's RP412 series premium grade pipe is typically required in non-abrasive formations when the tool joints wear out before the tube.

BENEFIT
RP416
- More durable than a standard, hot rolled, seamless carbon tube
- Wear-resistant mid-body tube
- Special heat-treated and quenched alloy

RP412
- Premium wear quality
- ST52 hotrolled, seamless carbon tube

TOOL JOINTS

DESCRIPTION
Sandvik tool joints are fitted to the tube body using a proprietary process that ensures concentricity and axial alignment.

BENEFIT
- Fast make-up of drill bit to pipe
- Better seating of threads due to accuracy of axial alignment
- Premium grade or modified heat-treated material for maximum wear resistance

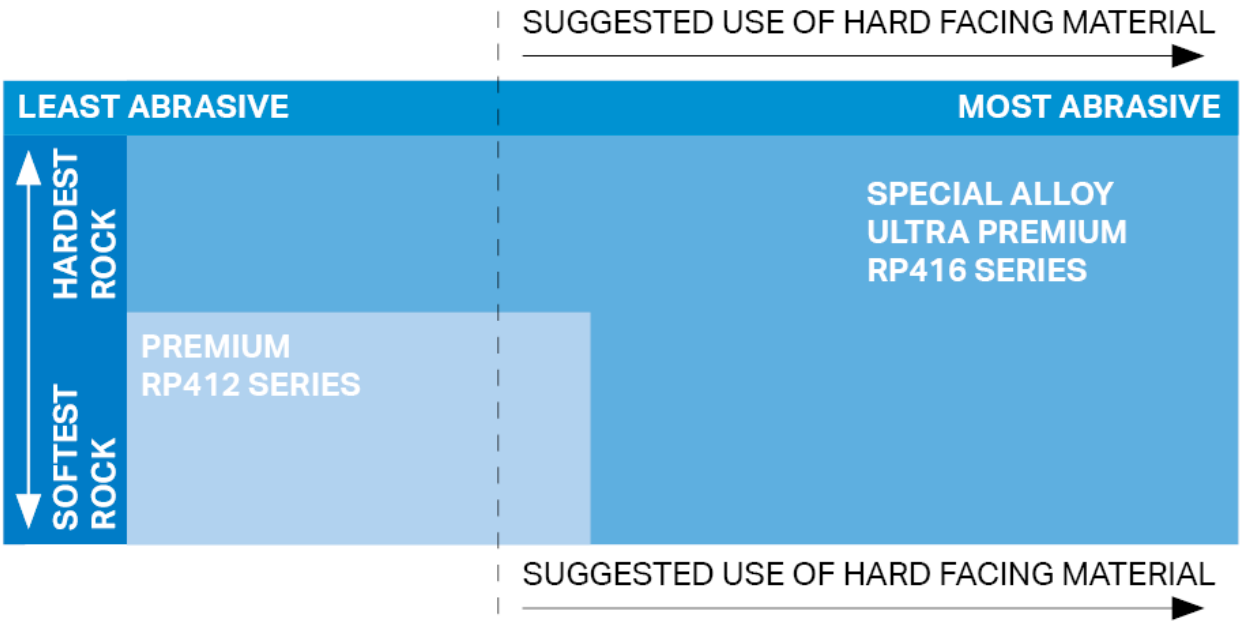
HARD MATERIAL WEAR PROTECTION (OPTION)

DESCRIPTION
Hard material wear protection can be a cost-effective option when applied either radially or axially on the tool joints as well as the lower portion of the tube.

BENEFIT
- Better wear on tool joint
- Longer component life

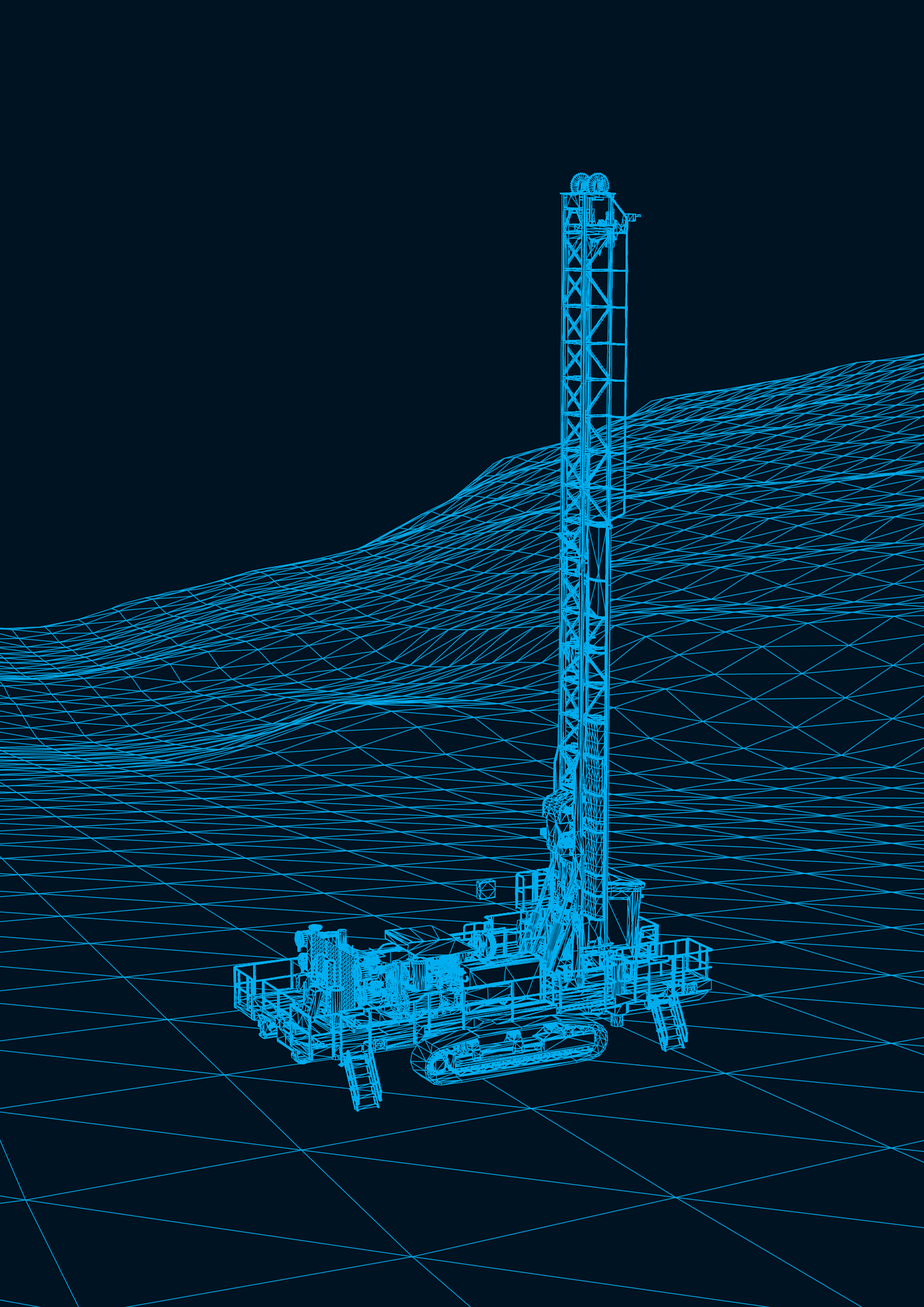
DRILL PIPE AVAILABILITY SELECTION CHART

This selection guide recommends pipe grades appropriate for various rock hardness and abrasiveness, and suggests conditions for applying optional hard facing material. Consult your Sandvik product specialist for specific recommendations for your drilling application.



SANDVIK BLASTHOLE DRILL PIPE SIZES

(O.D.) OUTER DIAMETER		WALL THICKNESS		TUBE WEIGHT		PIN BOX SET APPROX. WEIGHT		RECOMMENDED CONNECTIONS	SUGGESTED BIT SIZE RANGE
mm	in	mm	in	kg/m	lb/ft	kg	lb		
101.6	4	12.7	½	28	19	27.2	60	2 ⅜" API REG - API IF	4 ⅝" through 5 ⅛"
114	4 ½	7.33	5/16	19	13	59	130	3 ½" API REG - 2 ⅞" API IF - 3" BECO	4 ⅝" through 5 ⅛"
114	4 ½	12.7	½	31	21	59	130	3 ½" API REG - 2 ⅞" API IF - 3" BECO	5 ⅝" through 6 ¼"
114	4 ½	19.05	¾	45	30	59	130	3 ½" API REG - 2 ⅞" API IF - 3" BECO	5 ⅝" through 6 ¼"
127	5	19.05	¾	51	34	72.6	160	3 ½" BECO	5 ⅝" through 6 ¼"
139.7	5 ½	19.05	¾	57	38	81.6	180	3 ½" BECO	6 ¼" through 6 ¾"
152.4	6	19.05	¾	63	42	108.9	240	4" BECO	6 ¾" through 7 ⅞"
152.4	6	25.4	1	79	53	108.9	240	4" BECO	7 ⅜" through 7 ⅞"
158.75	6 ¼	19.05	¾	65	44	113.4	250	4" BECO	7 ⅜" through 7 ⅞"
165.1	6 ½	19.05	¾	68	46	124.7	275	4 ½" BECO	7 ⅜" through 7 ⅞"
165.1	6 ½	25.4	1	88	59	124.7	275	4 ½" BECO	7 ⅞"
177.8	7	19.05	¾	74	50	152	335	4 ½" BECO - 5 ¼" BECO	7 ⅞"
177.8	7	25.4	1	95	64	152	335	4 ½" BECO - 5 ¼" BECO	9"
193.67	7 ⅝	22.2	⅞	94	63	181.4	400	5 ¼" BECO	9"
193.67	7 ⅝	25.4	1	106	71	181.4	400	5 ¼" BECO	9" through 9 ⅞"
219	8 ⅝	25.4	1	122	82	235.9	520	6" BECO	9" through 9 ⅞"
219	8 ⅝	38.1	1 ½	170	114	235.9	520	6" BECO	9 ⅞" through 11"
235	9 ¼	25.4	1	131	88	267.6	590	6" BECO	9 ⅞" through 11"
235	9 ¼	38.1	1 ½	185	124	267.6	590	6" BECO	10 ⅝" through 11"
273	10 ¾	25.4	1	155	104	340.2	750	8" BECO	10 ⅝" through 11"
273	10 ¾	31.7	1 ¼	189	127	340.2	750	8" BECO	12 ¼" through 13 ¾"
273	10 ¾	38.1	1 ½	220	148	340.2	750	8" BECO	12 ¼" through 13 ¾"
324	12 ¾	25.4	1	189	127	585.1	1290	8" BECO	13 ¾" through 15"
340	13 ⅜	31.7	1 ¼	243	163	635	1400	10" BECO	15" through 17 ½"
340	13 ⅜	38.1	1 ½	286	192	635	1400	10" BECO	15" through 17 ½"



ROTARY SUBS AND ADAPTER

DESCRIPTION

Sandvik subs are used to connect the various components throughout the entire drill string, from the drill bit to the rotary head.

BENEFIT

- Optimum hard material wear protection on bit subs
- Hard face material in the 58 to 60 Rockwell C range
- Special alloy material
- Bit (bottom) subs, top (spindle) subs, cross-over subs, thread-saver subs available
- Changes from one thread form to another and reduce wear to component threads
- Hard facing available on all subs (option)

STABILIZERS

DESCRIPTION

Sandvik RP424 welded blade stabilizers are used to stabilize and control hole deviation. Sandvik RP424 welded blade stabilizers are used to stabilize and control hole deviation. It provides more reaming and cutting action than a bit sub. For maximum rate of penetration, partner the RP424 with Sandvik's roller cone bits.

BENEFIT

RP424

- Minimizes rough bores, spiral bores, ledges and crooked holes
- Faster bit performance reduces re-drill time
- Best for soft to medium formations in wet or dry conditions
- Integral welded blade design with no moving parts
- Specialized tungsten carbide pad design
- Specific gage tolerances optimize performance and extend bit life
- Wide selection for various hole and drill string sizes

DECK BUSHINGS

DESCRIPTION

Sandvik deck bushings run smoothly and provide extended, trouble-free operation. They centralize the drill pipe over the hole, prevent misalignment of the bit and drill string and extend the life of the bit and drill string. The RP432 static deck bushing is not suggested for use when rotary drilling.

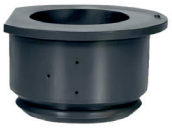
BENEFIT

RP432

- Static and non-rotating with a solid body and no moving parts
- Replaceable wear sleeves tack-welded into place
- High alloy, heat treated materials provide longer service life
- Used when the drilling application is down-the-hole (DTH)
- Available for all makes and models of drill rigs

RP434

- Triple race ball bearing design ensures longer bearing life
- Transmits less vibration through the drill string to the rotary head
- Less torque and drill pipe diameter gouging and scraping
- Smooth and quiet drill cab atmosphere
- More cost effective than static bushings



SHOCK SUBS

DESCRIPTION

The shock absorber decreases drilling cost, increases drilling efficiency and enhances performance, lowering maintenance costs and smoothing operating conditions. Its inner cushion pads deaden blows, protecting the bit and lengthening the life of the rotary head.

BENEFIT

RP500 Shock Cushion Sub

- Improves safety benefiting from fully sealed and maintenance free features
- Minimizes shock/vibration from the bottom of the hole by transferring through the drill string
- Provides rotary head and mast protection by reducing transfer of shock and vibration
- Reduces wear and damage to threaded connections
- Provides improved bottom hole contact between bit and rock drilled
- Increases drill string components and drill bit performance and life

BIT SUBS

PIN CONNECTION	OUTER DIAMETER (OD)		STANDARD LENGTH		SUB WEIGHT		WEIGHT PER UNIT	
inch	mm	inch	mm	inch	lbs	kgs	lbs/ft	kgs/m
2 ⅜ API REG	89	3 1/2	457	18	45	20	30	45
2 ⅜ API REG	102	4	457	18	60	27	40	60
2 ⅞ IF	114	4 ½	457	18	70	32	46	69
3 ½ API REG	114	4 ½	610	24	97	44	48	71
3 ½ API REG	127	5	610	24	122	55	61	91
3 ½ BECO	127	5	610	24	117	53	59	88
3 ½ BECO	140	5 ½	610	24	145	66	73	109
4 or 4 ½ BECO	159	6 ¼	610	24	176	80	88	131
4 or 4 ½ BECO	165	6 ½	610	24	194	88	97	144
4 ½ BECO	178	7	610	24	230	104	115	171
5 ¼ BECO	191	7 ½	610	24	270	123	134	199
5 ¼ BECO	194	7 ⅝	781	30 ¾	344	156	134	199
6 BECO	219	8 ⅝	781	30 ¾	434	197	170	253
6 BECO	235	9 ¼	813	32	531	241	200	298
7 BECO	245	9 ⅝	889	35	628	285	215	320
8 BECO	273	10 ¾	889	35	743	337	255	380
8 BECO	311	12 ¼	1067	42	1215	551	347	768
10 BECO	324	12 ¾	1067	42	1308	593	374	557
10 BECO	340	13 ⅜	1067	42	1462	663	418	622

STABILIZERS

HOLE SIZE		BODY DIAMETER		STANDARD LENGTH		RP424		RP427	
mm	inch	mm	inch	mm	inch	lbs	kgs	lbs	kgs
159	6 ¼	127	5	673	26 ½	144	65	130	59
172	6 ¾	140	5 ½	673	26 ½	210	95	163	74
199	7 ⅞	159 - 178	6 ¼ - 7	673	26 ½	250	113	220	100
229	9	194	7 ⅝	724	28 ½	350	159	290	132
250	9 ⅞	219	8 ⅝	781	30 ¾	470	213	400	181
270	10 ⅝	219 - 235	8 ⅝ - 9 ¼	781	30 ¾	520	236	460	209
279	11	235 - 245	9 ¼ - 9 ⅝	781	30 ¾	580	263	510	231
311	12 ¼	273	10 ¾	781	30 ¾	790	358	650	295
349	13 ¾	311	12 ¼	1041	42	1130	513	1030	467
381	15	340	13 ⅜	1041	42	1540	699	1350	612

DECK BUSHINGS

OD NOMINAL		RP432 STATIC WEIGHT		RP434 ROTARY WEIGHT		TYPICAL PIPE OD		TYPICAL BIT DATA	
mm	inch	lbs	kgs	lbs	kgs	mm	inch	mm	inch
191	7 ½	55 - 110	25 - 50	50 - 105	23 - 48	102 - 114	4 - 4 ½	121 - 165	4 ¾ - 6 ½
254	10	90 - 165	41 - 75	85 - 160	39 - 73	114 - 178	4 ½ - 7	143 - 229	5 ⅝ - 9
279	11	140 - 170	64 - 77	135 - 165	61 - 75	138 - 178	5 ½ - 7	171 - 229	6 ¾ - 9
305	12	125 - 155	57 - 70	120 - 150	54 - 68	152 - 178	6 - 7	187 - 229	7 ⅜ - 9
330	13	150 - 225	68 - 102	145 - 220	66 - 100	178 - 235	7 - 9 ¼	229 - 279	9 - 11
381	15	170 - 330	77 - 150	160 - 320	73 - 145	194 - 273	7 ⅝ - 10 ¾	229 - 311	9 - 12 ¼
406	16	195 - 360	89 - 163	185 - 350	84 - 159	219 - 273	8 ⅝ - 10 ¾	251 - 311	9 ⅞ - 12 ¼
438	17 ¼	360 - 400	163 - 181	350 - 390	159 - 177	273 - 340	10 ¾ - 13 ⅜	311 - 406	12 ¼- 16
483	19	460 - 510	209 - 231	450 - 500	204 - 227	311 - 340	12 ¼ - 13 ⅜	349 - 406	13 ¾ - 16

Approximate weight. Actual depends on inside diameter of deck opening.

PERFORMANCE TIPS

ROTARY DRILLING - BEST PRACTICE CHECKLIST

1. Always make up and break out bits carefully.
2. Only grease the bottom ⅓rd of bit or pipe threads.
3. Internal bit air pressure should be 35 - 40 PSI.
4. Always break in a new bit by drilling at a reduced weight and rotation for the first hole.
5. To collar or start a new hole, reduce down pressure and rotation speed.
6. Always switch on the bailing air before the bit starts drilling the hole and keep the air on until the bottom of the collar is reached.
7. Re-establish the bottom hole pattern with reduced down pressure and rotation when drilling is interrupted.
8. Never drill an old hole with a new bit. This can pinch the cones, damaging the bearings and prematurely destroying the bit.
9. As rock hardness increases, decrease rotary speed and increase down pressure.
10. In softer rock, use lower down pressure and higher rotary speeds.
11. Do not use more water than is necessary to control dust and maintain the hole wall condition.
12. Maintain rotation and bailing air while tripping into or out of a hole.
13. Near bit stabilization, deck centralizers, and shock subs can help bit life and drill longevity. Keep these tools in good condition to maximize performance and replace promptly when worn out.
14. Always clean, dry and lubricate a bit before an idle period and ensure the cones turn freely.
15. Before reusing a bit that has been idle, make sure all cones turn freely.
16. Bent drill steel will reduce drill bit life.
17. Record accurate drill data and note drilling issues. This information can be used to develop improved drilling tools.

THREAD GREASE

Use Sandvik thread grease on all threaded connections to extend thread life and prevent galling, corrosive conditions and difficulty breaking connections.

		WEIGHT (kg)	PART NO.
	Can	4,5	795-1960
	Can	18	795-1961
	Low temp. Can	18	795-1963
	Barrel	50	795-1967

EXAMPLE OF BIT MARKINGS

Sometimes our part numbers and serial numbers are confused which can lead to poor data capture. Below is an example of typical pin stamping with the key details identified.

1. Serial number - H029186036
2. Part number - 0038199-02
3. Type - S07
4. Size - 9″

SANDVIK