



# ***SURFACE DRILLING EQUIPMENT AND TOOLS***

[www.bddrill.com.au](http://www.bddrill.com.au) / [www.bddrill.ca](http://www.bddrill.ca)



**Black Diamond Drilling Services Australia Pty Ltd**

## ABOUT US

### Black Diamond Drilling Services Australia Pty Ltd



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### Black Diamond Drilling Tools Canada Inc.



**Sudbury Headquarters:** 1899 Lassalle Blvd, unit 6, Sudbury, On, Canada, P3A-2A3

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### Black Diamond Drilling Tools USA LLC.



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### Black Diamond Drilling Mongolia LLC.



**Ulan Bator Headquarters:** No 206, Second Floor, Arig Center Jamyan Gun Street,  
1<sup>st</sup> Khoroo, Sukhbaatar District, Ulaanbaatar, Mongolia

**Tel:** +976-99623888 **Email:** sales@bddrilling.mn

**1000**

EMPLOYEES



**300,000**

M<sup>2</sup> OF

FACTORY



### ANNUAL PRODUCTION

***DTH hammer: over 20,000 units***

***Maximum size for hammer: 609mm(24")***

***Drill bit: 250,000 pcs***

***Maximum size for drill bit: 1000mm(39-1/3")***

***30 days for production on any quantity***



Black Diamond Drilling Services Australia Pty Ltd known as "BD DRILL" is a privately owned Australian Company which services the Mineral exploration, Mining, Water well and Geotechnical sectors of the drilling industry.

BD DRILL is a subsidiary of Changsha Heijingang Industrial Ltd. Co., the head office is located in Perth, Western Australia and supports regions in Australia and the overseas market.

BD DRILL has established a reputation for outstanding commitment to product quality, innovation and most importantly customer service.

Our extensive product range covers DTH equipment (conventional, reverse circulation, bits, strings and rigs), Top hammer and a comprehensive selection of various drilling products (diamond bit, drag bit, tricone bits, drilling grease and other consumables.)

# USE OF LOCAL (AUSTRALIAN) CONTENT

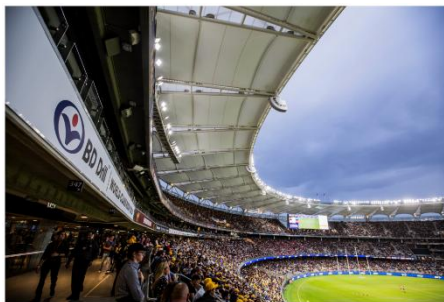
Black Diamond Drilling Australia is a Western Australian fully owned and operated company. Our manufacturing facilities are based in Australia and China with a comprehensive Quality Control system in place. The R & D for Black Diamond Australia is completed right here by our highly experienced staff of which 80% are local Australians.

We utilise the service of a Local Queensland Indigenous company to be our distributor through the East Coast of Australia. Please see attached policies for local engagement, Quality, Indigenous Engagement, Australian Participation.

**We use many local suppliers for training, logistics, I.T. etc.**

## Local Engagement

- Sponsorship and Advertising at Optus Stadium with the West Coast Eagles.
- Major Sponsor for the Annual Kalgoorlie Desert Race.
- Donations to several Cancer and Children's Charities.



## Member of

- **ADIA**      **Australian Drilling Industrial Association**



- The Australian Drilling Industry Association (ADIA) is the peak body representing the drilling industry nationally. It's membership is made up of individuals and companies committed to improving the skills, safety and overall professionalism of the drilling industry. It is the voice of its members, providing collective representation on matters that affect them and their businesses.

- **AMEC**      **Association of Mining and Exploration Companies**



- AMEC is an industrial association representing over 375 member companies from all around Australia. Their members are explorers, emerging miners, producers and a wide range of businesses and service providers working in and for the mining industry. AMEC is a leading voice of Australia's mineral exploration and mining industry.

Perth, Australia



Sudbury, Canada



Kalgoorlie, Australia



## CHINESE FACTORY

Founded on April 30, 1999, Changsha Heijiangang Industrial Co. Ltd (HJG) is a famous privately operated enterprise specialised in researching and manufacturing rock drilling equipment and pneumatic tools. The company has rich scientific research and production experience. It produces high quality rock drilling products by using high quality raw material, utilising advanced manufacturing technology and imposing strict quality inspection. The products made by HJG are being sold well all over China and exported to more than 50 countries such as America, France, Australia, Canada, Brazil, South Africa, Malaysia, South Korea and so on. It has gained high praise and a good reputation all over the world.

Changsha Heijiangang Industrial is located in Lei Feng, Wangcheng, Hunan, with a land area of 155,000 m<sup>2</sup> and workshop space of 95,000m<sup>2</sup>. Currently we have more than 900 employees and we are equipped with a wide range of advanced equipment required for manufacturing rock drilling machines and pneumatic tools. We have designed and manufactured the following products: the most advanced high air pressure DTH hammer in China, various kinds of threaded drill bits, reverse circulation hammers and bits, shank adapters and coupling sleeves, new style wells geothermal drilling rig, open air blasthole drilling rig, all kinds of tool joints and drill pipes as well as spare parts for drill rigs.

[www.bddrill.com.au](http://www.bddrill.com.au)





# AUSTRALIAN MADE PRODUCTS

The Australian Made certification is a distinctive and highly regarded symbol that signifies a product's origin in Australia. This certification assures consumers that the marked item has undergone stringent checks to ensure it meets the country's high-quality and safety standards. This iconic green and gold kangaroo logo not only serves as a point of pride for Australian manufacturers but also assists consumers in making informed choices, supporting the local economy, and fostering a sense of trust in the products they purchase.



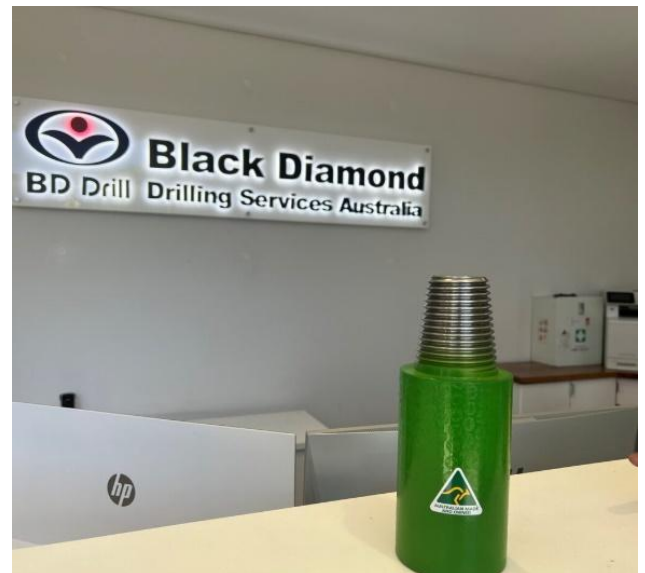
Black Diamond is licensed by Australian Made Campaign Limited to use the Australian made logo. Currently we have 10% of our SKU produced or purchased Locally, we are aiming to raise this figure to 30% in 5 years.

## Some of our products include:

### Australian Made Rig Baskets



### Australian Made Adaptor Subs



### Australian Made Lifting Bails



### Australian Made Check Valves



# RECOMMENDED SAFETY PROCEDURES

The mining industry continues to demand even higher levels of safety and productivity. In order to meet these requirements, we work continuously to develop even safer products and to produce comprehensive manuals enabling safer and effective use of our products.



## IT'S ALL ABOUT EVERYONE'S HEALTH

Helping you to ensure a safer workplace and healthier workforce is of the utmost importance to us. The well-being of any person coming into contact with our equipment is paramount. Therefore, we strive to identify and assess potential risk factors that could threaten the health of you and your employees. All the products in our catalogue are designed to meet safety requirements.

## DRESS RIGHT FROM HEAD TO TOE

You must always wear appropriate personal protective equipment (PPE). This is what we strongly recommend, to help avoid injury:

- Safety helmet
- Hearing protection
- Safety glasses
- Protective high visibility clothing
- Respiratory protection
- Safety boots
- Any site-specific PPE as required.

## BE AWARE OF ALL SAFETY PROCEDURES

We ask that you start by obeying all instructions given. Never work under an unsupported roof or close to potential pinch point locations. Beware of the potential hazards of a loose roof and ribs and scale down roof ribs prior to bolting. It is important to bolt early in the mining process – as soon as safely and practically possible.

Safe work procedures should incorporate inspection before the machine operates and also through regular monitoring based upon mining conditions, safety and management systems. Workers should be provided with safety information, instruction and training on transportation, installation, operational care and disposal of drilling tools.

## MAKE A RISK ANALYSIS BEFORE YOU START

Pay attention to safety when planning all of your work. Before you start, always take your time to go through all operations. Identify any potential risks and take appropriate measures to avoid them. If necessary, seek expert advice on how to help minimize risks. Finally, make sure that you have the right resources to perform all tasks in the safest manner possible.

Please check [www.safeworkaustralia.gov.au](http://www.safeworkaustralia.gov.au) or [www.canada.ca/en/services/jobs/workplace/health-safety.html](http://www.canada.ca/en/services/jobs/workplace/health-safety.html) for more information.

# CATALOGUE GUIDE

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## DTH Hammers & Bits

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## Selecting the Right Hammer

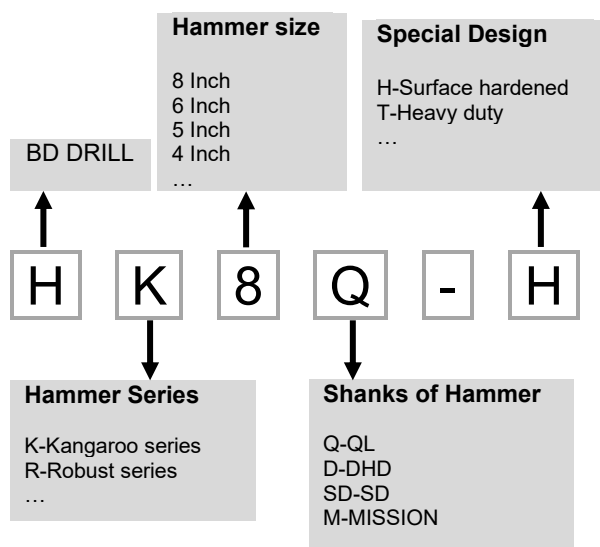
The optimum range of hole size for blast hole drilling with DTH is 90mm to 254mm (3 1/2"-10"). Smaller blast holes are generally drilled using tophammer, and larger holes generally use rotary machines. In other applications, like foundation drilling, DTH hammers can be used with single bit in hole sizes up to 914mm (36"). With multiple hammer units, CD (Cluster Drills) drill holes up to 1778mm (70") as standard. Larger cluster drills can be delivered as per customer request. As a rule of thumb, the smallest hole diameter a DTH hammer can drill is its nominal size. A 4-inch hammer will drill a 4-inch hole. The limiting factor is the outside diameter of the hammer, because, as hole diameter reduces, airflow is restricted. Maximum hole size for production drilling is the nominal hammer size plus 1 inch, so for a 4 inch hammer the maximum hole size is 5 inch (127-130mm). Choosing the right hammer is largely determined by hole size and type of rock formation. Ideally, the size of the hammer should match the required hole dimension as closely as possible, leaving just enough space for cuttings to evacuate the hole.

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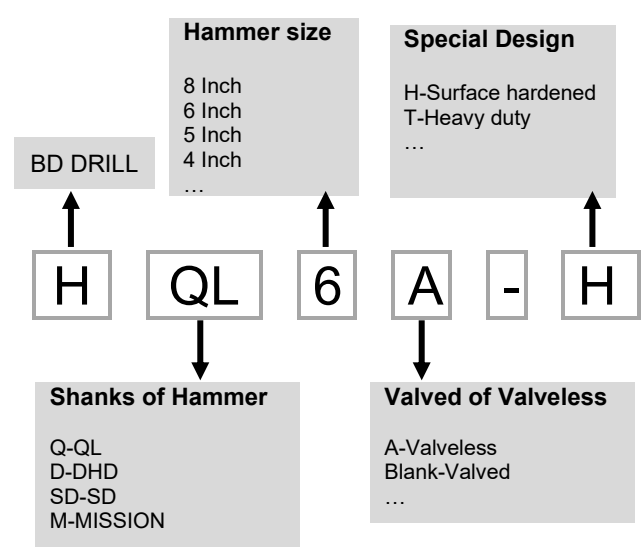
## Product codes

Product codes are a valuable tool to describe and identify the product. In the code structure we have tried to describe the product features with Alpha-numerical system that is not always 100% logical, but with the attached key you will be able to find the product you are looking for or a suitable alternative product.

### Example A: HK8Q-H



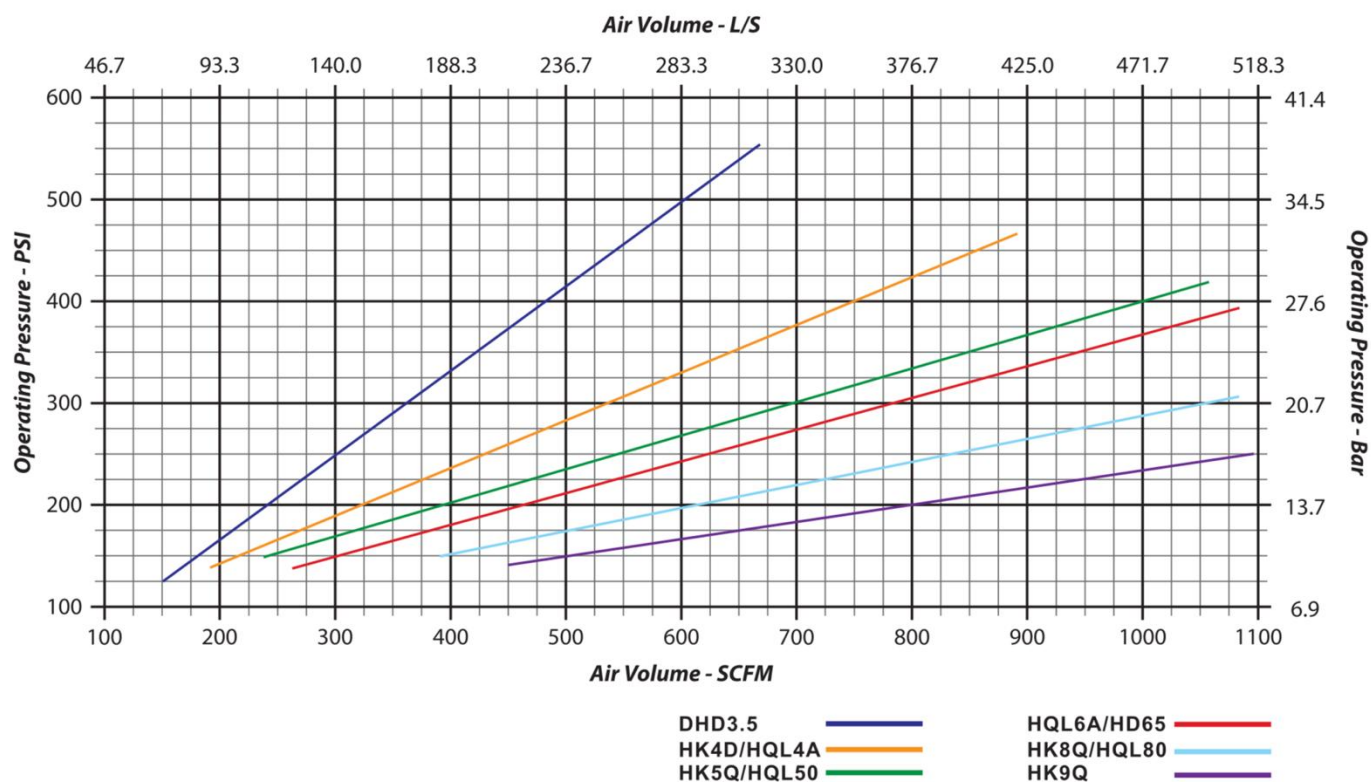
### Example B: HQL6A-H



## SPECIFICATIONS

| Hammer                                                                                   | BR2A                      | DHD3.5                      | HK4D                       | HD45                        | HQL4A                       | HQL50                       | HK5Q                        | HD55                        | HQL60                       | HQL6A                       | HK8Q                        | HD85                        | HK9Q                        |
|------------------------------------------------------------------------------------------|---------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Recommended bit size, mm                                                                 | 76                        | 92-105                      | 112-127                    |                             |                             | 140-152                     |                             |                             | 165-178                     |                             | 203-229                     |                             | 216-229                     |
| Bit Shank                                                                                | BR2A                      | DHD3.5                      | DHD340A                    |                             | QL40                        | QL50                        |                             | DHD350                      | QL60                        |                             | QL80                        | DHD380                      | QL80                        |
| External diameter, mm                                                                    | 63                        | 82                          | 100                        | 100                         | 101                         | 126.5                       | 127.5                       | 126.5                       | 148                         | 146                         | 185                         | 185                         | 203                         |
| Length excl. thread, mm (Less bit)                                                       | 837                       | 855                         | 915                        | 1032.5                      | 1057                        | 1147                        | 935                         | 1167                        | 1121                        | 1182                        | 1340                        | 1487                        | 1345                        |
| Hammer weight, kg (Less bit)                                                             | 14.1                      | 25                          | 37.5                       | 40.6                        | 41                          | 71.6                        | 67.6                        | 77.2                        | 105                         | 105                         | 180                         | 206                         | 228                         |
| Package case size                                                                        | (L)910<br>(W)90<br>(H)120 | (L)1020<br>(W)110<br>(H)140 | (L)1010<br>(W)30<br>(H)160 | (L)1080<br>(W)125<br>(H)134 | (L)1150<br>(W)130<br>(H)160 | (L)1230<br>(W)155<br>(H)180 | (L)1100<br>(W)155<br>(H)180 | (L)1290<br>(W)150<br>(H)175 | (L)1270<br>(W)170<br>(H)200 | (L)1260<br>(W)180<br>(H)200 | (L)1440<br>(W)230<br>(H)270 | (L)1560<br>(W)230<br>(H)270 | (L)1500<br>(W)240<br>(H)280 |
| Top Sub thread                                                                           | RD50                      | 2-3/8" API Reg              |                            |                             |                             |                             |                             |                             | 3-1/2" API REG              |                             | 4-1/2" API REG              |                             |                             |
| Working Pressure, PSI                                                                    | 80-170                    | 150-250                     | 200-300                    |                             |                             | 250-350                     |                             |                             | 300-350                     |                             | 300-380                     |                             |                             |
| Air consumption                                                                          | 250-350                   | 300-400                     | 500-700                    |                             |                             | 500-800                     |                             |                             | 600-900                     |                             | 950-1200                    |                             |                             |
| Piston diameter, mm                                                                      | 42.7                      | 65                          | 82                         | 80                          | 80                          | 104                         | 102                         | 100                         | 122                         | 121                         | 150                         | 150                         | 165                         |
| Piston weight, kg                                                                        | 1.7                       | 5.1                         | 9.2                        | 9                           | 9                           | 17                          | 17                          | 16                          | 24                          | 24                          | 38                          | 42                          | 50                          |
| Wrench flat, mm                                                                          | L47<br>W50                | L57<br>W35                  | L74.5<br>W45               | L64<br>W40                  | No wrench<br>Flat           | L89<br>W60                  | L88<br>W50                  | L89<br>W60                  | L101<br>W65                 | L101<br>W60                 | L128<br>W70                 | L140<br>W70                 | L128<br>W70                 |
| Feed force, kN                                                                           | 2~6                       | 3~8                         | 5~15                       |                             |                             | 6~25                        |                             |                             | 7~20                        |                             | 10~25                       |                             |                             |
| Rotation speed, r/m                                                                      | 30-70                     | 30-90                       | 25-80                      |                             |                             | 20-70                       |                             |                             | 25-60                       |                             | 20-60                       |                             |                             |
| Drilling conditions and project specifications may require larger air package to be used |                           |                             |                            |                             |                             |                             |                             |                             |                             |                             |                             |                             |                             |

## AIR CONSUMPTION/OPERATING PRESSURE



## BR2A DTH HAMMER

| BR2A Hammers | Item Description | Weight Kg | Part Number |
|--------------|------------------|-----------|-------------|
|--------------|------------------|-----------|-------------|



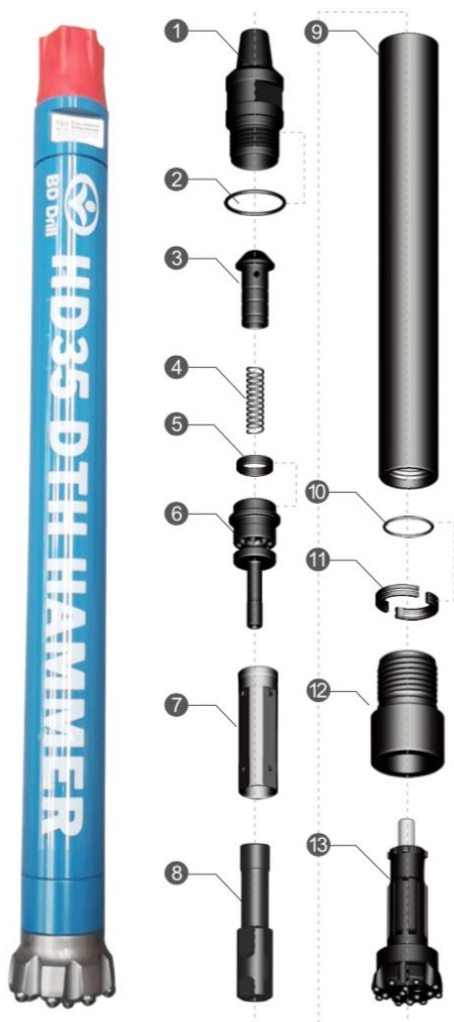
|    |                    |       |               |
|----|--------------------|-------|---------------|
| 1  | Top Sub            | 2.95  | BR2A-TSUB     |
| 2  | Check Valve        | 0.10  | BR2A-CVALVE   |
| 3  | Spring             | 0.05  | BR2A-SPRING   |
| 4  | Air Distributor    | 0.40  | BR2A-DIST     |
| 5  | Internal Cylinder  | 0.85  | BR2A-ICYL     |
| 6  | Piston             | 2.70  | BR2A-PISTON   |
| 7  | External Cylinder  | 5.35  | BR2A-ECYL     |
| 8  | Guided Sleeve      | 0.55  | BR2A-BUSH     |
| 9  | "O" Ring Stop Ring | 0.005 | BR2A-SR-SRING |
| 10 | Stop Ring          | 0.10  | BR2A-SRING    |
| 11 | Drive Chuck        | 1.05  | BR2A-DCHUCK   |
| 12 | Drill Bit          |       | BR2A-76FF-TV  |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range      | Connection Thread |
|------------------|--------------------------|----------------------------|-----------|-----------------|-------------------|
| 880mm            | 14.1kg                   | Φ62mm                      | BR2       | Φ76- Φ90        | RD 50<br>BOX      |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |           | Air Consumption |                   |
|                  |                          |                            |           | 80-170(PSI)     |                   |
| 910x90x120mm     | 25Hz                     | 25-40r/min                 |           | 250-350(CFM)    |                   |

## HD35 (DHD3.5) DTH HAMMER

| HD35 (DHD3.5) Hammers | Item Description | Weight Kg | Part Number |
|-----------------------|------------------|-----------|-------------|
|-----------------------|------------------|-----------|-------------|



|    |                       |      |              |
|----|-----------------------|------|--------------|
| 1  | Top Sub               | 4.20 | HD35-TSUB    |
| 2  | "O" Ring of Top Sub   | 0.01 | HD35-SR-TSUB |
| 3  | Check Valve           | 0.20 | HD35-CVALVE  |
| 4  | Spring                | 0.02 | HD35-SPRING  |
| 5  | Compression Buffer    | 0.02 | HD35-CBUFFER |
| 6  | Air Distributor       | 1.40 | HD35-DIST    |
| 7  | Internal Cylinder     | 1.50 | HD35-ICYL    |
| 8  | Piston                | 5.60 | HD35-PISTON  |
| 9  | External Cylinder     | 9.90 | HD35-ECYL    |
| 10 | "O" Ring of Stop Ring | 0.01 | HD35-SR-RING |
| 11 | Stop Ring             | 0.15 | HD35-SRING   |
| 12 | Drive Chuck           | 1.90 | HD35-DCHUCK  |
| 13 | Drill Bit             |      | HD35-90FF-TV |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank      | Hole Range                   | Connection Thread            |
|------------------|--------------------------|----------------------------|----------------|------------------------------|------------------------------|
| 930mm            | 24.4Kg                   | Φ82mm                      | DHD3.5<br>HD35 | Φ92- Φ105                    | API 2 3/8" REG<br>CUBEX # 21 |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |                | Air Consumption              |                              |
| 1020x110x140mm   | 28Hz                     | 25-40r/min                 |                | 150-250(PSI)<br>300-400(CFM) |                              |

## HK4-D DTH HAMMER

| HK4-D Hammers | Item Description | Weight Kg | Part Number |
|---------------|------------------|-----------|-------------|
|---------------|------------------|-----------|-------------|

|    |                       |      |                 |
|----|-----------------------|------|-----------------|
| 1  | Top Sub               | 6.50 | HK4D-TSUB       |
| 2  | "O" Ring of Top Sub   | 0.01 | HK4D-SR-TSUB    |
| 3  | Check Valve           | 0.35 | HK4D-CVALVE     |
| 4  | Spring                | 0.05 | HK4D-SPRING     |
| 5  | Compression Buffer    | 0.15 | HK4D-CBUFFER    |
| 6  | Air Distributor       | 2.10 | HK4D-DIST       |
| 7  | Internal Cylinder     | 2.25 | HK4D-ICYL       |
| 8  | Piston                | 8.50 | HK4D-PISTON     |
| 9  | External Cylinder     | 15.2 | HK4D-ECYL       |
| 10 | Retainer Ring         | 0.02 | HD4D-RRING      |
| 11 | Guided Sleeve         | 1.30 | HK4D-BUSH       |
| 12 | Bush Retaining Ring   | 0.02 | HK4D-BUSH-RRING |
| 13 | "O" Ring of Stop Ring | 0.01 | HK4D-SK-SRING   |
| 14 | Stop Ring             | 0.30 | HK4D-SRING      |
| 15 | Drive Chuck           | 3.40 | HK4D-DCHUCK     |
| 16 | Drill Bit             |      | HK4D-110FF-TV   |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank        | Hole Range      | Connection Thread            |
|------------------|--------------------------|----------------------------|------------------|-----------------|------------------------------|
| 922mm            | 38.0Kg                   | Φ100mm                     | DHD340A<br>Cop44 | Φ112- Φ127      | API 2 3/8" REG<br>CUBEX # 24 |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |                  | Air Consumption |                              |
| 1010x130x160mm   | 25Hz                     | 30-70r/min                 |                  | 200-300(PSI)    |                              |
|                  |                          |                            |                  | 500-700(CFM)    |                              |

## HD45 DTH HAMMER

| HD45 Hammers | Item Description | Weight Kg | Part Number |
|--------------|------------------|-----------|-------------|
|--------------|------------------|-----------|-------------|



|    |                       |      |               |
|----|-----------------------|------|---------------|
| 1  | Top Sub               | 6.50 | HD45-TSUB     |
| 2  | "O" Ring of Top Sub   | 0.01 | HD45-SR-TSUB  |
| 3  | Check Valve           | 0.42 | HD45-CVALVE   |
| 4  | Spring                | 0.04 | HD45-SPRING   |
| 5  | Compression Buffer    | 0.04 | HD45-CBUFFER  |
| 6  | Air Distributor       | 2.20 | HD45-DIST     |
| 7  | Internal Cylinder     | 2.30 | HD45-ICYL     |
| 8  | Piston                | 9.00 | HD45-PISTON   |
| 9  | External Cylinder     | 15.8 | HD45-ECYL     |
| 10 | "O" Ring of Stop Ring | 0.01 | HD45-SK-SRING |
| 11 | Stop Ring             | 0.20 | HD45-SRING    |
| 12 | Drive Chuck           | 3.50 | HD45-DCHUCK   |
| 13 | Drill Bit             |      | HD45-115FF-TV |

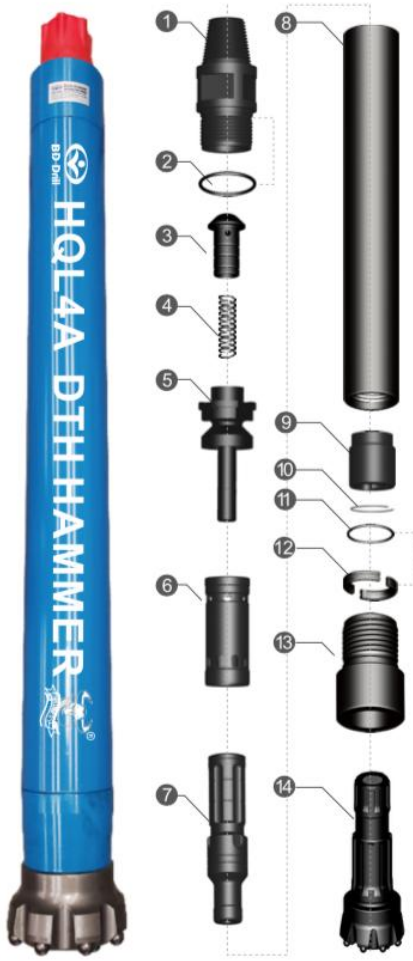
## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank               | Hole Range                   | Connection Thread            |
|------------------|--------------------------|----------------------------|-------------------------|------------------------------|------------------------------|
| 1030mm           | 40.0                     | Φ99mm                      | Cop44<br>DHD340<br>HD45 | Φ112- Φ127                   | API 2 3/8" REG<br>CUBEX # 24 |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |                         | Air Consumption              |                              |
| 1150x130x160mm   | 27Hz                     | 25-40r/min                 |                         | 200-300(PSI)<br>500-700(CFM) |                              |

## HQL40A DTH HAMMER

| HQL40A Hammers | Item Description | Weight Kg | Part Number |
|----------------|------------------|-----------|-------------|
|----------------|------------------|-----------|-------------|



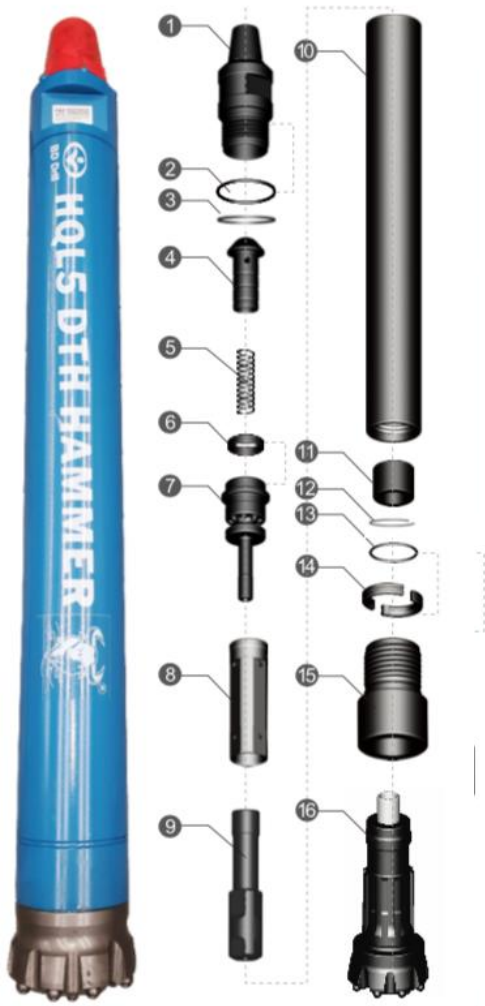
|    |                       |       |                   |
|----|-----------------------|-------|-------------------|
| 1  | Top Sub               | 6.50  | HQL40A-TSUB       |
| 2  | "O" Ring of Top Sub   | 0.01  | HQL40A-SR-TSUB    |
| 3  | Check Valve           | 0.35  | HQL40A-CVALVE     |
| 4  | Spring                | 0.05  | HQL40A-SPRING     |
| 5  | Air Distributor       | 1.50  | HQL40A-DIST       |
| 6  | Internal Cylinder     | 2.10  | HQL40A-ICYL       |
| 7  | Piston                | 8.50  | HQL40A-PISTON     |
| 8  | External Cylinder     | 15.20 | HQL40A-ECYL       |
| 9  | Guided Sleeve         | 1.80  | HQL40A-GSLEEVE    |
| 10 | Bush Retaining Ring   | 0.02  | HQL40A-RRING-BUSH |
| 11 | "O" Ring of Stop Ring | 0.005 | HQL40A-SK-SRING   |
| 12 | Stop Ring             | 0.20  | HQL40A-SRING      |
| 13 | Drive Chuck           | 3.20  | HQL40A-DCHUCK     |
| 14 | Drill Bit             |       | HQL40A-115FF-TV   |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank     | Hole Range      | Connection Thread            |
|------------------|--------------------------|----------------------------|---------------|-----------------|------------------------------|
| 1070mm           | 40.0Kg                   | Φ99mm                      | QL40<br>HQL40 | Φ112- Φ127      | API 2 3/8" REG<br>CUBEX # 24 |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |               | Air Consumption |                              |
|                  |                          |                            |               | 200-300(PSI)    |                              |
| 1230x155x180mm   | 30Hz                     | 25-40r/min                 |               | 500-700(CFM)    |                              |

## HQL50 DTH HAMMER

| HQL50 Hammers | Item Description | Weight Kg | Part Number |
|---------------|------------------|-----------|-------------|
|---------------|------------------|-----------|-------------|



|    |                          |       |                  |
|----|--------------------------|-------|------------------|
| 1  | Top Sub                  | 15.0  | HQL50-TSUB       |
| 2  | "O" Ring of Top Sub      | 0.015 | HQL50-SR-TSUB    |
| 3  | Breakout Ring of Top Sub | 0.15  | HQL50-BR-TSUB    |
| 4  | Check Valve              | 1.00  | HQL50-CVALVE     |
| 5  | Spring                   | 0.10  | HQL50-SPRING     |
| 6  | Compression Buffer       | 0.10  | HQL50-CBUFFER    |
| 7  | Air Distributor          | 3.50  | HQL50-DIST       |
| 8  | Internal Cylinder        | 4.20  | HQL50-ICYL       |
| 9  | Piston                   | 16.8  | HQL50-PISTON     |
| 10 | External Cylinder        | 24.6  | HQL50-ECYL       |
| 11 | Guided Sleeve            | 0.90  | HQL50-BUSH       |
| 12 | Bush Retaining Ring      | 0.02  | HQL50-RRING-BUSH |
| 13 | "O" Ring of Stop Ring    | 0.01  | HQL50-SK-SRING   |
| 14 | Stop Ring                | 0.40  | HQL50-SRING      |
| 15 | Drive Chuck              | 4.60  | HQL50-DCHUCK     |
| 16 | Drill Bit                |       | HQL50-135FF-TV   |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank                | Hole Range      | Connection Thread          |
|------------------|--------------------------|----------------------------|--------------------------|-----------------|----------------------------|
| 1156mm           | 73.0Kg                   | Φ125mm                     | Cop54-G<br>QL50<br>HQL50 | Φ140- Φ152      | API 3 ½" REG<br>CUBEX # 28 |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |                          | Air Consumption |                            |
| 1230x155x180mm   | 25Hz                     | 20-35r/min                 |                          | 250-350(PSI)    |                            |
|                  |                          |                            |                          | 500-800(CFM)    |                            |

## HK5-Q DTH HAMMER

| HK5-Q Hammers | Item Description | Weight Kg | Part Number |
|---------------|------------------|-----------|-------------|
|---------------|------------------|-----------|-------------|



|    |                       |      |                  |
|----|-----------------------|------|------------------|
| 1  | Top Sub               | 13.7 | HK5Q-TSUB        |
| 2  | "O" Ring of Top Sub   | 0.01 | HK5Q-SR-TSUB     |
| 3  | Check Valve           | 0.60 | HK5Q-CVALVE      |
| 4  | Spring                | 0.10 | HK5Q-SPRING      |
| 5  | Compression Buffer    | 0.20 | HK5Q-CBUFFER     |
| 6  | Air Distributor       | 2.00 | HK5Q-DIST        |
| 7  | Internal Cylinder     | 2.70 | HK5Q-ICYL        |
| 8  | Piston                | 13.0 | HK5Q-PISTON      |
| 9  | External Cylinder     | 22.5 | HK5Q-ECYL        |
| 10 | Guided Sleeve         | 3.00 | HK5Q-BUSH        |
| 11 | Bush Retaining Ring   | 0.10 | HK5Q-RRING-BUSH  |
| 12 | "O" Ring of Stop Ring | 0.01 | HK5Q-SK-SRING    |
| 13 | Stop Ring             | 0.65 | HK5Q-SRING       |
| 14 | Make Up Ring Steel    | 0.02 | HK5Q-MURS-DCHUCK |
| 15 | Drive Chuck           | 4.50 | HK5Q-DCHUCK      |
| 16 | Drill Bit             |      | HK5Q-135FF-TV    |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range      | Connection Thread           |
|------------------|--------------------------|----------------------------|-----------|-----------------|-----------------------------|
| 935mm            | 65.0Kg                   | Φ126mm                     | QL50      | Φ140- Φ152      | API 3 ½ " REG<br>CUBEX # 28 |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |           | Air Consumption |                             |
|                  |                          |                            |           | 250-350(PSI)    |                             |
| 1100x155x180mm   | 25Hz                     | 30-70r/min                 |           | 500-800(CFM)    |                             |

## HD55 DTH HAMMER

| HD55 Hammers | Item Description | Weight Kg | Part Number |
|--------------|------------------|-----------|-------------|
|--------------|------------------|-----------|-------------|

|    |                         |       |               |
|----|-------------------------|-------|---------------|
| 1  | Top Sub                 | 15.0  | HD55-TSUB     |
| 2  | "O" Ring of Top Sub     | 0.01  | HD55-SR-TSUB  |
| 3  | Check Valve             | 1.00  | HD55-CVALVE   |
| 4  | Spring                  | 0.04  | HD55-SPRING   |
| 5  | Ring                    | 0.10  | HD55-RING     |
| 6  | Compression Buffer      | 0.06  | HD55-CBUFFER  |
| 7  | Compression Buffer Seat | 0.40  | HD55-SBS      |
| 8  | Air Distributor         | 4.00  | HD55-DIST     |
| 9  | Internal Cylinder       | 4.70  | HD55-ICYL     |
| 10 | Piston                  | 15.50 | HD55-PISTON   |
| 11 | External Cylinder       | 30.00 | HD55-ECYL     |
| 12 | "O" Ring of Stop Ring   | 0.01  | HD55-SR-SRING |
| 13 | Stop Ring               | 0.30  | HD55-SRING    |
| 14 | Drive Chuck             | 6.40  | HD55-DCHUCK   |
| 15 | Drill Bit               |       | HD55-140FF-TV |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank                | Hole Range      | Connection Thread          |
|------------------|--------------------------|----------------------------|--------------------------|-----------------|----------------------------|
| 1214mm           | 77.5Kg                   | Φ125mm                     | Cop54<br>DHD350R<br>HD55 | Φ140- Φ152      | API 3 ½" REG<br>CUBEX # 28 |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |                          | Air Consumption |                            |
|                  |                          |                            |                          | 250-350(PSI)    |                            |
| 1290x150x175mm   | 25Hz                     | 20-35r/min                 |                          | 500-800(CFM)    |                            |

## HQL60 DTH HAMMER

| HQL60 Hammers | Item Description | Weight Kg | Part Number |
|---------------|------------------|-----------|-------------|
|---------------|------------------|-----------|-------------|

|    |                       |       |                  |
|----|-----------------------|-------|------------------|
| 1  | Top Sub               | 20.00 | HQL60-TSUB       |
| 2  | "O" Ring of Top Sub   | 0.02  | HQL60-SR-TSUB    |
| 3  | Check Valve           | 1.00  | HQL60-CVALVE     |
| 4  | Spring                | 0.10  | HQL60-SPRING     |
| 5  | Compression Buffer    | 0.10  | HQL60-CBUFFER    |
| 6  | Air Distributor       | 6.00  | HQL60-DIST       |
| 7  | Internal Cylinder     | 5.00  | HQL60-ICYL       |
| 8  | Piston                | 23.50 | HQL60-PISTON     |
| 9  | External Cylinder     | 31.00 | HQL60-ECYL       |
| 10 | Guided Sleeve         | 1.00  | HQL60-BUSH       |
| 11 | Bush Retaining Ring   | 0.02  | HQL60-RRING-BUSH |
| 12 | "O" Ring of Stop Ring | 0.02  | HQL60-SR-RING    |
| 13 | Stop Ring             | 0.60  | HQL60-SRING      |
| 14 | Drive Chuck           | 5.40  | HQL60-DCHUCK     |
| 15 | Drill Bit             |       | HQL60-165CC-TV   |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank                  | Hole Range      | Connection Thread          |
|------------------|--------------------------|----------------------------|----------------------------|-----------------|----------------------------|
| 1212mm           | 95.0Kg                   | Φ148mm                     | Cop64-G<br>QL 60<br>HQL 60 | Φ165- Φ178      | API 3 ½ "REG<br>CUBEX # 28 |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |                            | Air Consumption |                            |
|                  |                          |                            |                            | 300-350(PSI)    |                            |
| 1270x170x200mm   | 23Hz                     | 20-30r/min                 |                            | 600-900(CFM)    |                            |

## HQL60A DTH HAMMER

| HQL60A Hammers | Item Description | Weight Kg | Part Number |
|----------------|------------------|-----------|-------------|
|----------------|------------------|-----------|-------------|

|    |                       |       |                   |
|----|-----------------------|-------|-------------------|
| 1  | Top Sub               | 20.00 | HQL60A-TSUB       |
| 2  | "O" Ring of Top Sub   | 0.015 | HQL60A-SR-TSUB    |
| 3  | Check Valve           | 0.70  | HQL60A-CVALVE     |
| 4  | Spring                | 0.10  | HQL60A-SPRING     |
| 5  | Air Distributor       | 3.50  | HQL60A-DIST       |
| 6  | Internal Cylinder     | 4.20  | HQL60A-ICYL       |
| 7  | Piston                | 23.00 | HQL60A-PISTON     |
| 8  | External Cylinder     | 30.00 | HQL60A-ECYL       |
| 9  | Guided Sleeve         | 4.00  | HQL60A-BUSH       |
| 10 | Bush Retaining Ring   | 0.02  | HQL60A-RRING-BUSH |
| 11 | "O" Ring of Stop Ring | 0.01  | HQL60A-SR-RING    |
| 12 | Stop Ring             | 0.60  | HQL60A-SRING      |
| 13 | Drive Chuck           | 5.50  | HQL60A-DCHUCK     |
| 14 | Drill Bit             |       | HQL60A-165CC-TV   |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank      | Hole Range      | Connection Thread          |
|------------------|--------------------------|----------------------------|----------------|-----------------|----------------------------|
| 1183mm           | 92.0Kg                   | Φ148mm                     | QL60<br>HQL60A | Φ165- Φ178      | API 3 ½" REG<br>CUBEX # 28 |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |                | Air Consumption |                            |
| 1260x180x200mm   | 25Hz                     | 20-30r/min                 |                | 300-350(PSI)    |                            |
|                  |                          |                            |                | 600-900(CFM)    |                            |

## HQL80 DTH HAMMER

| HQL80 Hammers | Item Description | Weight Kg | Part Number |
|---------------|------------------|-----------|-------------|
|---------------|------------------|-----------|-------------|

|    |                       |      |                  |
|----|-----------------------|------|------------------|
| 1  | Top Sub               | 44.6 | HQL80-TSUB       |
| 2  | "O" Ring of Top Sub   | 0.01 | HQL80-SK-TSUB    |
| 3  | Shim of Top Sub       | 0.30 | HQL80-BOR-TSUB   |
| 4  | Check Valve           | 1.30 | HQL80-CVALVE     |
| 5  | Spring                | 0.20 | HQL80-SPRING     |
| 6  | Compression Buffer    | 0.46 | HQL80-CBUFFER    |
| 7  | Air Distributor       | 13.2 | HQL80-DIST       |
| 8  | Internal Cylinder     | 8.40 | HQL80-ICYL       |
| 9  | Piston                | 41.5 | HQL80-PISTON     |
| 10 | External Cylinder     | 74.1 | HQL80-ECYL       |
| 11 | Guided Sleeve         | 3.70 | HQL80-BUSH       |
| 12 | Bush Retaining Ring   | 0.03 | HQL80-RRING-BUSH |
| 13 | "O" Ring of Stop Ring | 0.01 | HQL80-SK-SRING   |
| 14 | Stop Ring             | 1.20 | HQL80-SRING      |
| 15 | Shim of Drive Chuck   | 0.35 | HQL80-BOR-DCHUCK |
| 16 | Drive Chuck           | 13.6 | HQL80-DCHUCK     |
| 17 | Drill Bit             |      | HQL80-203CC-TV   |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank            | Hole Range      | Connection Thread             |
|------------------|--------------------------|----------------------------|----------------------|-----------------|-------------------------------|
| 1471mm           | 203Kg                    | Φ185mm                     | QL80<br>TD80<br>TD85 | Φ195- Φ254      | BECO 4 ½" REG<br>API 4 ½" REG |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |                      | Air Consumption |                               |
| 1440x230x270mm   | 25Hz                     | 30-70r/min                 |                      | 300-380(PSI)    |                               |
|                  |                          |                            |                      | 950-1200(CFM)   |                               |

## HD85 DTH HAMMER

| HD85 Hammers | Item Description | Weight Kg | Part Number |
|--------------|------------------|-----------|-------------|
|--------------|------------------|-----------|-------------|

|    |                          |      |               |
|----|--------------------------|------|---------------|
| 1  | Top Sub                  | 41.0 | HD85-TSUB     |
| 2  | "O" Ring of Top Sub      | 0.02 | HD85-SR-TSUB  |
| 3  | Breakout Ring of Top Sub | 0.20 | HD85-BR-TSUB  |
| 4  | Check Valve              | 1.50 | HD85-CVALVE   |
| 5  | Spring                   | 0.10 | HD85-SPRING   |
| 6  | Compression Buffer       | 0.42 | HD85-CBUFFER  |
| 7  | Air Distributor          | 0.13 | HD85-DIST     |
| 8  | Internal Cylinder        | 8.60 | HD85-ICYL     |
| 9  | Piston                   | 41.0 | HD85-PISTON   |
| 10 | External Cylinder        | 75.2 | HD85-ECYL     |
| 11 | "O" Ring of Stop Ring    | 0.02 | HD85-SR-SRING |
| 12 | Stop Ring                | 1.20 | HD85-SRING    |
| 13 | Drive Chuck              | 17.5 | HD85-DCHUCK   |
| 14 | Drill Bit                |      | HD85-195CC-YV |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank               | Hole Range      | Connection Thread             |
|------------------|--------------------------|----------------------------|-------------------------|-----------------|-------------------------------|
| 1492mm           | 186.9Kg                  | Φ185mm                     | Cop84<br>DHD380<br>HD85 | Φ203- Φ229      | BECO 4 ½" REG<br>API 4 ½" REG |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |                         | Air Consumption |                               |
|                  |                          |                            |                         | 300-380(PSI)    |                               |
| 1560x230x270mm   | 20Hz                     | 20-30r/min                 |                         | 950-1200(CFM)   |                               |

## HK9-Q DTH HAMMER

| HK9-Q Hammers | Item Description | Weight Kg | Part Number |
|---------------|------------------|-----------|-------------|
|---------------|------------------|-----------|-------------|

|    |                     |      |               |
|----|---------------------|------|---------------|
| 1  | Top Sub             | 45.5 | HK9Q-TSUB     |
| 2  | "O" Ring of Top Sub | 0.02 | HK9Q-SK-TSUB  |
| 3  | Breakout Ring       | 0.55 | HK9Q-BOR      |
| 4  | Check Valve         | 1.20 | HK9Q-CVALVE   |
| 5  | Spring              | 0.15 | HK9Q-SPRING   |
| 6  | Compression Buffer  | 0.45 | HK9Q-CBUFFER  |
| 7  | Air Distributor     | 10.2 | HK9Q-DIST     |
| 8  | Internal Cylinder   | 7.50 | HK9Q-ICYL     |
| 9  | Piston              | 50.0 | HK9Q-PISTON   |
| 10 | External Cylinder   | 79.5 | HK9Q-ECYL     |
| 11 | Guided Sleeve       | 6.20 | HK9Q-BUSH     |
| 12 | Retaining Ring      | 0.30 | HK9Q-RRING    |
| 13 | Stop Ring           | 2.20 | HK9Q-SRING    |
| 14 | Breakout Ring       | 0.55 | HK9Q-BOR      |
| 15 | Drive Chuck         | 23.0 | HK9Q-DCHUCK   |
| 16 | Drill Bit           |      | HK9Q-216CC-TV |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range      | Connection Thread             |
|------------------|--------------------------|----------------------------|-----------|-----------------|-------------------------------|
| 1345mm           | 205.0Kg                  | Φ203mm                     | QL80      | Φ216- Φ229      | BECO 4 ½" REG<br>API 4 ½" REG |
| Box Size         | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption |                               |
|                  |                          |                            |           | 300-380(PSI)    |                               |
| 1500x240x280mm   | 25Hz                     | 30-70r/min                 |           | 950-1200(CFM)   |                               |

## HSD10 DTH HAMMER

| HSD12 Hammers |  | Item Description | Weight Kg | Part Number |
|---------------|--|------------------|-----------|-------------|
|---------------|--|------------------|-----------|-------------|



|    |                            |       |          |
|----|----------------------------|-------|----------|
| 1  | Top Sub                    | 121.7 | HSD12-01 |
| 2  | "O" Ring of Top Sub        | 0.02  | HSD12-02 |
| 3  | Breakout Ring of Top Sub   | 2.10  | HSD12-03 |
| 4  | Check Valve                | 2.10  | HSD12-04 |
| 5  | Spring                     | 0.20  | HSD12-05 |
| 6  | Air Distributor            | 20.2  | HSD12-06 |
| 7  | Internal Cylinder          | 31.3  | HSD12-07 |
| 8  | Piston                     | 110   | HSD12-08 |
| 9  | External Cylinder          | 168.7 | HSD12-09 |
| 10 | Retaining Ring             | 1.20  | HSD12-10 |
| 11 | "O" Ring of Stop Ring      | 3.70  | HSD12-11 |
| 12 | Stop Ring                  | 0.03  | HSD12-12 |
| 13 | Guided Sleeve              | 0.01  | HSD12-13 |
| 14 | Breakout Ring of Stop Ring | 1.20  | HSD12-14 |
| 15 | Drive Chuck                | 0.35  | HSD12-15 |
| 16 | Drill Bit                  | 13.6  | HSD12-16 |

### Technical Data

| Length(Less bit) | Weight(Less bit)          | External Diameter          | Bit Shank       | Hole Range | Connection Thread |           |
|------------------|---------------------------|----------------------------|-----------------|------------|-------------------|-----------|
| 1880mm           | 487Kg                     | Φ275mm                     | SD12            | Φ305- Φ445 | API 6 5/8 REG     |           |
| Working Pressure | Impact rate<br>At 0.5 Mpa | Recommended rotation speed | Air Consumption |            |                   |           |
|                  |                           |                            | 1.0 MPa         | 1.8 MPa    | 2.4 MPa           |           |
| 1.0 - 2.5 MPa    | 16Hz                      | 15-25 r/min                |                 | 30 m³/min  | 56 m³/min         | 78 m³/min |

## HSD12 DTH HAMMER

| HSD12 Hammers | Item Description | Weight Kg | Part Number |
|---------------|------------------|-----------|-------------|
|---------------|------------------|-----------|-------------|

|    |                            |       |          |
|----|----------------------------|-------|----------|
| 1  | Top Sub                    | 121.7 | HSD12-01 |
| 2  | "O" Ring of Top Sub        | 0.02  | HSD12-02 |
| 3  | Breakout Ring of Top Sub   | 2.10  | HSD12-03 |
| 4  | Check Valve                | 2.10  | HSD12-04 |
| 5  | Spring                     | 0.20  | HSD12-05 |
| 6  | Air Distributor            | 20.2  | HSD12-06 |
| 7  | Internal Cylinder          | 31.3  | HSD12-07 |
| 8  | Piston                     | 110   | HSD12-08 |
| 9  | External Cylinder          | 168.7 | HSD12-09 |
| 10 | Retaining Ring             | 1.20  | HSD12-10 |
| 11 | "O" Ring of Stop Ring      | 3.70  | HSD12-11 |
| 12 | Stop Ring                  | 0.03  | HSD12-12 |
| 13 | Guided Sleeve              | 0.01  | HSD12-13 |
| 14 | Breakout Ring of Stop Ring | 1.20  | HSD12-14 |
| 15 | Drive Chuck                | 0.35  | HSD12-15 |
| 16 | Drill Bit                  | 13.6  | HSD12-16 |

### Technical Data

| Length(Less bit) | Weight(Less bit)       | External Diameter          | Bit Shank | Hole Range      | Connection Thread |
|------------------|------------------------|----------------------------|-----------|-----------------|-------------------|
| 1880mm           | 487Kg                  | Φ275mm                     | SD12      | Φ305- Φ445      | API 6 5/8 REG     |
| Working Pressure | Impact rate At 0.5 Mpa | Recommended rotation speed |           | Air Consumption |                   |
|                  |                        |                            |           | 1.0 MPa         | 1.8 MPa           |
|                  |                        |                            |           | 2.4 MPa         |                   |
| 1.0 - 2.5 MPa    | 16Hz                   | 15-25 r/min                |           | 30 m³/min       | 56 m³/min         |
|                  |                        |                            |           | 78 m³/min       |                   |

## HK12-Y DTH HAMMER

| HK12-Y Hammers |  | Item Description | Weight Kg | Part Number |
|----------------|--|------------------|-----------|-------------|
|----------------|--|------------------|-----------|-------------|

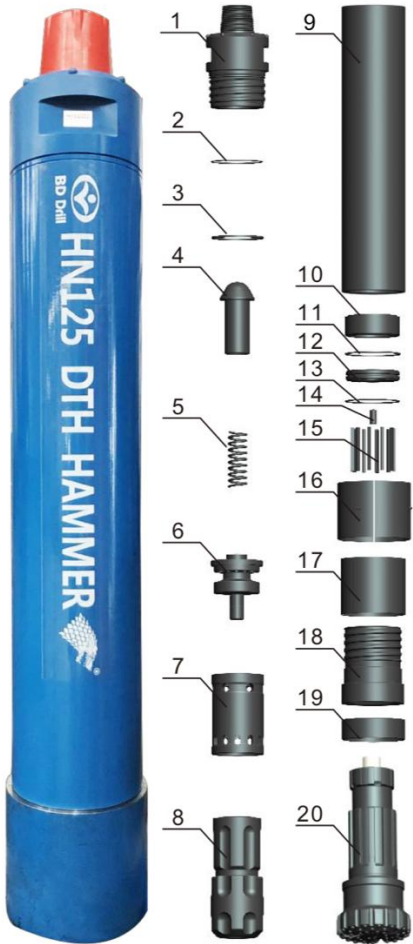


|    |                     |       |                |
|----|---------------------|-------|----------------|
| 1  | Top Sub             | 119.5 | HK12Y-TSUB     |
| 2  | "O" Ring of Top Sub | 0.02  | HK12Y-SK-TSUB  |
| 3  | Spacer              | 1.20  | HK12Y-SPACER-A |
| 4  | Check Valve         | 0.20  | HK12Y-CVALVE   |
| 5  | Spring              | 0.50  | HK12Y-SPRING   |
| 6  | Compression Buffer  | 2.20  | HK12Y-CBUFFER  |
| 7  | Air Distributor     | 19.6  | HK12Y-DIST     |
| 8  | Internal Cylinder   | 15.1  | HK12Y-ICYL     |
| 9  | Piston              | 111.1 | HK12Y-PISTON   |
| 10 | External Cylinder   | 177.1 | HK12Y-ECYL     |
| 11 | Bearing Bush        | 19.15 | HK12Y-BUSH     |
| 12 | Retaining Ring      | 1.50  | HK12Y-RRING    |
| 13 | "O" Ring (Bit Ring) | 0.20  | HK12Y-SK-SRING |
| 14 | Bit Retaining Ring  | 4.35  | HK12Y-SRING    |
| 15 | Spacer              | 1.20  | HK12Y-SPACER-B |
| 16 | Drive Chuck         | 37.2  | HK12Y-DSUB     |
| 17 | Drill Bit           | 108.0 | HK12Y-311CC    |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range                     | Connection Thread                |
|------------------|--------------------------|----------------------------|-----------|--------------------------------|----------------------------------|
| 1590mm           | 510.2Kg                  | Φ275mm                     | HY12      | Φ305- Φ350                     | API 6 5/8" REG<br>API 7 5/8" REG |
| Box Size         | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption                |                                  |
| 1665x320x360mm   | 19.2Hz                   | 15-35r/min                 |           | 200-350(PSI)<br>1200-1500(CFM) |                                  |

# N125-R DTH HAMMER

| N125-R Hammers                                                                     | Item Description                 | Weight Kg | Part Number       |
|------------------------------------------------------------------------------------|----------------------------------|-----------|-------------------|
|  | 1 Top Sub                        | 123.0     | HN125-TSUB        |
|                                                                                    | 2 "O" Ring of Top Sub            | 0.02      | HN125-SK-TSUB     |
|                                                                                    | 3 Breakout Ring of Top Sub       | 0.85      | HN125-MURS-TSUB   |
|                                                                                    | 4 Check Valve                    | 1.00      | HN125-CVALVE      |
|                                                                                    | 5 Spring                         | 1.00      | HN125-SPRING      |
|                                                                                    | 6 Air Distributor                | 20.20     | HN125-DIST        |
|                                                                                    | 7 Internal Cylinder              | 31.00     | HN125-ICYL        |
|                                                                                    | 8 Piston                         | 111.0     | HN125-PISTON      |
|                                                                                    | 9 External Cylinder              | 147.0     | HN125-ECYL        |
|                                                                                    | 10 Bush                          | 18.4      | HN125-BUSH        |
|                                                                                    | 11 Bush Retaining Ring           | 0.20      | HN125-BUSH-RRING  |
|                                                                                    | 12 Stop Ring                     | 5.30      | HN125-SRING       |
|                                                                                    | 13 "O" Ring Stop Ring            | 0.02      | HN125-SK-SRING    |
|                                                                                    | 14 Lock Pin                      | 0.20      | HN125-LOCK-PIN    |
|                                                                                    | 15 Nylon Strip                   | 0.30      | HN125-NYLON-STRIP |
|                                                                                    | 16 Internal Bit Catcher          | 6.80      | HN125-IBCATCHER   |
|                                                                                    | 17 External Bit Catcher          | 15.7      | HN125-EBCATCHER   |
|                                                                                    | 18 Drive Chuck                   | 31.9      | HN125-DCHUCK      |
|                                                                                    | 19 Plastic Spacer of Drive Chuck | 0.5       | HN125-PSPACER     |
|                                                                                    | 20 Bit                           |           | HN-476CC          |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range      | Connection Thread |
|------------------|--------------------------|----------------------------|-----------|-----------------|-------------------|
| 1812mm           | 546kg                    | Φ275mm                     | NUMA125R  | Φ305-Φ445       | API 6 5/8" REG    |
| Box Size         | Impact rate<br>At 1.7Mpa | Recommended rotation speed |           | Air Consumption |                   |
|                  |                          |                            |           | 200-350(PSI)    |                   |
| 1880x310x310mm   | 18Hz                     | 15-35r/min                 |           | 800-1800(CFM)   |                   |

## Selecting the right bit

Black diamond has a comprehensive range of DTH drill bits to match all conceivable applications. Each bit is made from quality alloy steel and has been precision machined to produce a perfect body, heat treated to the required hardness. Given surface compression for fatigue resistance and fitted with precision buttons manufactured in-house. These are designed for specific applications for all rock types, hardness and conditions. Bit life and rate of penetration are the most important criteria in selecting the right bit for a particular application.

### Bit Face Shape Selection



#### Drop Center

For high penetration rates in soft to medium hard and fissured rock formations. Low to medium air pressures. Maximum hole deviation control.



#### Concave Face

The all-round application bit face specifically for medium hard and homogenous rock formations. Good hole deviation and good flushing capacity.



#### Convex Face

For high penetration rates in soft to medium-hard with low to medium air pressures. It is the most resistance to steel wash and may reduce the load and wear on the gauge buttons. However, it has poor hole deviation control.



#### Double Gauge Face

This kind of face shape is suitable for fast penetration rates in medium to hard rock formations. Designed for high air pressures and good resistance to steel wash step gauge bit.



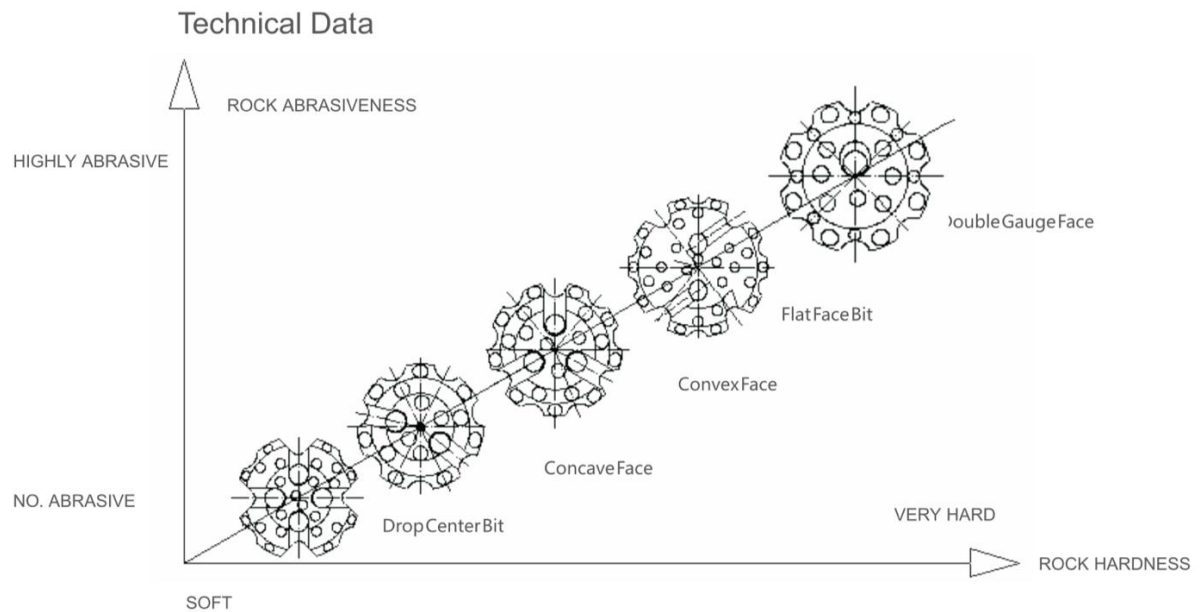
#### Flat Face

This kind of face shape is suitable for hard to very hard and abrasive rock formations in applications with high air pressures. Good penetration rates and resistance to steel wash.



#### Pineapple Bit

The Pineapple Bit can be dressed with ballistic buttons for use in soft to medium hard Formations where fractured rock can be expected, or can be supplied with spherical buttons for hard and abrasive formations.



## Carbide Button Shape Selection



Round Button



Semi-Ballistic  
Buttons



Ballistic Button



Flat Button

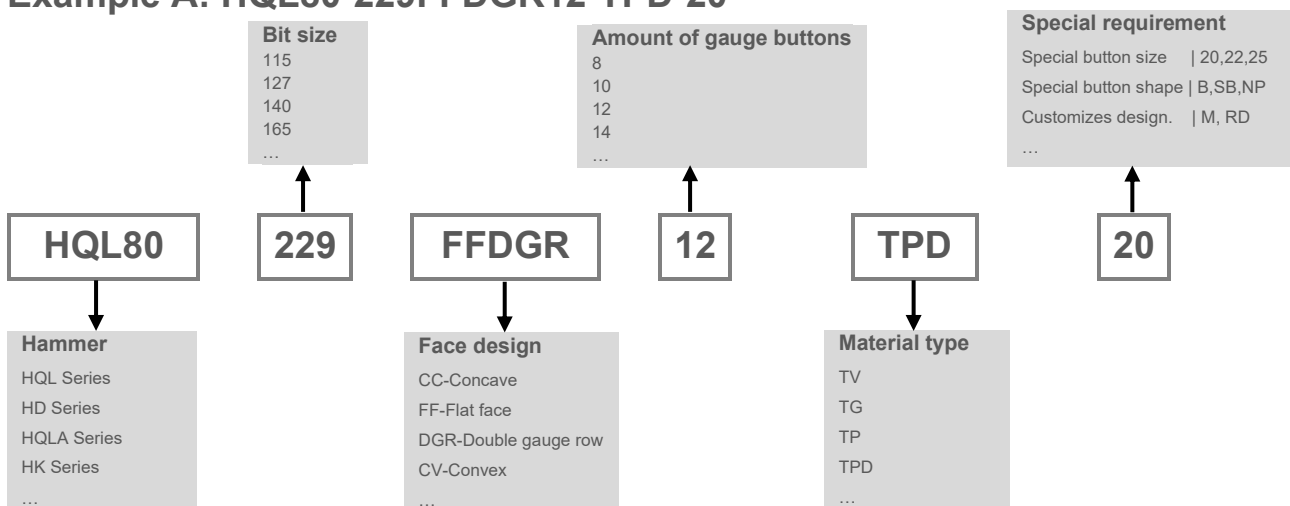


Sharp Button

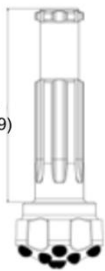
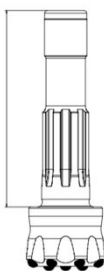
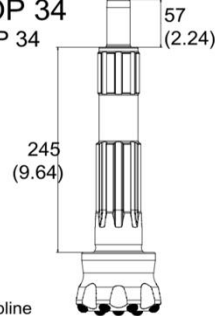
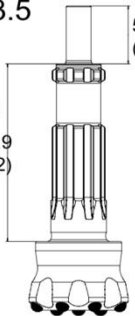
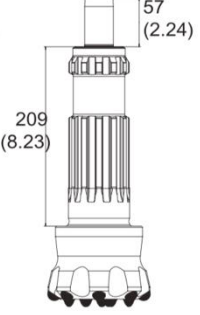
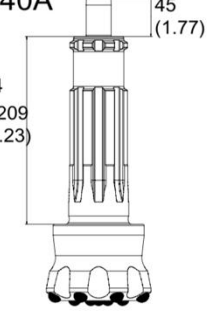
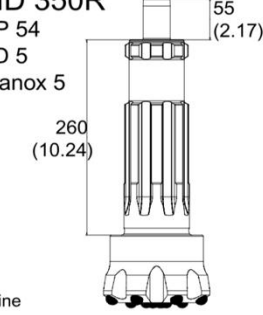
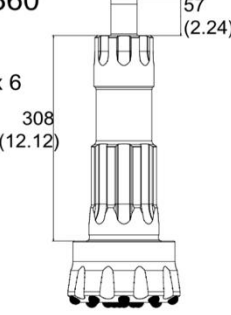
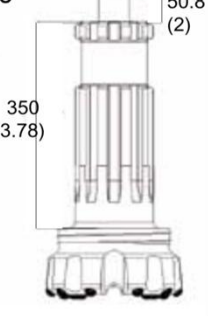
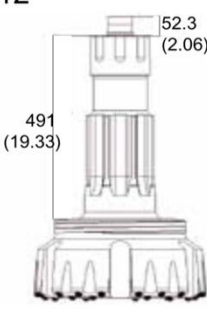
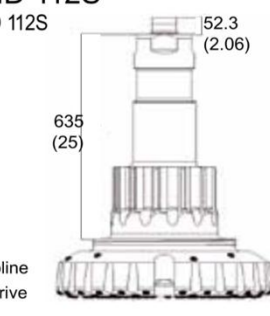
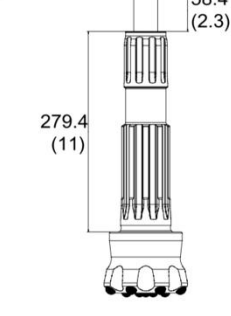
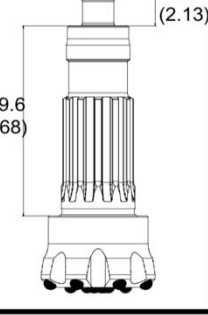
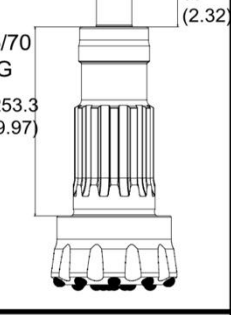
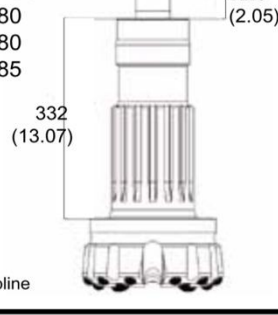
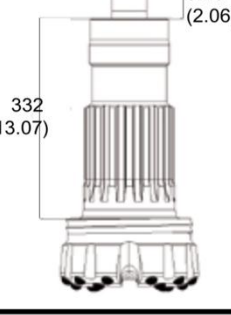
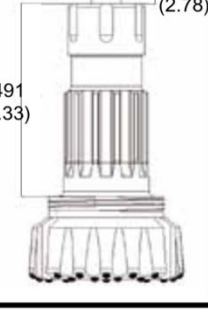
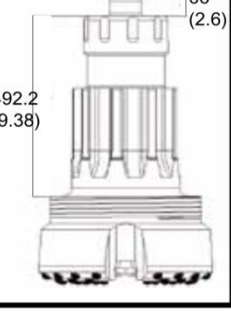
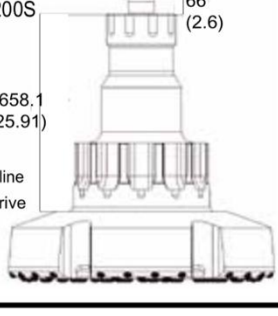
## Product codes

Product codes are a valuable tool to describe and identify the product. In the code structure we have tried to describe the product features with a coding system. While not always 100% logical, with the attached key you will be able to find the product you are looking for or a suitable alternative product.

### Example A: HQL80-229FFDGR12-TPD-20



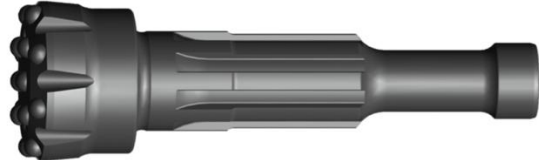
# Bit shanks

|                                                                                                                                                                    |                                                                                                                                                                              |                                                                                                                                                                      |                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BR 2</b><br>COP 20<br><br>165<br>(6.49)<br>6 spline                            | <b>COP 32</b><br>COP 32<br><br>215.2<br>(8.47)<br>8 spline                                  | <b>COP 34</b><br>COP 34<br><br>245<br>(9.64)<br>8 spline                           | <b>DHD 3.5</b><br>COP 35<br>TD 35.2<br>QLX 35<br>DHD 3.5<br>Terranox 3<br><br>180.9<br>(7.12)<br>8 spline |
| <b>TD 40</b><br>COP 44 G<br>QLX 40<br><br>209<br>(8.23)<br>12 spline              | <b>DHD 340A</b><br>COP 44<br>DHD 4<br>QL 340<br>Terranox 4<br><br>209<br>(8.23)<br>8 spline | <b>DHD 350R</b><br>COP 54<br>DHD 5<br>Terranox 5<br><br>260<br>(10.24)<br>8 spline | <b>DHD 360</b><br>COP 64<br>DHD 6<br>Terranox 6<br><br>308<br>(12.12)<br>8 spline                         |
| <b>DHD 380</b><br>DHD 8<br>Terranox 8<br><br>350<br>(13.78)<br>10 spline         | <b>DHD 112</b><br>DHD 112<br><br>491<br>(19.33)<br>8 spline<br>Pin drive                   | <b>DHD 112S</b><br>DHD 112S<br><br>635<br>(25)<br>12 spline<br>Pin drive          | <b>QL 40</b><br>QL 40<br><br>279.4<br>(11)<br>10 spline                                                  |
| <b>QL 50</b><br>QL 50<br>TD 50<br>COP 54 G<br><br>239.6<br>(21.68)<br>12 spline | <b>QL 60</b><br>QL 60<br>TD 60/65/70<br>COP 64 G<br><br>253.3<br>(9.97)<br>12 spline      | <b>QL 80</b><br>QL 80<br>TD 80<br>TD 85<br><br>332<br>(13.07)<br>16 spline       | <b>TD 90</b><br>TD 90<br><br>332<br>(13.07)<br>16 spline                                                |
| <b>QL 120</b><br>QL 120<br><br>491<br>(19.33)<br>12 spline<br>Pin drive         | <b>QL 200</b><br>QL 200<br><br>492.2<br>(19.38)<br>9 spline<br>Pin drive                  | <b>QL 200S</b><br>QL 200S<br><br>658.1<br>(25.91)<br>12 spline<br>Pin drive      |                                                                                                                                                                                              |

### 3" BIT Data Referenced By IR3.5 Flat Face Bit



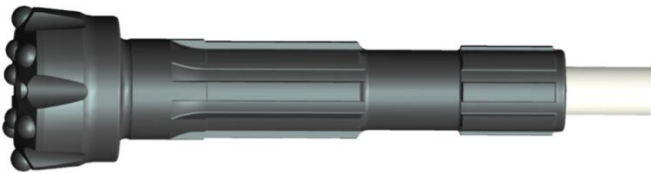
Specification Of Products : IR3.5



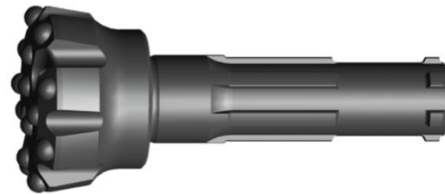
Specification Of Products : M30



Specification Of Products : COP32



Specification Of Products : QL30, COP34



Specification Of Products : BR3

| Diameter |         | No x Button diameter , mm |               | Button angle° | Flushing Holes | Weight (Kg) | Part No. |
|----------|---------|---------------------------|---------------|---------------|----------------|-------------|----------|
| mm       | Inch    | Gauge Buttons             | Front Buttons |               |                |             |          |
| 90       | 3 9/16  | 8x12                      | 7x11          | 38            | 2              | 4.6         | HD35-90  |
| 92       | 3 5/8   | 8x12                      | 7x11          | 38            | 2              | 4.6         | HD35-92  |
| 95       | 3 3/4   | 8x12                      | 7x11          | 38            | 2              | 4.7         | HD35-95  |
| 100      | 3 15/16 | 8x12                      | 7x12          | 38            | 2              | 4.8         | HD35-100 |
| 105      | 4 1/8   | 8x14                      | 7x12          | 38            | 2              | 5.0         | HD35-105 |
| 110      | 4 5/16  | 8x14                      | 7x12          | 38            | 2              | 5.5         | HD35-110 |

## 4" BIT Data Referenced By DHD340A Flat Face Bit



Specification Of Products : DHD340A  
COP44



Specification Of Products : M50



Specification Of Products : SD5



Specification Of Products : QL50

| Diameter |         | No x Button diameter , mm |               | Button angle° | Flushing Holes | Weight (Kg) | Part No. |
|----------|---------|---------------------------|---------------|---------------|----------------|-------------|----------|
| mm       | Inch    | Gauge Buttons             | Front Buttons |               |                |             |          |
| 105      | 4 1/8   | 8x14                      | 7x12          | 38            | 2              | 7.6         | HD45-105 |
| 110      | 4 5/16  | 8x14                      | 7x12          | 38            | 2              | 7.8         | HD45-110 |
| 115      | 4 1/2   | 8x14                      | 7x13          | 38            | 2              | 8.2         | HD45-115 |
| 120      | 4 3/4   | 8x14                      | 8x13          | 38            | 2              | 8.7         | HD45-120 |
| 125      | 4 15/16 | 8x14                      | 10x13         | 38            | 2              | 8.9         | HD45-125 |
| 130      | 5 1/8   | 8x16                      | 8x14          | 38            | 2              | 9.4         | HD45-130 |

## 5" BIT Data Referenced By DHD350R Flat Face Bit



Specification Of Products : DHD350R  
COP54



Specification Of Products : M50



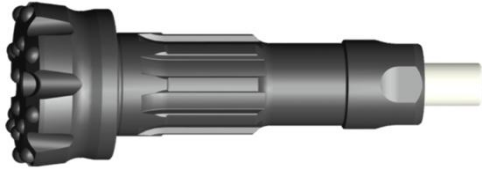
Specification Of Products : SD4



Specification Of Products : QL40

| Diameter |       | No x Button diameter , mm |               | Button angle° | Flushing Holes | Weight (Kg) | Part No. |
|----------|-------|---------------------------|---------------|---------------|----------------|-------------|----------|
| mm       | Inch  | Gauge Buttons             | Front Buttons |               |                |             |          |
| 130      | 5 1/8 | 8x16                      | 8x14          | 38            | 2              | 15          | HD55-130 |
| 135      | 6 1/4 | 8x16                      | 8x14          | 38            | 2              | 15.2        | HD55-135 |
| 138      | 5 1/2 | 8x16                      | 10x14         | 38            | 2              | 15.6        | HD55-138 |
| 140      | 5 1/2 | 8x16                      | 10x14         | 38            | 2              | 15.8        | HD55-140 |
| 146      | 5 3/4 | 8x18                      | 8x15          | 38            | 2              | 16.1        | HD55-146 |
| 150      | 5 7/8 | 8x18                      | 8x15          | 38            | 2              | 16.5        | HD55-150 |
| 152      | 6     | 8x18                      | 8x15          | 38            | 2              | 17          | HD55-152 |
| 156      | 6 1/8 | 8x18                      | 8x16          | 38            | 2              | 17.5        | HD55-156 |

## 6" BIT Data Referenced By DHD360R Concave Face Bit



Specification Of Products : DHD360  
COP64



Specification Of Products : M60



Specification Of Products : SD6



Specification Of Products : QL60

| Diameter |       | No x Button diameter , mm |               | Button angle° | Flushing Holes | Weight (Kg) | Part No. |
|----------|-------|---------------------------|---------------|---------------|----------------|-------------|----------|
| mm       | Inch  | Gauge Buttons             | Front Buttons |               |                |             |          |
| 152      | 6     | 8x18                      | 4x16+4x14     | 38            | 2              | 23          | HD65-152 |
| 154      | 6     | 8x18                      | 4x16+4x14     | 38            | 2              | 23          | HD65-154 |
| 156      | 6 1/4 | 8x18                      | 4x16+4x14     | 38            | 2              | 23          | HD65-156 |
| 159      | 6 1/4 | 8x18                      | 4x16+4x14     | 38            | 2              | 23.5        | HD65-159 |
| 165      | 6 1/2 | 8x18                      | 8x16          | 38            | 2              | 24          | HD65-165 |
| 171      | 6 3/4 | 8x18                      | 8x16          | 38            | 2              | 25          | HD65-171 |
| 178      | 7     | 8x18                      | 10x16         | 38            | 2              | 26          | HD65-178 |
| 185      | 7 1/4 | 8x18                      | 10x16         | 38            | 2              | 26.8        | HD65-185 |
| 190      | 7 1/2 | 10x18                     | 13x16         | 38            | 2              | 27.5        | HD65-190 |
| 203      | 8     | 10x18                     | 8x18+6x16     | 38            | 2              | 31          | HD65-203 |

## 8" BIT Data Referenced By DHD380 Concave Face Bit



Specification Of Products : DHD380  
COP84



Specification Of Products : M80



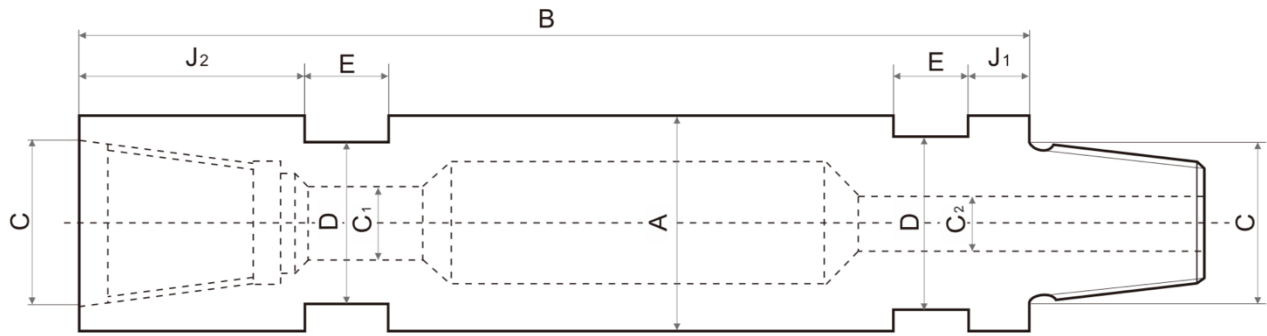
Specification Of Products : SD8



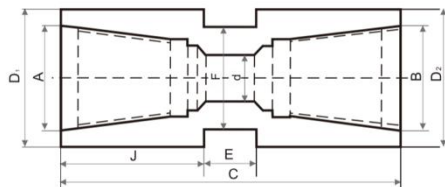
Specification Of Products QL80

| Diameter |        | No x Button diameter , mm |               | Button angle° | Flushing Holes | Weight (Kg) | Part No. |
|----------|--------|---------------------------|---------------|---------------|----------------|-------------|----------|
| mm       | Inch   | Gauge Buttons             | Front Buttons |               |                |             |          |
| 200      | 7 7/8  | 10x18                     | 8x18+6x16     | 38            | 2              | 46          | HD85-200 |
| 203      | 8      | 10x18                     | 8x18+6x16     | 38            | 2              | 47          | HD85-203 |
| 216      | 8 1/2  | 10x18                     | 8x18+6x16     | 38            | 2              | 53          | HD85-216 |
| 219      | 8 5/8  | 10x18                     | 8x18+6x16     | 38            | 2              | 54          | HD85-219 |
| 222      | 8 3/4  | 10x18                     | 8x18+6x16     | 38            | 2              | 55          | HD85-222 |
| 225      | 8 7/8  | 10x18                     | 8x18+7x16     | 38            | 2              | 56          | HD85-225 |
| 229      | 9      | 10x18                     | 8x18+7x16     | 38            | 2              | 57          | HD85-229 |
| 235      | 9 1/4  | 12x18                     | 30x16         | 38            | 2              | 57.5        | HD85-235 |
| 240      | 9 1/2  | 12x18                     | 30x16         | 38            | 2              | 58          | HD85-240 |
| 254      | 10     | 12x18                     | 12x18+8x16    | 38            | 2              | 61          | HD85-254 |
| 270      | 10 5/8 | 12x19                     | 20x18+8x16    | 38            | 2              | 66          | HD85-270 |
| 279      | 11     | 12x19                     | 20x18+9x16    | 38            | 2              | 71          | HD85-279 |

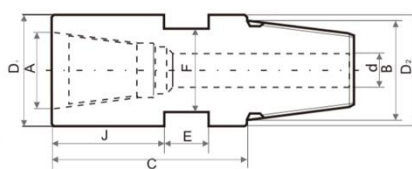
## Drill Pipe



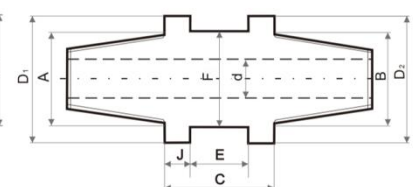
| A<br>OD(mm) | B<br>Length SS | C1<br>Joints type | C2<br>Thread type | D<br>Across flat | E<br>Width spanner<br>flat | F<br>Thickness |
|-------------|----------------|-------------------|-------------------|------------------|----------------------------|----------------|
| 76          | 1500           | box-pin           | RD 50             | 65               | 38.1                       | 5              |
| 89          | 1800           | box-box           | API 2 3/8" Reg    | 69.8             | 60.3                       | 6              |
| 102         | 3000           | pin-pin           | API 3 1/2" Reg    | 63.5             | 50.8                       | 7.5            |
| 114         | 4000           |                   | API 4 1/2" Reg    | 92.2             | 69.8                       | 8              |
| 127         | 5000           |                   | 3 1/8" DIBH       | 120.6            | ...                        | 10             |
| 140         | 6000           |                   | CUBEX#21          | 130.1            |                            | 12             |
| 152         | 7500           |                   | CUBEX#24          | ...              |                            | 14             |
| ...         | 9144           |                   | CUBEX#28          |                  |                            | ...            |
| ...         | ...            | ...               | ...               | ...              | ...                        | ...            |



Box-Box Adapters



Pin-Box Adapters



Pin-Pin Adapters

| A-B<br>Joints type | A1-B1<br>Thread type | C<br>Length SS | D1<br>OD | D2<br>OD | E<br>Width spanner<br>flat | F<br>Across flat |
|--------------------|----------------------|----------------|----------|----------|----------------------------|------------------|
| box-pin            | RD 50                | 1500           | 76       | 76       | 38.1                       | 65               |
| box-box            | API 2 3/8" Reg       | 1800           | 89       | 89       | 60.3                       | 69.8             |
| pin-pin            | API 3 1/2" Reg       | 3000           | 102      | 102      | 50.8                       | 63.5             |
|                    | API 4 1/2" Reg       | 4000           | 114      | 114      | 69.8                       | 92.2             |
|                    | 3 1/8" DIBH          | 5000           | 127      | 127      | ...                        | 120.6            |
|                    | CUBEX#21             | 6000           | 140      | 140      |                            | 130.1            |
|                    | CUBEX#24             | 7500           | 152      | 152      |                            | ...              |
|                    | CUBEX#28             | 9144           | ...      | ...      |                            | ...              |
|                    | BECO                 | ...            | ...      | ...      |                            | ...              |

...

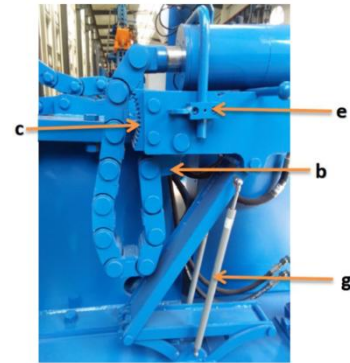
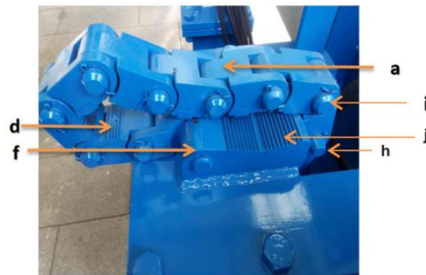
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## Breakout Bench



**Black Diamond**  
Drilling Services Australia

The threaded connections of the driver chuck and top sub hammer may become very tightly tensioned during drilling. It is convenient to break the hammer threads on the rig, but if the threads cannot be loosened or tend to get stuck, a breakout bench is the solution. This handy but powerful breakout bench can easily be placed in a workshop or container and it breaks DTH hammers between 3" and 10". Select the right breakout bench depending on voltage and power source.



| No. | Part Name                  | Usage on a bench |
|-----|----------------------------|------------------|
| a   | link A                     | 20               |
| b   | link B                     | 1                |
| c   | Jaw A                      | 1                |
| d   | Jaw B                      | 20               |
| e   | U bar                      | 2                |
| f   | Jaw base                   | 1                |
| g   | Air cylinder               | 2                |
| h   | Pin A                      | 2                |
| i   | Pin B                      | 20               |
| j   | Jaw C                      | 2                |
| k   | "link C<br>BOB-DOUBLELINK" | 1                |

**Available for hammer size 3.5"~10"**

Technical Data: rpm of chain less than 10tums/m

velocity of piston rod 1.8meter/m

| Hammer Range               | Overall dimensions | Weight          | Maximum assembly torque |
|----------------------------|--------------------|-----------------|-------------------------|
| 3.5"-10"                   | 1600*930*1050mm    | 800Kg           | 67 KN*m(50FTlb)         |
| Maximum disassembly torque | Operating Height   | Hydraulic Range | Power                   |
| 81 KN*m(60ftlb)            | 800mm              | 0-20Mpa         | 3Kw,220V,50Hz           |



## Reverse Circulation Hammers & Bits

- RC HAMMERS 

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 PAGE 32
- RC BITS 

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 PAGE 47
- REVERSE CIRCULATION DRILL STRING 

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 PAGE 50

## Selecting the Right Hammer

Black Diamond's reverse circulation hammers are specifically designed for all kind of exploration drilling (deep hole and pit grade control applications).

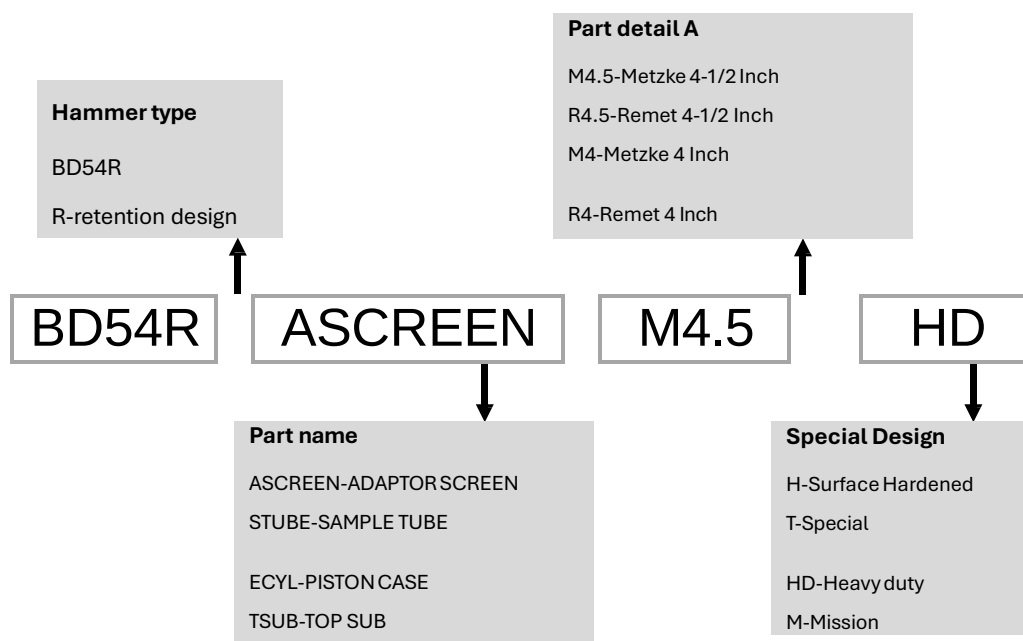
Whether you are exploring potential sites or working an existing mine, the BDDRILL RC hammer will assure high performance, exceptional reliability and dependable support.

---

## Product codes

Product codes are a valuable tool to describe and identify the product. In the code structure we have tried to describe the product features with Alpha-numerical system that is not always 100% logical, but with the attached key you will be able to find the product you are looking for or a suitable alternative product.

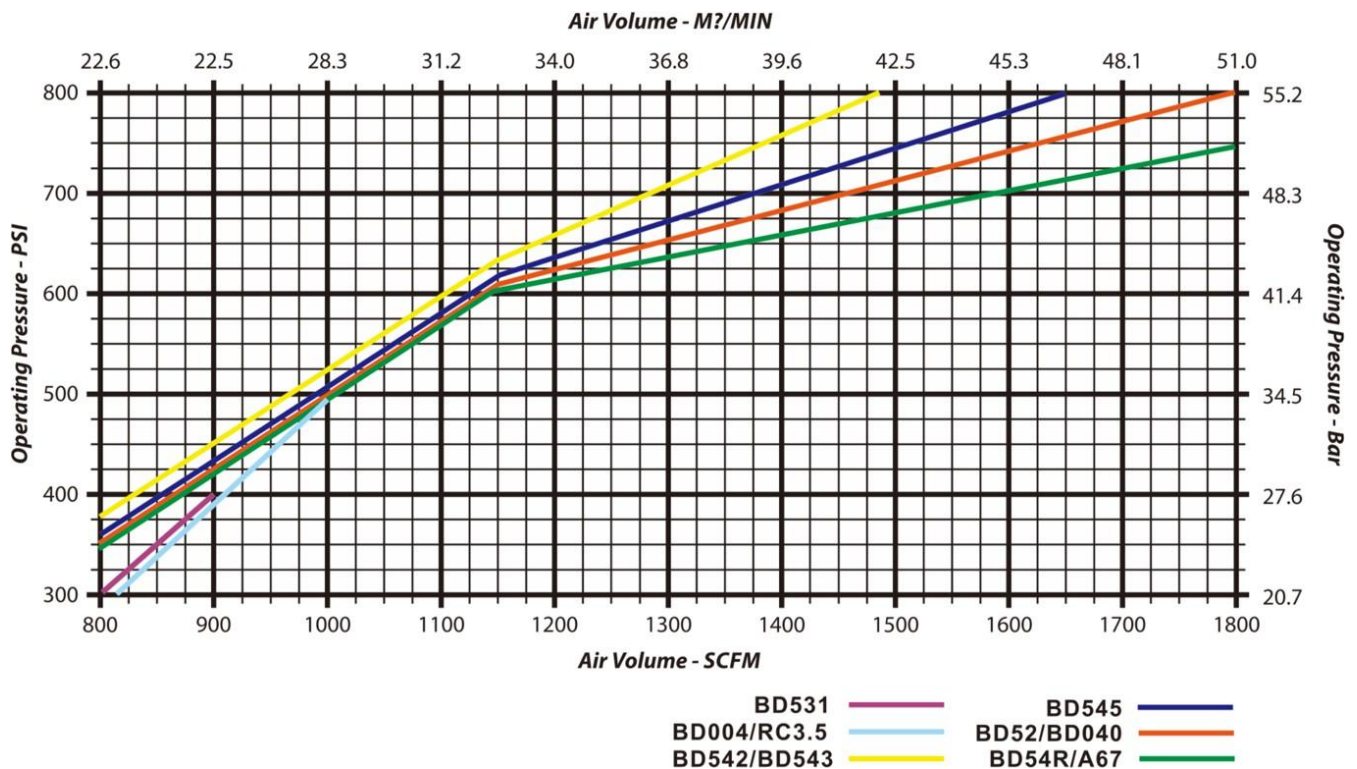
### Example A: BDR54R-ASCREEEN-M4.5-HD



# SPECIFICATIONS

| Hammer                                                                                     | BD351                       | RC3.5                       | BD004                       |                |                | BD542                       |                |                | BD543                       |                | BD545                       |                 | BD040                       |                |                |                | BD52                        |                | BD54                        |                 | A67                         |
|--------------------------------------------------------------------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------|----------------|-----------------------------|----------------|----------------|-----------------------------|----------------|-----------------------------|-----------------|-----------------------------|----------------|----------------|----------------|-----------------------------|----------------|-----------------------------|-----------------|-----------------------------|
| Top sub thread                                                                             | R3"                         | R3"                         | R3.5"                       | R4"            | M4"            | R3.5"                       | R4"            | M4"            | R4"                         | M4"            | M4.5                        | R4.5            | M4"                         | R4"            | M4.5"          | R4.5"          | m4.5"                       | R4.5"          | M4.5"                       | R4.5            | M4.5"                       |
| Package case size                                                                          | (L)1100<br>(W)110<br>(H)120 | (L)1230<br>(W)120<br>(H)150 | (L)1300<br>(W)150<br>(H)180 |                |                | (L)1230<br>(W)140<br>(H)170 |                |                | (L)1260<br>(W)150<br>(H)180 |                | (L)1300<br>(W)150<br>(H)180 |                 | (L)1300<br>(W)150<br>(H)180 |                |                |                | (L)1300<br>(W)160<br>(H)190 |                | (L)1300<br>(W)160<br>(H)190 |                 | (L)1330<br>(W)160<br>(H)190 |
| Recommended bit size, mm                                                                   | 86-100                      | 100-110                     | 111-125                     |                |                | 113-133                     |                |                | 123-140                     |                | 127-140                     |                 | 133-143                     |                |                |                | 136-146                     |                | 136-146                     |                 | 136-146                     |
| Bit shank                                                                                  | RE531                       | RC3.5                       | RE004                       |                |                | RE542                       |                |                | RE543                       |                | RE545                       |                 | RE040                       |                |                |                | PR52                        |                | PR54                        |                 | BD67                        |
| External diameter, mm                                                                      | 81                          | 94                          | 107                         |                |                | 109.5                       |                |                | 116                         |                | 117.5                       |                 | 121                         |                |                |                | 120.5                       |                | 130                         |                 | 132                         |
| Length excl. thread, mm (Less bit)                                                         | 1069                        | 1184                        | 1252                        |                |                | 1191                        |                |                | 1261                        |                | 1210                        |                 | 1227                        |                |                |                | 1294                        |                | 1200                        |                 | 1200                        |
| Hammer weight, Kg (Less bit)                                                               | 29                          | 44                          | 52                          |                |                | 57                          |                |                | 63                          |                | 65                          |                 | 53.8                        | 47.5           | 69.8           | 69.4           | 68.5                        |                | 84.5                        |                 | 81.8                        |
| Piston weight, Kg                                                                          | 4.8                         | 8.3                         | 10.5                        |                |                | 11.6                        |                |                | 11.6                        |                | 13.5                        |                 | 13.6                        |                |                |                | 14.3                        |                | 16.8                        |                 | 17                          |
| Wrench flat, mm                                                                            | No wrench flat              | (L)82<br>(W)40              | (L)90<br>(W)40              | (L)90<br>(W)50 | (L)90<br>(W)50 | (L)95<br>(W)45              | (L)95<br>(W)45 | (L)95<br>(W)50 | (L)95<br>(W)45              | (L)95<br>(W)50 | (L)102<br>(W)50             | (L)102<br>(W)50 | (L)94<br>(W)50              | (L)94<br>(W)50 | (L)94<br>(W)50 | (L)94<br>(W)50 | (L)94<br>(W)50              | (L)94<br>(W)50 | (L)100<br>(W)50             | (L)100<br>(W)50 | (L)95<br>(W)51              |
| Drilling conditions and project specifications may require a larger air package to be used |                             |                             |                             |                |                |                             |                |                |                             |                |                             |                 |                             |                |                |                |                             |                |                             |                 |                             |

## AIR CONSUMPTION/OPERATING PRESSURE



## Reverse Circulation Service Guide

When breaking a hammer down, avoid placing breakout tools in the mid-section of the cylinder (barrel). Recommended breakout points are 130mm from each end of cylinder. Wrap around chain breakouts are recommended (see diagram). When holding bits for breakout, use a secure plate or opt to grab the bit head, but never on the gauge row buttons.

**This information is included with every Hammer purchase.**



**DO NOT APPLY HEAT OR DIRECT IMPACT TO HAMMER WHEN CRACKING JOINTS AS THIS TYPICALLY DAMAGES THE HAMMER.**

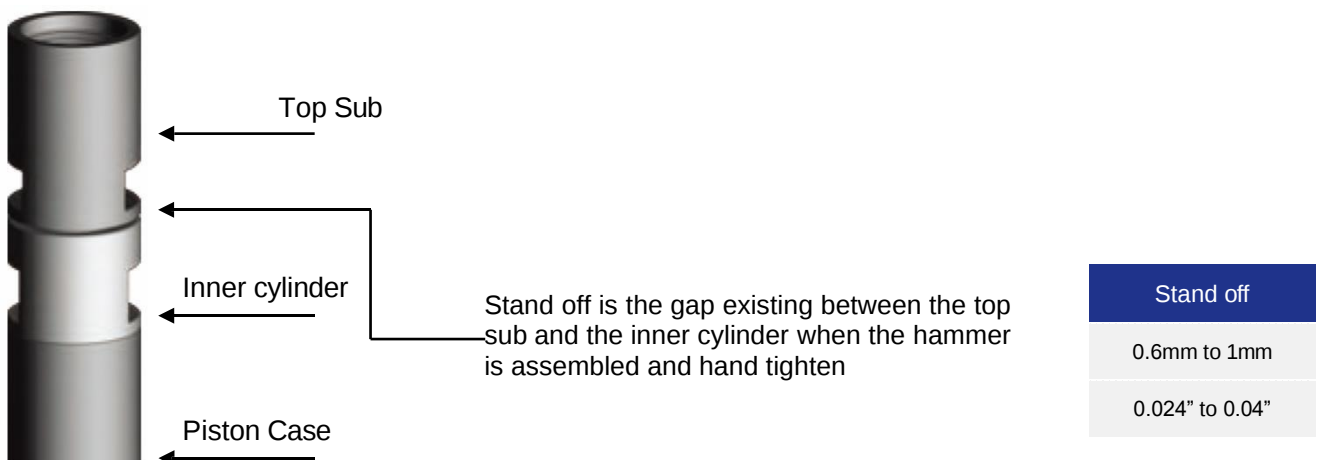


Figure 1: Gripping Locations for BD DRILL Reverse Circulation Hammer  
**Lubrication**

Correct lubrication is critical to the performance and longevity of the hammer.

### Recommended:

- Oil Grade: SAE 320 Hammer Oil for most operating conditions
  - Rate: 2 litre/hour minimum via automatic feeder
- Double the rate when injecting fluids such as water, foam & polymers
- Clean and relubricate the hammer each day after use to prevent corrosion and premature failure



## BD531 R.C. HAMMER

| 3" R.C. Hammers | Item Description | Weight Kg | Part Number |
|-----------------|------------------|-----------|-------------|
|-----------------|------------------|-----------|-------------|



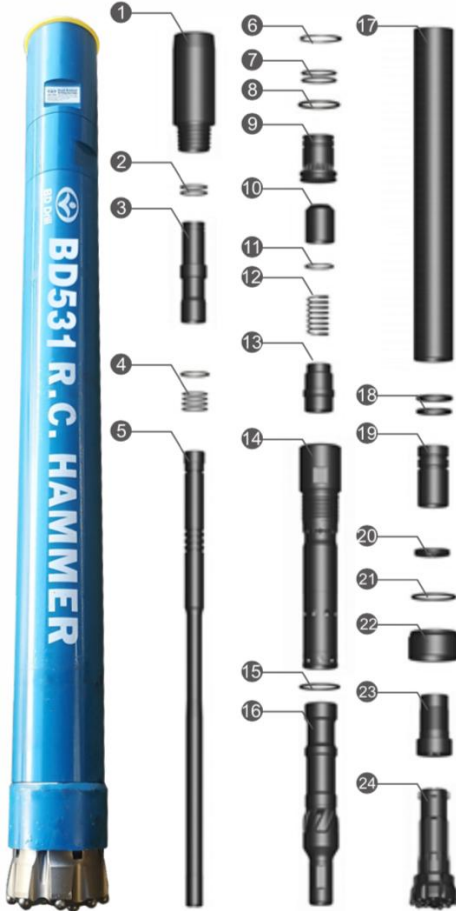
|    |                                       |      |                    |
|----|---------------------------------------|------|--------------------|
| 1  | Top Sub-Remet 3"                      | 3.76 | BD531-TSUB-R3      |
| 2  | O Ring (Adaptor Tube Remet 3") x 2    | 0.01 | BD531-SK-TSUB-R3   |
| 3  | Adaptor Tube Remet 3"                 | 1.85 | BD531-ASCREENR3    |
| 4  | O Ring (Sample Tube) x 4              | 0.01 | BD531-SK-STUBE     |
| 5  | Sample Tube                           | 1.97 | BD531-STUBE        |
| 6  | Circlip                               | 0.04 | BD531-CIRCLIP      |
| 7  | O Ring (Distributor 1) x 2            | 0.01 | BD531-SK-DIST-1    |
| 8  | O Ring (Distributor 2) x 1            | 0.01 | BD531-SK-DIST-2    |
| 9  | Distributor                           | 0.37 | BD531-DIST         |
| 10 | Check Valve/Plunger                   | 0.08 | BD531-CVALVE       |
| 11 | O Ring (Check Valve) x 1              | 0.01 | BD531-SK-CVALVE    |
| 12 | Spring                                | 0.1  | BD531-SPRING       |
| 13 | Mount Sample Tube                     | 0.49 | BD531-STUBE-MOUNT  |
| 14 | Inner Cylinder/Top Barrel             | 3.4  | BD531-ICYL         |
| 15 | O Ring (Inner Cylinder) x 1           | 0.01 | BD531-SK-ICYL      |
| 16 | Piston                                | 4.69 | BD531-PISTON       |
| 17 | External Cylinder/Barrel/Piston Case  | 9.2  | BD531-ECYL         |
| 18 | Seal Cover/ O Ring (Bearing Bush) x 2 | 0.02 | BD531-SCOVER       |
| 19 | Bearing Bush                          | 1.03 | BD531-BUSH         |
| 20 | Bit Stop Ring                         | 0.08 | BD531-SRING        |
| 21 | O Ring (Bit Stop Ring) x 1            | 0.01 | BD531-SK-SRING     |
| 22 | Shroud                                | 0.45 | BD531-SHROUD-85/83 |
| 23 | Drive Sub                             | 1.6  | BD531-DSUB         |
| 24 | Drill Bit                             | 4.2  | BD531-85DC-TV      |
| 25 | Seal Kit (Item 2+4+7+8+11+18+21)      | 0.2  | BD531-SK           |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range      | Connection Thread |
|------------------|--------------------------|----------------------------|-----------|-----------------|-------------------|
| 1069mm           | 29.0kg                   | Φ81mm                      | BD531     | Φ84- Φ100       | 3 " Remet         |
| Box Size         | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption |                   |
|                  |                          |                            |           | 200-500(Psi)    |                   |
| 1100x110x120mm   | 30Hz                     | 25-40r/min                 |           | 300-1200(CFM)   |                   |

## RC3.5 R.C. HAMMER

| 3.5" R.C. Hammers | Item Description | Weight Kg | Part Number |
|-------------------|------------------|-----------|-------------|
|-------------------|------------------|-----------|-------------|



|    |                                       |      |                      |
|----|---------------------------------------|------|----------------------|
| 1  | Top Sub-Remet 3"                      | 6.13 | RC3.5-TSUB-R3        |
| 2  | Adaptor Tube Remet 3"                 | 1.49 | RC3.5-ASCREEN-R3     |
| 3  | O Ring (Adaptor Tube Remet 3") x 2    | 0.01 | RC3.5-SK-ASCREEN-R3  |
| 4  | Sample Tube                           | 3.31 | RC3.5-STUBE          |
| 5  | O Ring (Sample Tube) x 6              | 0.01 | RC3.5-SK-STUBE       |
| 6  | Circlip                               | 0.01 | RC3.5-CIRCLIP        |
| 7  | Distributor                           | 0.3  | RC3.5-DIST           |
| 8  | Top Barrel (Sub)                      | 5.38 | RC3.5-TBARREL        |
| 9  | Check Valve/Plunger                   | 0.28 | RC3.5-CVALVE         |
| 10 | Y Ring (Check Valve)                  | 0.01 | RC3.5-SK-CVALVE      |
| 11 | Spring                                | 0.05 | RC3.5-SPRING         |
| 12 | Compression Buffer/Make up Ring Steel | 0.28 | RC3.5-MUR-STEEL      |
| 13 | Mount Sample Tube                     | 0.87 | RC3.5-STUBE-MOUNT    |
| 14 | Inner Cylinder                        | 1.26 | RC3.5-ICYL           |
| 15 | Piston                                | 8.33 | RC3.5-PISTON         |
| 16 | External Cylinder/Barrel/Piston Case  | 10.8 | RC3.5-ECYL           |
| 17 | Bearing Bush (Cold Pressed)           | 1.47 | RC3.5-BUSH           |
| 18 | O Ring (Bit Stop Ring) x 1            | 0.01 | RC3.5-SK-SRING       |
| 19 | Bit Stop Ring                         | 0.17 | RC3.5-SRING          |
| 20 | Shroud                                | 1.1  | RC3.5-SHROUD-104/102 |
| 21 | Drive Sub                             | 2.9  | RC3.5-DSUB           |
| 22 | Drill Bit                             | 8.0  | RC3.5-104DC-TV       |
| 23 | Seal Kit (3+5+10+18)                  | 0.2  | RC3.5-SK             |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range      | Connection Thread |
|------------------|--------------------------|----------------------------|-----------|-----------------|-------------------|
| 1184mm           | 44.0kg                   | Φ94mm                      | RC3.5Y    | Φ100- Φ110      | 3 " Remet         |
| Box Size         | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption |                   |
|                  |                          |                            |           | 200-500(PSI)    |                   |
| 1230x120x150mm   | 30Hz                     | 25-40r/min                 |           | 300-1200(CFM)   |                   |

# BD004 R.C. HAMMER

| 4" R.C. Hammers                                                                    | Item Description                      | Weight Kg | Part Number                                  |
|------------------------------------------------------------------------------------|---------------------------------------|-----------|----------------------------------------------|
|  | <b>A Top sub Assy Remet 3.5"</b>      |           |                                              |
|                                                                                    | 1 Circlip                             | 0.02      | BD004-CIRCLIP                                |
|                                                                                    | 2 O Ring (Adaptor Tube Remet 3.5) x 4 | 0.02      | BD004-SK-ASCREEEN3.5                         |
|                                                                                    | 3 Adaptor Tube Remet 3.5"             | 1.06      | BD004-ASCREEEN-R3.5                          |
|                                                                                    | 4 Top Sub-Remet 3.5"                  | 7.79      | BD004-TSUB-R3.5                              |
|                                                                                    | <b>B Top sub Assy Remet 4"</b>        |           |                                              |
|                                                                                    | 1 Circlip                             | 0.02      | BD004-CIRCLIP                                |
|                                                                                    | 2 O Ring (Adaptor Tube Remet 4") x 4  | 0.02      | BD004-SK-ASCREEENR4                          |
|                                                                                    | 3 Adaptor Tube Remet 4"               | 1.06      | BD004-ASCREEEN-R4                            |
|                                                                                    | 4 Top Sub-Remet 4"                    | 7.79      | BD004-TSUB-R4                                |
|                                                                                    | <b>C Top sub Assy Metzke 4"</b>       |           |                                              |
|                                                                                    | 1 Circlip                             | 0.02      | BD004-CIRCLIP                                |
|                                                                                    | 2 O Ring (Adaptor Metzke 4") x 2      | 0.02      | BD004-SK-ASCREEENM4                          |
|                                                                                    | 3 Adaptor Tube Metzke 4"              | 1.06      | BD004-ASCREEEN-M4/54<br>BD004-ASCREEEN-M4/57 |
|                                                                                    | 4 Top Sub-Metzke 4"                   | 7.79      | BD004-TSUB-M4                                |
|                                                                                    | <b>Parts List</b>                     |           |                                              |
|                                                                                    | 5 Check Valve/Plunger                 | 0.51      | BD004-CVALVE                                 |
|                                                                                    | 6 Y Ring (Check Valve)                | 0.01      | BD004-SK-CVALVE                              |
|                                                                                    | 7 Spring                              | 0.06      | BD004-SPRING                                 |
|                                                                                    | 8 Sample Tube Upper                   | 0.74      | BD004-STUBE-U                                |
|                                                                                    | 9 Make Up Ring, Steel                 | 0.17      | BD004-MUR-STEEL                              |
|                                                                                    | 10 O Ring (Sample Tube) x 2           | 0.02      | BD004-SK-STUBE1                              |
|                                                                                    | 11 O Ring (Sample Tube) x 1           | 0.02      | BD004-SK-STUBE2                              |
|                                                                                    | 12 Sample Tube Lower                  | 2.38      | BD004-STUBE                                  |
|                                                                                    | 13 Distributor                        | 1.75      | BD004-DIST                                   |
|                                                                                    | 14 O Ring (Distributor)               | 0.02      | BD004-SK-DIST                                |
|                                                                                    | 15 Inner Cylinder                     | 2.45      | BD004-ICYL                                   |
|                                                                                    | 16 Piston                             | 10.45     | BD004-PISTON                                 |
|                                                                                    | 17 Piston Case with Bush (cold press) | 17.95     | BD004-ECYL                                   |
|                                                                                    | 18 Bit Stop Ring                      | 0.29      | BD004-SRING                                  |
|                                                                                    | 19 O Ring (Bit Stop Ring)             | 0.02      | BD004-SK-SRING                               |
|                                                                                    | 20 Shroud                             | 1.05      | BD004-SHROUD-115/113                         |
|                                                                                    | 21 Drive Sub                          | 3.13      | BD004-DSUB                                   |
|                                                                                    | 22 Drill Bit                          | 11.7      | BD004-115DC-TV                               |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range                    | Connection Thread            |
|------------------|--------------------------|----------------------------|-----------|-------------------------------|------------------------------|
| 1252mm           | 52.0kg                   | Φ107mm                     | BD004     | Φ111- Φ127                    | 3.5" – 4" Remet<br>4" Metzke |
| Box Size         | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption               |                              |
| 1300x150x180mm   | 30Hz                     | 25-40r/min                 |           | 200-500(PSI)<br>300-1200(CFM) |                              |

# BD542 R.C. HAMMER

| 4.5" R.C. Hammers                                                                  |  | Item Description                        | Weight Kg | Part Number              |
|------------------------------------------------------------------------------------|--|-----------------------------------------|-----------|--------------------------|
|  |  | <b>A Top sub Assy Remet 3.5"</b>        |           |                          |
|                                                                                    |  | 1 Circlip A                             | 0.04      | BD543/542-CIRCLIP-R3.5   |
|                                                                                    |  | 2 O Ring (Adaptor Tube Remet 3.5") x 4  | 0.02      | BD543/542-SK-ASCREEN3.5  |
|                                                                                    |  | 3 Adaptor Tube Remet 3.5"               | 2.55      | BD543/542-ASCSCREEN-R3.5 |
|                                                                                    |  | 4 Top Sub-Remet 3.5"                    | 8.52      | BD543/542-TSUB-R3.5      |
|                                                                                    |  | <b>B Top sub Assy Remet 4"</b>          |           |                          |
|                                                                                    |  | 1 Circlip A                             | 0.02      | BD543/542-CIRCLIP-4      |
|                                                                                    |  | 2 O Ring (Adaptor Tube Remet 4") x 4    | 0.02      | BD543/542-SK-ASCSCREENR4 |
|                                                                                    |  | 3 Adaptor Tube Remet 4"                 | 2.55      | BD543/542-ASCSCREEN-R4   |
|                                                                                    |  | 4 Top Sub-Remet 4"                      | 8.52      | BD543/542-TSUB-R4        |
|                                                                                    |  | <b>C Top sub Assy Metzke 4"</b>         |           |                          |
|                                                                                    |  | 1 Circlip A                             | 0.02      | BD543/542-CIRCLIP-4      |
|                                                                                    |  | 2 O Ring (Adaptor Metzke 4") x 2        | 0.02      | BD543/542-SK-ASCSCREENM4 |
|                                                                                    |  | 3 Adaptor Tube Metzke 4"                | 2.55      | BD543/542-ASCSCREEN-M4   |
|                                                                                    |  | 4 Top Sub-Metzke 4"                     | 8.52      | BD543/542-TSUB-M4        |
|                                                                                    |  | <b>Parts List</b>                       |           |                          |
|                                                                                    |  | 5 Sample Tube                           | 3.5       | BD543/542-STUBE          |
|                                                                                    |  | 6 O Ring (Sample Tube) x 5              | 0.02      | BD543/542-SK-STUBE       |
|                                                                                    |  | 7 Circlip B                             | 0.02      | BD543/542-CIRCLIP-4      |
|                                                                                    |  | 8 Air Screen                            | 0.04      | BD543/542-AIRSCREEN      |
|                                                                                    |  | 9 Distributor                           | 0.56      | BD543/542-DIST           |
|                                                                                    |  | 10 O Ring (Distributor)                 | 0.02      | BD543/542-SK-DIST        |
|                                                                                    |  | 11 Check Valve/Plunger                  | 0.5       | BD543/542-CVALVE         |
|                                                                                    |  | 12 Y Ring (Check Valve)                 | 0.02      | BD543/542-SK-CVALVE      |
|                                                                                    |  | 13 Spring                               | 0.08      | BD543/542-SPRING         |
|                                                                                    |  | 14 Mount Sample Tube                    | 0.86      | BD543/542-STUBE-M        |
|                                                                                    |  | 15 Y Ring (Mount Sample Tube)           | 0.02      | BD543/542-SK-STUBEM      |
|                                                                                    |  | 16 Inner Cylinder/Top Barrel            | 7.26      | BD542-ICYL               |
|                                                                                    |  | 17 O Ring (Inner Cylinder)              | 0.02      | BD543/542-SK-ICYL        |
|                                                                                    |  | 18 Piston                               | 11.64     | BD543/542-PISTON         |
|                                                                                    |  | 19 External Cylinder/Barrel/Piston Case | 19.17     | BD542-ECYL               |
|                                                                                    |  | 20 Bearing Bush                         | 0.05      | BD543/542-PRING          |
|                                                                                    |  | 21 Bush Retaining Ring                  | 2.35      | BD543/542-BUSH           |
|                                                                                    |  | 22 O Ring (Bearing Bush) x 2            | 0.02      | BD543/542-SK-BUSH        |
|                                                                                    |  | 23 Bit Ring                             | 0.26      | BD543/542-SRING          |
|                                                                                    |  | 24 O Ring (Bit Ring)                    | 0.02      | BD543/542-SK-SRING       |
|                                                                                    |  | 25 Shroud                               | 2.21      | BD543/542-SHROUD-127/125 |
|                                                                                    |  | 26 Drive Sub                            | 2.94      | BD543/542-DSUB           |
|                                                                                    |  | 27 Drill Bit                            | 10.96     | BD543/542-127DC          |
|                                                                                    |  | 28 Seal Kit (Item2+6+10+12+15+17+22+24) | 0.3       | BD543/542-SK             |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range                    | Connection Thread            |
|------------------|--------------------------|----------------------------|-----------|-------------------------------|------------------------------|
| 1191mm           | 57.0kg                   | Φ109.5mm                   | BD542     | Φ113- Φ130                    | 3.5" – 4" Remet<br>4" Metzke |
| Box Size         | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption               |                              |
| 1230x140x170mm   | 35Hz                     | 25-40r/min                 |           | 200-500(PSI)<br>300-1200(CFM) |                              |

**BD543 R.C. HAMMER**

## 4.5" R.C. Hammers

| Item Description                                                                                                                                        |                                                                                       | Weight<br>Kg | Part Number              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------|--------------------------|
| <b>A</b> Crossover sub Assy PIN Metzke 4"(54mm) to Remet 4"(blank, Matrix, Drill Star...) PIN to BOX CROSSOVER SUB ASSEMBLY OD116MM ADAPT-PM4BR4-116/54 |                                                                                       |              |                          |
| 1                                                                                                                                                       | Top Sub-Remet 4" Adaptor Tube                                                         | 7.79         | ADPAT-SUB-PM4BR4-116/54  |
| 2                                                                                                                                                       | Remet 4"                                                                              | 1.06         | ADAPT-ATUBE-PM4BR4       |
| 3                                                                                                                                                       | O Ring (Adaptor Tube Remet 4") x4                                                     | 0.02         | SK-BR4                   |
| 4                                                                                                                                                       | Circlip A                                                                             | 0.02         | BD543/542-CIRCLIP-4      |
| <b>Parts List</b>                                                                                                                                       |                                                                                       |              |                          |
| 5                                                                                                                                                       | Sample Tube-Metzke 4"                                                                 | 3.5          | BD543/542-STUBE-M4/54    |
| 6                                                                                                                                                       | O Ring (Sample Tube) x 5                                                              | 0.02         | BD543/542-SK-STUBE       |
| 7                                                                                                                                                       | Circlip B                                                                             | 0.02         | BD543/542-CIRCLIP-4      |
| 8                                                                                                                                                       | Air Screen                                                                            | 0.04         | BD543/542-AIRSCREEN      |
| 9                                                                                                                                                       | Distributor                                                                           | 0.56         | BD543/542-DIST           |
| 10                                                                                                                                                      | O Ring (Distributor)                                                                  | 0.02         | BD543/542-SK-DIST        |
| 11                                                                                                                                                      | Check Valve/Plunger                                                                   | 0.5          | BD543/542-CVALVE         |
| 12                                                                                                                                                      | Y Ring (Check Valve)                                                                  | 0.02         | BD543/542-SK-CVALVE      |
| 13                                                                                                                                                      | Spring                                                                                | 0.08         | BD543/542-SPRING         |
| 14                                                                                                                                                      | Mount Sample Tube                                                                     | 0.86         | BD543/542-STUBE-M        |
| 15                                                                                                                                                      | O Ring (Mount Sample Tube)                                                            | 0.02         | BD543/542-SK-STUBEM      |
| 16                                                                                                                                                      | Inner Cylinder/Top Barrel-Metzke 4"<br>(to build 543 Hammer with thread of metzke 4") | 7.26         | BD543-ICYL-M4/54         |
| 17                                                                                                                                                      | O Ring (Inner Cylinder)                                                               | 0.02         | BD543/542-SK-ICYL        |
| 18                                                                                                                                                      | Piston                                                                                | 11.64        | BD543/542-PISTON         |
| 19                                                                                                                                                      | External Cylinder/Barrel/Piston Case                                                  | 19.17        | BD543-ECYL               |
| 20                                                                                                                                                      | Bearing Bush                                                                          | 0.05         | BD543/542-PRING          |
| 21                                                                                                                                                      | Bush Retaining Ring                                                                   | 2.35         | BD543/542-BUSH           |
| 22                                                                                                                                                      | O Ring (Bearing Bush) x 2                                                             | 0.02         | BD543/542-SK-BUSH        |
| 23                                                                                                                                                      | Bit Ring                                                                              | 0.26         | BD543/542-SRING          |
| 24                                                                                                                                                      | O Ring (Bit Ring)                                                                     | 0.02         | BD543/542-SK-SRING       |
| 25                                                                                                                                                      | Shroud                                                                                | 2.21         | BD543/542-SHROUD-127/125 |
| 26                                                                                                                                                      | Drive Sub                                                                             | 2.94         | BD543/542-DSUB           |
| 27                                                                                                                                                      | Drill Bit                                                                             | 10.96        | BD543/542-127DC          |
| 28                                                                                                                                                      | Seal Kit (Item2+6+10+12+15+17+22+24)                                                  | 0.3          | BD543/542-SK             |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range                    | Connection Thread          |
|------------------|--------------------------|----------------------------|-----------|-------------------------------|----------------------------|
| 1191mm           | 62.0kg                   | Φ116mm                     | BD543     | Φ113- Φ133                    | 3" – 4" Remet<br>4" Metzke |
| Box Size         | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption               |                            |
| 1230x140x170mm   | 35Hz                     | 25-40r/min                 |           | 200-500(PSI)<br>300-1200(CFM) |                            |

# BD545 R.C. HAMMER

| 5" R.C. Hammers | Item Description | Weight Kg | Part Number |
|-----------------|------------------|-----------|-------------|
|-----------------|------------------|-----------|-------------|

**A** Crossover sub Assy PIN Metzke 4.5"(57mm) to Remet 4.5"(blank, Matrix, Drill Star...) PIN to BOX CROSSOVER SUB ASSEMBLY OD117MM ADAPT-PM4BR4-117/57

|   |                                     |      |                      |
|---|-------------------------------------|------|----------------------|
| 1 | Top Sub-Remet 4.5"                  | 7.79 | SUB-RC-PM45BR45-117  |
| 2 | Adaptor Tube Remet 4.5"             | 1.06 | ADAPT-ATUBE-PM45BR45 |
| 3 | O Ring (Adaptor Tube Remet 4.5") x6 | 0.02 | SK-BR45              |
| 4 | Circlip A                           | 0.02 | BD545-CIRCLIP-A      |

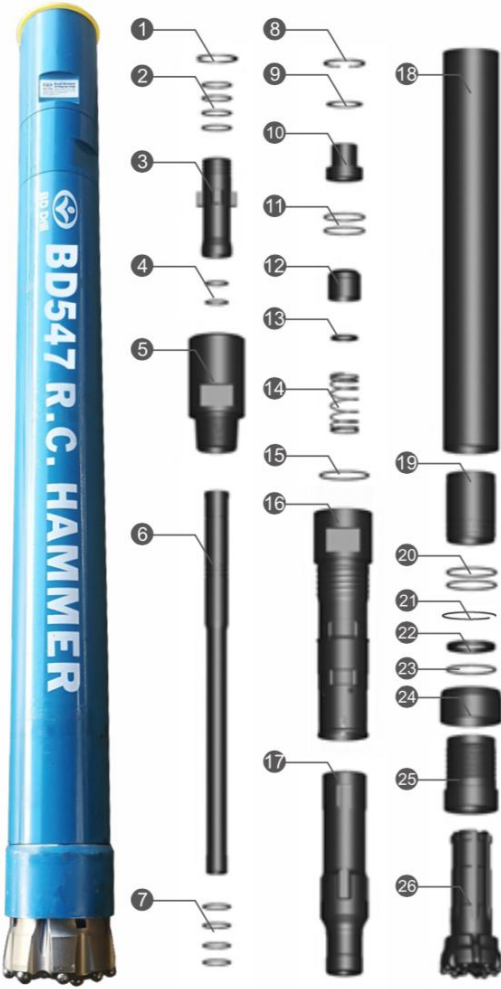
**Parts List**

|    |                                         |      |                     |
|----|-----------------------------------------|------|---------------------|
| 5  | Sample Tube                             | 4.61 | BD545-STUBE-M4.5    |
| 6  | O Ring (Sample Tube) x 4                | 0.02 | BD545-SK-STUBE      |
| 7  | Circlip B                               | 0.02 | BD545-CIRCLIP-4     |
| 8  | Air Screen                              | 0.04 | BD545-AIRSCREEN     |
| 9  | Distributor                             | 0.48 | BD545-DIST          |
| 10 | O Ring (Distributor) x2                 | 0.02 | BD545-SK-DIST       |
| 11 | Check Valve/Plunger                     | 0.53 | BD545-CVALVE        |
| 12 | Y Ring (Check Valve)                    | 0.02 | BD545-SK-CVALVE     |
| 13 | Spring                                  | 0.12 | BD545-SPRING        |
| 14 | O Ring (Inner Cylinder)                 | 0.02 | BD545-SK-ICYL       |
| 15 | Inner Cylinder/Top Barrel               | 10.2 | BD545-ICYL-M4.5     |
| 16 | Piston                                  | 15.1 | BD545-PISTON        |
| 17 | External Cylinder/Barrel/Piston Case    | 17.2 | BD545-ECYL          |
| 18 | Bearing Bush                            | 2.95 | BD545-BUSH          |
| 19 | O Ring (Bearing Bush) x 4               | 0.05 | BD545-SK-BUSH       |
| 20 | Bush Retaining Ring                     | 0.02 | BD545-PRING         |
| 21 | Bit Ring                                | 0.26 | BD545-SRING         |
| 22 | O Ring (Bit Ring)                       | 0.02 | BD545-SK-SRING      |
| 23 | Shroud                                  | 1.6  | BD545-SHROUD127/125 |
| 24 | Drive Sub                               | 3.41 | BD545-DSUB          |
| 25 | Drill Bit                               | 12.6 | BD545-133DC         |
| 26 | Seal Kit (Item 2+4(3)+7+11+13+15+20+23) | 0.3  | BD545-SK            |

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range                    | Connection Thread                   |
|------------------|--------------------------|----------------------------|-----------|-------------------------------|-------------------------------------|
| 1261mm           | 65.0kg                   | Φ117.5mm                   | BD545     | Φ123- Φ140                    | 4" – 4.5" Remet<br>4" – 4.5" Metzke |
| Box Size         | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption               |                                     |
| 1260x150x180mm   | 35Hz                     | 25-40r/min                 |           | 200-500(PSI)<br>300-1200(CFM) |                                     |

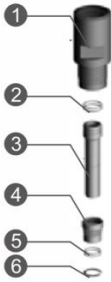
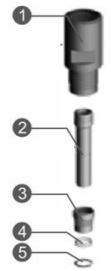
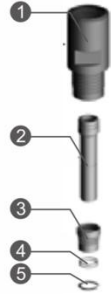
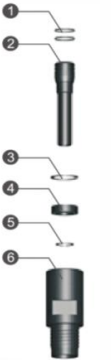
# BD547 R.C. HAMMER

| 5" R.C. Hammers                                                                    | Item Description                            | Weight Kg | Part Number          |
|------------------------------------------------------------------------------------|---------------------------------------------|-----------|----------------------|
|  | <b>A Top sub Assy Remet 3.5"</b>            |           |                      |
|                                                                                    | 1 Circlip A                                 | 0.04      | BD547-CIRCLIP-R4.5   |
|                                                                                    | 2 O Ring (Adaptor Tube Remet 4.5") x 4      | 0.02      | BD547-SK-ASCREEN4.5  |
|                                                                                    | 3 Adaptor Tube Remet 4.5"                   | 2.95      | BD547-ASCREEN-R4.5   |
|                                                                                    | 4 O Ring (Adaptor Tube) x 2                 | 0.02      | BD547-SK-ASCREENMR   |
|                                                                                    | 5 Top Sub-Remet 3.5"                        | 6.98      | BD547-TSUB-R4.5      |
|                                                                                    | <b>B Top sub Assy Metzke 4.5"</b>           |           |                      |
|                                                                                    | 1 Circlip A                                 | 0.04      | BD547-CIRCLIP-M4.5   |
|                                                                                    | 2 Adaptor Tube Metzke 4.5                   | 2.95      | BD547-ASCREEN-M4.5   |
|                                                                                    | 3 O Ring Adaptor Tube x 2                   | 0.02      | BD547-SK-ASCREENMR   |
|                                                                                    | 4 Top Sub-Metzke 4.5"                       | 6.98      | BD547-TSUB-M4.5      |
|                                                                                    | <b>Parts List</b>                           |           |                      |
|                                                                                    | 6 Sample Tube                               | 4.61      | BD547-STUBE          |
|                                                                                    | 7 O Ring (Sample Tube) x 4                  | 0.02      | BD547-SK-STUBE       |
|                                                                                    | 8 Circlip B                                 | 0.02      | BD547-CIRCLIP-4      |
|                                                                                    | 9 Air Screen                                | 0.04      | BD547-AIRSCREEN      |
|                                                                                    | 10 Distributor                              | 0.48      | BD547-DIST           |
|                                                                                    | 11 O Ring (Distributor) x 2                 | 0.02      | BD547-SK-DIST        |
|                                                                                    | 12 Check Valve/Plunger                      | 0.53      | BD547-CVALVE         |
|                                                                                    | 13 Y Ring (Check Valve)                     | 0.02      | BD547-SK-CVALVE      |
|                                                                                    | 14 Spring                                   | 0.12      | BD547-SPRING         |
|                                                                                    | 15 O Ring (Inner Cylinder)                  | 0.02      | BD547-SK-ICYL        |
|                                                                                    | 16 Inner Cylinder/Top Barrel                | 10.2      | BD547-ICYL           |
|                                                                                    | 17 Piston                                   | 15.1      | BD547-PISTON         |
|                                                                                    | 18 External Cylinder/Barrel/Piston Case     | 17.2      | BD547-ECYL           |
|                                                                                    | 19 Bearing Bush                             | 0.05      | BD547-PRING          |
|                                                                                    | 20 O Ring (Bearing Bush) x 2                | 2.95      | BD547-BUSH           |
|                                                                                    | 21 Bush Retaining Ring                      | 0.02      | BD547-SK-BUSH        |
|                                                                                    | 22 Bit Ring                                 | 0.26      | BD547-SRING          |
|                                                                                    | 23 O Ring (Bit Ring)                        | 0.02      | BD547-SK-SRING       |
|                                                                                    | 24 Shroud                                   | 1.6       | BD547-SHROUD-127/125 |
|                                                                                    | 25 Drive Sub                                | 3.41      | BD547-DSUB           |
|                                                                                    | 26 Drill Bit                                | 12.6      | BD547-133DC          |
|                                                                                    | 27 Seal Kit (Item 2+4(3)+7+11+13+15+21+233) | 0.3       | BD547-SK             |

## Technical Data

| Length(Less bit) | Weight(Less bit)      | External Diameter          | Bit Shank | Hole Range                    | Connection Thread                 |
|------------------|-----------------------|----------------------------|-----------|-------------------------------|-----------------------------------|
| 1292mm           | 80.0kg                | Φ124.4mm                   | BD547     | Φ133- Φ146                    | 4" – 4.5" Remet<br>4"-4.5" Metzke |
| Box Size         | Impact rate At 2.4Mpa | Recommended rotation speed |           | Air Consumption               |                                   |
| 1300x160x190mm   | 35Hz                  | 25-40r/min                 |           | 200-500(PSI)<br>300-1200(CFM) |                                   |

# BD040 R.C. HAMMER

| 5" R.C. Hammers                                                                                                                                                                                                                                                                              | Item Description                      | Weight Kg | Part Number               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------|---------------------------|
|  <p><b>Top Sub Assembly-A</b></p> | <b>A Top sub Assy Remet 4"</b>        |           |                           |
|                                                                                                                                                                                                                                                                                              | ① Top Sub-Remet 4"                    | 7.79      | BD040-TSUB-R4             |
|                                                                                                                                                                                                                                                                                              | ② O Ring (Adaptor Tube Remet 4") x2   | 0.02      | BD040-SK-ASCREEEN-R4      |
|                                                                                                                                                                                                                                                                                              | ③ Adaptor Tube Remet 4"               | 1.51      | BD040-ASCREEEN-R4         |
|                                                                                                                                                                                                                                                                                              | ④ Air Screen                          | 0.5       | BD040-AIRSCREEN           |
|                                                                                                                                                                                                                                                                                              | ⑤ O Ring (Air Screen) x 2             | 0.02      | BD040-SK-AIRSCREEN        |
|                                                                                                                                                                                                                                                                                              | ⑥ Circlip                             | 0.02      | BD040-CIRCLIP             |
|  <p><b>Top Sub Assembly-B</b></p>                                | <b>B Top sub Assy Metzke 4"</b>       |           |                           |
|                                                                                                                                                                                                                                                                                              | ① Top Sub-Metzke 4"                   | 7.79      | BD040-TSUB-M4             |
|                                                                                                                                                                                                                                                                                              | ② Adaptor Tube Metzke 4"              | 1.51      | BD040-ASCREEEN-M4         |
|                                                                                                                                                                                                                                                                                              | ③ Air Screen                          | 0.5       | BD040-AIRSCREEN           |
|                                                                                                                                                                                                                                                                                              | ④ O Ring (Air Screen) x 2             | 0.02      | BD040-SK-AIRSCREEN        |
|                                                                                                                                                                                                                                                                                              | ⑤ Circlip                             | 0.02      | BD040-CIRCLIP             |
|  <p><b>Top Sub Assembly-C</b></p>                            | <b>C Top sub Assy Metzke 4.5"</b>     |           |                           |
|                                                                                                                                                                                                                                                                                              | ① Top Sub-Metzke 4.5"                 | 7.79      | BD040-TSUB-M4.5           |
|                                                                                                                                                                                                                                                                                              | ② Adaptor Tube Metzke 4.5"            | 1.51      | BD040-ASCREEEN-M4.5       |
|                                                                                                                                                                                                                                                                                              | ③ Air Screen                          | 0.5       | BD040-AIRSCREEN           |
|                                                                                                                                                                                                                                                                                              | ④ O Ring (Air Screen) x 2             | 0.02      | BD040-SK-AIRSCREEN        |
|                                                                                                                                                                                                                                                                                              | ⑤ Circlip                             | 0.02      | BD040-CIRCLIP             |
|  <p><b>Top Sub Assembly-D</b></p>                   | <b>D Top sub Assy Remet 4.5"</b>      |           |                           |
|                                                                                                                                                                                                                                                                                              | ① O Ring (Adaptor Tube Remet 4.5") x2 | 0.02      | BD040/52-SK-ASCREEEN-R4.5 |
|                                                                                                                                                                                                                                                                                              | ② Adaptor Tube Remet 4.5"             | 1.51      | BD040/52-ASCREEEN-R4.5    |
|                                                                                                                                                                                                                                                                                              | ③ Circlip A                           | 0.02      | BD040/52-CIRCLIP-1        |
|                                                                                                                                                                                                                                                                                              | ④ Air Screen                          | 0.5       | BD040/52-AIRSCREEN-R4.5   |
|                                                                                                                                                                                                                                                                                              | ⑤ Circlip B                           | 0.02      | BD040/52-CIRCLIP-2        |
|                                                                                                                                                                                                                                                                                              | ⑥ Top Sub-Remet 4.5"                  | 7.79      | BD040-TSUB-R4.5           |

## BD040 R.C. HAMMER

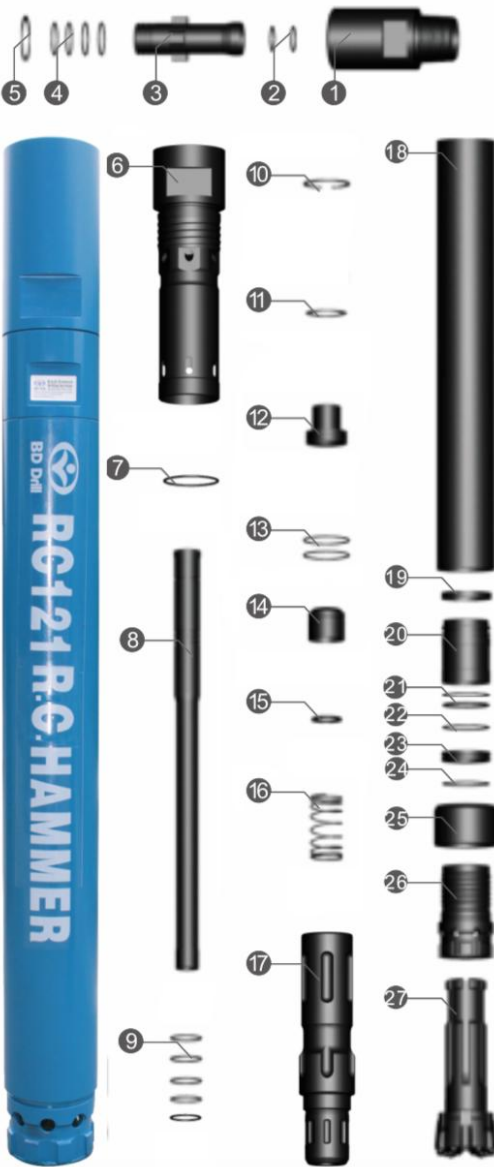
| 5" R.C. Hammers                                                                    | Item Description                                      | Weight Kg | Part Number          |
|------------------------------------------------------------------------------------|-------------------------------------------------------|-----------|----------------------|
|  | 7 Check Valve/Plunger                                 | 0.63      | BD040/52-CVALVE      |
|                                                                                    | 8 Y Ring (Check Valve)                                | 0.01      | BD040/52-SK-CVALVE   |
|                                                                                    | 9 Spring                                              | 0.12      | BD040/52-SPRING      |
|                                                                                    | 10 Spring Seat                                        | 0.12      | BD040/52-SSEAT       |
|                                                                                    | 11 Make Up Ring, Steel                                | 0.09      | BD040/52-MUR-STEEL   |
|                                                                                    | 12 Make Up Ring, Viton                                | 0.06      | BD040/52-MUR-VITON   |
|                                                                                    | 13 Distributor                                        | 1.75      | BD040/52-DIST        |
|                                                                                    | 14 O Ring (Distributor) x 1                           | 0.02      | BD040/52-SK-DIST     |
|                                                                                    | 15 O Ring (Sample Tube) x 2                           | 0.02      | BD040-SK-STUBE1      |
|                                                                                    | 16 O Ring (Sample Tube) x 1                           | 0.02      | BD040-SK-STUBE2      |
|                                                                                    | 17 Sample Tube Lower                                  | 4.32      | BD040-STUBE          |
|                                                                                    | 18 Mount Sample Tube                                  | 1         | BD040-STUBE-MOUNT    |
|                                                                                    | 19 O Ring (Mount Sample Tube) x 1                     | 0.02      | BD040-SK-STUBE-M     |
|                                                                                    | 20 Inner Cylinder                                     | 7.69      | BD040-ICYL           |
|                                                                                    | 21 Piston                                             | 13.63     | BD040-PISTON         |
|                                                                                    | 22 External Cylinder/Barrel/Piston Case               | 24.14     | BD040-ECYL           |
|                                                                                    | 23 Piston Retaining Ring                              | 0.1       | BD040-PRING          |
|                                                                                    | 24 Bearing Bush                                       | 1.89      | BD040-BUSH           |
|                                                                                    | 25 O Ring (Bearing Bush) x 1                          | 0.02      | BD040-SK-BUSH1       |
|                                                                                    | 26 O Ring (Bearing Bush) x 1                          | 0.02      | BD040-SK-BUSH2       |
|                                                                                    | 27 Bit Stop Ring                                      | 0.31      | BD040-SRING          |
|                                                                                    | 28 O Ring (Bit Stop Ring) x 1                         | 0.02      | BD040-SK-SRING       |
|                                                                                    | 29 Shroud                                             | 2.2       | BD040-SHROUD-136/134 |
|                                                                                    | 30 Drive Sub                                          | 3.67      | BD040-DSUB           |
|                                                                                    | 31 Drill Bit                                          | 15.09     | BD040-136DC=TV       |
|                                                                                    | 32 Seal Kit<br>(Item2(1)+5(4)+8+14+15+16+19+25+26+28) | 0.2       | BD040-SK             |

### Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range      | Connection Thread                       |
|------------------|--------------------------|----------------------------|-----------|-----------------|-----------------------------------------|
| 1362mm           | 80.5kg                   | Φ120.5mm                   | BD040     | Φ124- Φ142      | 3.5" – 4.5" Remet<br>3.5" - 4.5" Metzke |
| Working Pressure | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption |                                         |
|                  |                          |                            |           | 200-500(PSI)    |                                         |
| 1.5-3.5Mpa       | 35Hz                     | 25-40r/min                 |           | 300-1200(CFM)   |                                         |

# RC121-BD040 R.C. HAMMER

4.5" R.C. Hammers



| ①                | DAPT-PM45BR45-121                                | Pin to Box Crossover Sub Assembly Od121mm |
|------------------|--------------------------------------------------|-------------------------------------------|
| ②                | ADAPT-SUB-PM45BR45-121                           | Pin to Box Crossover Sub Od121mm          |
| ③                | SK-BR45                                          | O Ring (Box Remet 4.5")                   |
| ④                | ATUBE-PM45BR45                                   | Adaptor Tube Pin to Box                   |
| ⑤                | SKOPM45                                          | O Ring (Pin Metzke 4.5)                   |
| Item Description |                                                  | Weight Kg                                 |
| ⑥                | Inner Cylinder                                   | 8.95                                      |
| ⑦                | O Ring x 1                                       | 0.02                                      |
| ⑧                | Sample Tube                                      | 5.2                                       |
| ⑨                | O Ring x 5                                       | 0.02                                      |
| ⑩                | Circlip B                                        | 0.02                                      |
| ⑪                | Air Screen                                       | 0.02                                      |
| ⑫                | Distribution Nozzle                              | 0.48                                      |
| ⑬                | "O" Ring x2                                      | 0.02                                      |
| ⑭                | Plunger/Check Valve                              | 0.53                                      |
| ⑮                | "Y" Ring x 1                                     | 0.02                                      |
| ⑯                | Spring                                           | 0.12                                      |
| ⑰                | Piston                                           | 14.1                                      |
| ⑱                | External Cylinder/Barrel/Wear Sleeve/Piston Case | 19.4                                      |
| ⑲                | Bush Retaining Ring                              | 0.02                                      |
| ⑳                | Bearing Bush/Bush Drive Sub                      | 1.85                                      |
| ㉑                | "O" Ring x 2                                     | 0.02                                      |
| ㉒                | Bit Retaining Ring                               | 0.31                                      |
| ㉓                | "O" Ring x 1                                     | 0.02                                      |
| ㉔                | Piston Retaining Ring                            | 0.15                                      |
| ㉕                | Shroud                                           | 2.2                                       |
| ㉖                | Drive Sub/Chuck                                  | 3.67                                      |
| ㉗                | Drill Bit                                        | 15.09                                     |

Crossover Sub Remet 4 ½"(Thread available in Drill Star, Matrix and Blank

## Technical Data

| Length(Less bit) | Weight(Less bit)         | External Diameter          | Bit Shank | Hole Range                    | Connection Thread         |
|------------------|--------------------------|----------------------------|-----------|-------------------------------|---------------------------|
| 1039mm           | 71.0kg                   | Φ121mm                     | RE040     | Φ126- Φ146                    | Metzke 4.5"<br>Remet 4.5" |
| Box Size         | Impact rate<br>At 2.4Mpa | Recommended rotation speed |           | Air Consumption               |                           |
| 1340x350x350mm   | 35Hz                     | 25-40r/min                 |           | 200-500(PSI)<br>300-1200(CFM) |                           |

# BD52 R.C. HAMMER

| 5.5" R.C. Hammers                                                                  |  | Item Description                            | Weight Kg | Part Number                                 |
|------------------------------------------------------------------------------------|--|---------------------------------------------|-----------|---------------------------------------------|
|  |  | <b>A Top sub Assy Metzke 4.5"</b>           |           |                                             |
|                                                                                    |  | 2 Adaptor Tube Metzke 4.5"                  | 2.19      | BD52-ASCREEN-M4.5                           |
|                                                                                    |  | 3 Circlip B                                 | 0.03      | BD52-CIRCLIP                                |
|                                                                                    |  | 4 Air Screen                                | 0.42      | BD52-AIRSCREEN-M4.5                         |
|                                                                                    |  | 5 Circlip A                                 | 0.03      | BD52-CIRCLIP                                |
|                                                                                    |  | 6 Top Sub-Metzke 4.5"                       | 8.92      | BD-TSUB-M4.5                                |
|                                                                                    |  | <b>B Top sub Assy Remet 4.5"</b>            |           |                                             |
|                                                                                    |  | 1 O Ring Adaptor Tube Remet 4.5" x 2        | 0.02      | BD040/52-SK-ASCREEN-R4.5                    |
|                                                                                    |  | 2 Adaptor Tube Remet 4.5"                   | 2.19      | BD040/52-ASCREEN-R4.5                       |
|                                                                                    |  | 3 Circlip B                                 | 0.03      | BD040/52-CIRCLIP                            |
|                                                                                    |  | <b>Parts List</b>                           |           |                                             |
|                                                                                    |  | 7 Check Valve/Plunger                       | 0.63      | BD040/52-CVALVE                             |
|                                                                                    |  | 8 Y Ring (Check Valve)                      | 0.03      | BD040/52-SK-CVALVE                          |
|                                                                                    |  | 9 Spring                                    | 0.12      | BD040/52-SPRING                             |
|                                                                                    |  | 10 Spring Seat                              | 0.12      | BD040/52-SSEAT                              |
|                                                                                    |  | 11 Make Up Ring, Steel                      | 0.1       | BD040/52-MUR-STEEL                          |
|                                                                                    |  | 12 Make Up Ring, Viton                      | 0.05      | BD040/52-MUR-VITON                          |
|                                                                                    |  | 13 Distributor                              | 1.31      | BD040/52-DIST                               |
|                                                                                    |  | 14 O Ring (Distributor)                     | 0.02      | BD040/52-SK-DIST                            |
|                                                                                    |  | 15 O Ring (Sample Tube) x 2                 | 0.02      | BD52-SK-STUBE1                              |
|                                                                                    |  | 16 O Ring (Sample Tube) x 1                 | 0.02      | BD52-SK-STUBE2                              |
|                                                                                    |  | 17 Sample Tube Lower                        | 4.52      | BD52-STUBE                                  |
|                                                                                    |  | 18 Mount Sample Tube                        | 0.8       | BD52-STUBE-MOUNT                            |
|                                                                                    |  | 19 O Ring (Mount Sample Tube)               | 0.02      | BD52-SK-STUBE-M                             |
|                                                                                    |  | 20 Inner Cylinder                           | 7.39      | BD52-ICYL                                   |
|                                                                                    |  | 21 Piston                                   | 14.63     | BD52-PISTON                                 |
|                                                                                    |  | 22 External Cylinder/Barrel/Piston Case     | 18.86     | BD52-ECYL                                   |
|                                                                                    |  | 23 Piston Retaining Ring                    | 0.13      | BD52-PRING                                  |
|                                                                                    |  | 24 Bearing Bush                             | 1.89      | BD52-BUSH                                   |
|                                                                                    |  | 25 O Ring (Bearing Bush) x 1                | 0.02      | BD52-SK-BUSH1                               |
|                                                                                    |  | 26 O Ring (Bearing Bush) x 1                | 0.02      | BD52-SK-BUSH2                               |
|                                                                                    |  | 27 Bit Stop Ring                            | 0.31      | BD52-SRING                                  |
|                                                                                    |  | 28 O Ring (Bit Stop Ring)                   | 0.02      | BD52-SK-SRING                               |
|                                                                                    |  | 29 Shroud (Retaining Option)                | 1.86      | BD52 SHROUD-136/134 or BD52R-SHROUD-136/134 |
|                                                                                    |  | 30 Drive Sub (Retaining Option)             | 4.17      | BD52-DSUB or BD52R-DSUB                     |
|                                                                                    |  | 31 Drill Bit (Retaining Option)             | 11.01     | BD52-136DC or BD52R-136DC                   |
|                                                                                    |  | 32 Seal Kit (Item 1+8+14+15+16+19+25+26+28) | 0.30      | BD52-SK                                     |

## Technical Data

| Length(Less bit) | Weight(Less bit)      | External Diameter          | Bit Shank | Hole Range                    | Connection Thread                 |
|------------------|-----------------------|----------------------------|-----------|-------------------------------|-----------------------------------|
| 1227mm           | 68.5kg                | Φ121mm                     | BD52      | Φ126- Φ142                    | 4" – 4.5" Remet<br>4"-4.5" Metzke |
| Working Pressure | Impact rate At 2.4Mpa | Recommended rotation speed |           | Air Consumption               |                                   |
| 1.5-3.5Mpa       | 35Hz                  | 25-40r/min                 |           | 200-500(PSI)<br>300-1200(CFM) |                                   |

# BD54 R.C. HAMMER

| 5.5" R.C. Hammers                                                                  |  | Item Description                              | Weight Kg | Part Number                                 |
|------------------------------------------------------------------------------------|--|-----------------------------------------------|-----------|---------------------------------------------|
|  |  | <b>A Top sub Assy Remet 4.5"</b>              |           |                                             |
|                                                                                    |  | 1 Top Sub-Remet 4.5"                          | 11.61     | BD54-TSUB-R4.5                              |
|                                                                                    |  | 2 O Ring (Adaptor Tube Remet 4.5") x 2        | 0.02      | BD54-SK-ASCREEEN-R4.5                       |
|                                                                                    |  | 3 Adaptor Tube Remet 4.5"                     | 2.35      | BD54-ASCREEEN-R4.5                          |
|                                                                                    |  | 4 Air Screen                                  | 0.50      | BD54-AIRSCREEN                              |
|                                                                                    |  | 5 O Ring (Air Screen) x 2                     | 0.02      | BD54-SK-AIRSCREEN                           |
|                                                                                    |  | 6 Circlip                                     | 0.04      | BD54-CIRCLIP                                |
|                                                                                    |  | <b>B Top sub Assy Metzke 4.5"</b>             |           |                                             |
|                                                                                    |  | 1 Top Sub-Metzke 4.5"                         | 11.61     | BD54-TSUB-M4.5                              |
|                                                                                    |  | 2 Adaptor Tube Metzke 4.5"                    | 2.35      | BD54-ASCREEEN-M4.5                          |
|                                                                                    |  | 3 Air Screen                                  | 0.5       | BD54-AIRSCREEN                              |
|                                                                                    |  | 4 O Ring (Air Screen) x 2                     | 0.02      | BD54-SK-AIRSCREEN                           |
|                                                                                    |  | 5 Circlip                                     | 0.04      | BD54-CIRCLIP                                |
|                                                                                    |  | <b>Parts List</b>                             |           |                                             |
|                                                                                    |  | 7 Check Valve/Plunger                         | 0.58      | BD54-CVALVE                                 |
|                                                                                    |  | 8 Y Ring (Check Valve)                        | 0.02      | BD54-SK-CVALVE                              |
|                                                                                    |  | 9 Spring                                      | 0.12      | BD54-SPRING                                 |
|                                                                                    |  | 10 Spring Seat                                | 0.12      | BD54-SSEAT                                  |
|                                                                                    |  | 11 Make Up Ring, Steel                        | 0.14      | BD54-MUR-STEEL                              |
|                                                                                    |  | 12 Make Up Ring, Viton                        | 0.06      | BD54-MUR-VITON                              |
|                                                                                    |  | 13 Distributor                                | 1.54      | BD54-DIST                                   |
|                                                                                    |  | 14 O Ring (Distributor)                       | 0.02      | BD54-SK-DIST                                |
|                                                                                    |  | 15 O Ring (Sample Tube) x 2                   | 0.02      | BD54-SK-STUBE1                              |
|                                                                                    |  | 16 O Ring (Sample Tube) x 1                   | 0.02      | BD54-SK-STUBE2                              |
|                                                                                    |  | 17 Sample Tube Lower                          | 6.47      | BD54-STUBE                                  |
|                                                                                    |  | 18 Mount Sample Tube                          | 1.00      | BD54-STUBE-MOUNT                            |
|                                                                                    |  | 19 O Ring (Mount Sample Tube)                 | 0.02      | BD54-SK-STUBE-M                             |
|                                                                                    |  | 20 Inner Cylinder                             | 8.54      | BD54-ICYL                                   |
|                                                                                    |  | 21 Piston                                     | 16.8      | BD54-PISTON                                 |
|                                                                                    |  | 22 External Cylinder/Barrel/Piston Case       | 23.44     | BD54-ECYL                                   |
|                                                                                    |  | 23 Piston Retaining Ring                      | 0.2       | BD54-PRING                                  |
|                                                                                    |  | 24 Bearing Bush                               | 1.89      | BD54-BUSH                                   |
|                                                                                    |  | 25 O Ring (Bearing Bush) x 1                  | 0.02      | BD54-SK-BUSH1                               |
|                                                                                    |  | 26 O Ring (Bearing Bush) x 1                  | 0.02      | BD54-SK-BUSH2                               |
|                                                                                    |  | 27 Bit Stop Ring                              | 0.43      | BD54-SRING                                  |
|                                                                                    |  | 28 O Ring (Bit Stop Ring)                     | 0.02      | BD54-SK-SRING                               |
|                                                                                    |  | 29 Shroud (Retaining Option)                  | 2.35      | BD54 SHROUD-143/141 or BD54R-SHROUD-136/134 |
|                                                                                    |  | 30 Drive Sub (Retaining Option)               | 4.9       | BD54-DSUB or BD54R-DSUB                     |
|                                                                                    |  | 31 Drill Bit (Retaining Option)               | 18.33     | BD54-143DC or BD54R-143DC                   |
|                                                                                    |  | 32 Seal Kit (Item 2+4+8+14+15+16+19+25+26+28) | 0.3       | BD52-SK                                     |

## Technical Data

| Length(Less bit) | Weight(Less bit)      | External Diameter          | Bit Shank | Hole Range                    | Connection Thread         |
|------------------|-----------------------|----------------------------|-----------|-------------------------------|---------------------------|
| 1294mm           | 84.5kg                | Φ130mm                     | BD54      | Φ136- Φ150                    | 4.5" Remet<br>4.5" Metzke |
| Working Pressure | Impact rate At 2.4Mpa | Recommended rotation speed |           | Air Consumption               |                           |
| 1.5-3.5Mpa       | 35Hz                  | 25-40r/min                 |           | 200-500(PSI)<br>300-1200(CFM) |                           |

## REVERSE CIRCULATION DRILL BIT AND SHROUD

### BD 531 Reverse circulation drill bit and shroud

|  | Diameter |       | No x Button diameter mm |               | Button Angle° | Flushing Holes | Shroud Diameter | Weight (Kg) | Part No.  |
|-----------------------------------------------------------------------------------|----------|-------|-------------------------|---------------|---------------|----------------|-----------------|-------------|-----------|
|                                                                                   | mm       | Inch  | Gauge Buttons           | Front Buttons |               |                |                 |             |           |
|                                                                                   | 86       | 2 1/4 | 6x12                    | 4x12          | 35            | 2              | 84              | 4.2         | BD351-86  |
|                                                                                   | 89       | 2 1/2 | 8x12                    | 5x12          | 35            | 2              | 87              | 4.3         | BD351-89  |
|                                                                                   | 95       | 2 3/4 | 8x12                    | 6x12          | 35            | 2              | 93              | 4.6         | BD351-95  |
|                                                                                   | 102      | 3     | 8x12                    | 6x12          | 35            | 2              | 100             | 4.9         | BD531-102 |

### RC3.5Y Reverse circulation drill bit and shroud

|  | Diameter |         | No x Button diameter mm |               | Button Angle° | Flushing Holes | Shroud Diameter | Weight (Kg) | Part No.   |
|------------------------------------------------------------------------------------|----------|---------|-------------------------|---------------|---------------|----------------|-----------------|-------------|------------|
|                                                                                    | mm       | Inch    | Gauge Buttons           | Front Buttons |               |                |                 |             |            |
|                                                                                    | 100      | 3 15/16 | 6x16                    | 6x14+6x13     | 35            | 2              | 98              | 6.3         | RC3.5Y-100 |
|                                                                                    | 104      | 4 1/10  | 6x16                    | 6x14+6x13     | 35            | 2              | 102             | 6.6         | RC3.5Y-104 |
|                                                                                    | 108      | 4 1/4   | 8x16                    | 6x14+6x13     | 35            | 2              | 106             | 6.9         | RC3.5Y-108 |
|                                                                                    | 114      | 4 1/2   | 8x16                    | 6x14+6x13     | 35            | 2              | 112             | 7.5         | RC3.5Y-114 |

### BD 004 Reverse circulation drill bit and shroud

|  | Diameter |       | No x Button diameter mm |               | Button Angle° | Flushing Holes | Shroud Diameter | Weight (Kg) | Part No.  |
|-------------------------------------------------------------------------------------|----------|-------|-------------------------|---------------|---------------|----------------|-----------------|-------------|-----------|
|                                                                                     | mm       | Inch  | Gauge Buttons           | Front Buttons |               |                |                 |             |           |
|                                                                                     | 114      | 4 1/2 | 8x14                    | 6x14          | 35            | 2              | 112             | 11.5        | BD004-114 |
|                                                                                     | 118      | 4 5/8 | 8x14                    | 6x14          | 35            | 2              | 116             | 11.7        | BD004-118 |
|                                                                                     | 121      | 4 3/4 | 8x14                    | 6x14          | 35            | 2              | 119             | 12.0        | BD004-121 |
|                                                                                     | 127      | 5     | 8x14                    | 8x14          | 35            | 2              | 125             | 12.4        | BD004-127 |

## BD 542 Reverse circulation drill bit and shroud

|  | Diameter |       | No x Button diameter mm |               | Button Angle° | Flushing Holes | Shroud Diameter | Weight (Kg) | Part No.  |
|-----------------------------------------------------------------------------------|----------|-------|-------------------------|---------------|---------------|----------------|-----------------|-------------|-----------|
|                                                                                   | mm       | Inch  | Gauge Buttons           | Front Buttons |               |                |                 |             |           |
|                                                                                   | 121      | 4 3/4 | 8x14                    | 6x14          | 35            | 2              | 119             | 10.6        | BD542-121 |
|                                                                                   | 124      | 4 7/8 | 8x14                    | 8x13          | 35            | 2              | 122             | 10.8        | BD542-124 |
|                                                                                   | 127      | 5     | 8x14                    | 8x14          | 35            | 2              | 125             | 11.0        | BD542-127 |
|                                                                                   | 130      | 5 1/8 | 8x14                    | 10x14         | 35            | 2              | 128             | 11.3        | BD542-130 |

## BD 543 Reverse circulation drill bit and shroud

|  | Diameter |       | No x Button diameter mm |               | Button Angle° | Flushing Holes | Shroud Diameter | Weight (Kg) | Part No.  |
|------------------------------------------------------------------------------------|----------|-------|-------------------------|---------------|---------------|----------------|-----------------|-------------|-----------|
|                                                                                    | mm       | Inch  | Gauge Buttons           | Front Buttons |               |                |                 |             |           |
|                                                                                    | 124      | 4 7/8 | 8x14                    | 8x13          | 35            | 2              | 122             | 10.8        | BD543-124 |
|                                                                                    | 127      | 5     | 8x14                    | 8x14          | 35            | 2              | 125             | 11.0        | BD543-127 |
|                                                                                    | 130      | 5 1/8 | 8x14                    | 10x14         | 35            | 2              | 128             | 11.3        | BD543-130 |
|                                                                                    | 133      | 5 1/4 | 8x16                    | 10x14         | 35            | 2              | 131             | 11.8        | BD543-133 |

## BD 545 Reverse circulation drill bit and shroud

|  | Diameter |       | No x Button diameter mm |               | Button Angle° | Flushing Holes | Shroud Diameter | Weight (Kg) | Part No.  |
|-------------------------------------------------------------------------------------|----------|-------|-------------------------|---------------|---------------|----------------|-----------------|-------------|-----------|
|                                                                                     | mm       | Inch  | Gauge Buttons           | Front Buttons |               |                |                 |             |           |
|                                                                                     | 124      | 4 7/8 | 8x14                    | 8x13          | 35            | 2              | 122             | 13.3        | BD545-124 |
|                                                                                     | 127      | 5     | 8x14                    | 8x14          | 35            | 2              | 125             | 13.5        | BD545-127 |
|                                                                                     | 133      | 5 1/4 | 8x16                    | 10x14         | 35            | 2              | 131             | 13.8        | BD545-133 |
|                                                                                     | 136      | 5 3/8 | 8x16                    | 6x16+3x14     | 35            | 2              | 134             | 14.2        | BD545-136 |

## BD 040 Reverse circulation drill bit and shroud

|  | Diameter |        | No x Button diameter mm |               | Button Angle° | Flushing Holes | Shroud Diameter | Weight (Kg) | Part No.  |
|-----------------------------------------------------------------------------------|----------|--------|-------------------------|---------------|---------------|----------------|-----------------|-------------|-----------|
|                                                                                   | mm       | Inch   | Gauge Buttons           | Front Buttons |               |                |                 |             |           |
|                                                                                   | 124      | 4 7/8  | 8x14                    | 8x13          | 35            | 2              | 122             | 14.3        | BD040-124 |
|                                                                                   | 127      | 5      | 8x14                    | 8x14          | 35            | 2              | 125             | 14.7        | BD040-127 |
|                                                                                   | 133      | 5 1/4  | 8x16                    | 10x14         | 35            | 2              | 131             | 15.2        | BD040-133 |
|                                                                                   | 138      | 5 7/16 | 8x16                    | 6x16+3x14     | 35            | 2              | 136             | 15.8        | BD040-138 |

## BD 52 Reverse circulation drill bit and shroud

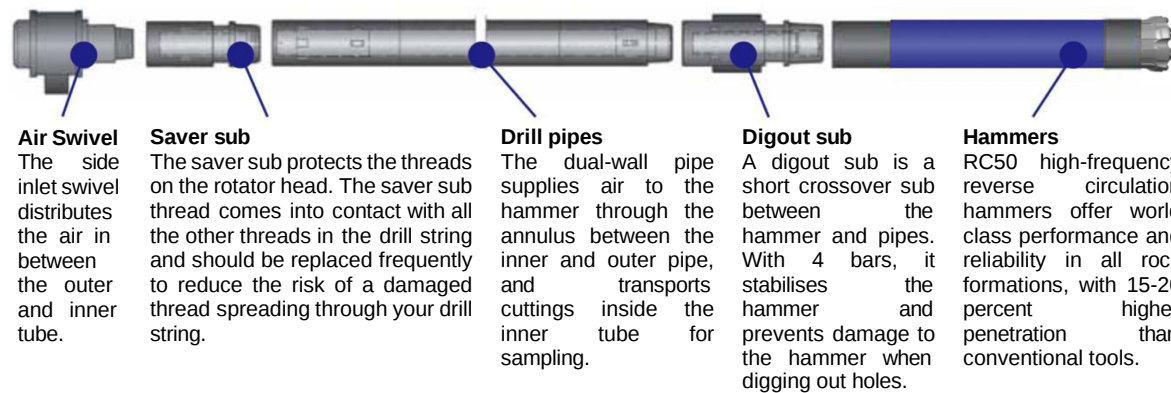
|  | Diameter |       | No x Button diameter mm |               | Button Angle° | Flushing Holes | Shroud Diameter | Weight (Kg) | Part No. |
|------------------------------------------------------------------------------------|----------|-------|-------------------------|---------------|---------------|----------------|-----------------|-------------|----------|
|                                                                                    | mm       | Inch  | Gauge Buttons           | Front Buttons |               |                |                 |             |          |
|                                                                                    | 133      | 5 1/4 | 8x16                    | 10x14         | 35            | 2              | 131             | 11.2        | BD52-133 |
|                                                                                    | 136      | 5 3/8 | 8x16                    | 6x16+3x14     | 35            | 2              | 134             | 11.5        | BD52-136 |
|                                                                                    | 140      | 5 1/2 | 8x16                    | 6x16+3x14     | 35            | 2              | 138             | 11.9        | BD52-140 |
|                                                                                    | 143      | 5 5/8 | 8x16                    | 6x16+3x14     | 35            | 2              | 141             | 12.3        | BD52-143 |

## BD 54 Reverse circulation drill bit and shroud

|  | Diameter |       | No x Button diameter mm |               | Button Angle° | Flushing Holes | Shroud Diameter | Weight (Kg) | Part No. |
|-------------------------------------------------------------------------------------|----------|-------|-------------------------|---------------|---------------|----------------|-----------------|-------------|----------|
|                                                                                     | mm       | Inch  | Gauge Buttons           | Front Buttons |               |                |                 |             |          |
|                                                                                     | 136      | 5 3/8 | 8x16                    | 6x16+3x14     | 35            | 2              | 134             | 18.2        | BD54-136 |
|                                                                                     | 140      | 5 1/2 | 8x16                    | 6x16+3x14     | 35            | 2              | 138             | 18.5        | BD54-140 |
|                                                                                     | 143      | 5 5/8 | 8x16                    | 6x16+3x14     | 35            | 2              | 141             | 18.8        | BD54-143 |
|                                                                                     | 146      | 5 3/4 | 8x16                    | 6x16+3x14     | 35            | 2              | 144             | 19.2        | BD54-146 |

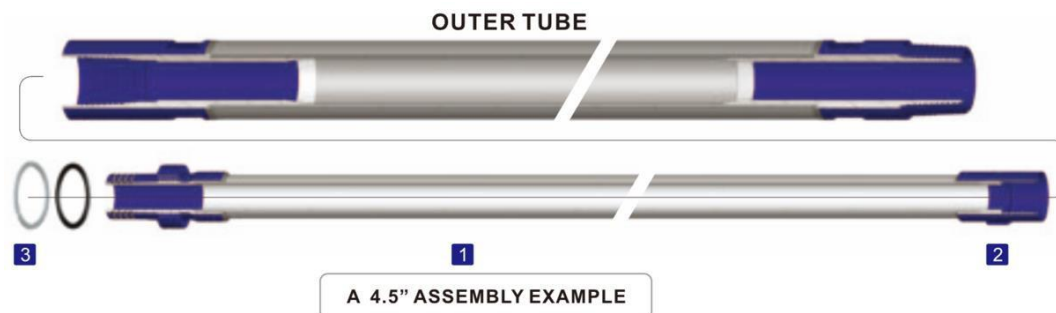
## Reverse circulation drill string

Black Diamond offers a complete range of reverse circulation rock drilling tools. The drill string equipment is designed specifically for greenfield exploration and in-pit grade control.



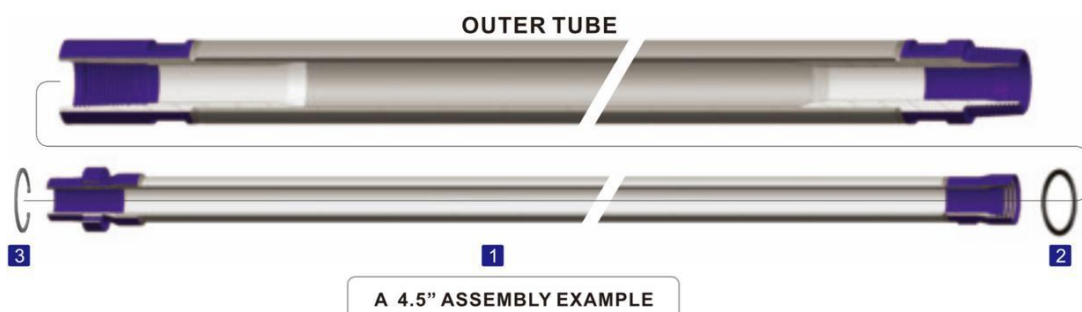
### Remet

|   | A                             | 1                               | 2                           | 3                            |
|---|-------------------------------|---------------------------------|-----------------------------|------------------------------|
| 1 | Rod RC 4-1/2" x 6m Long Remet | Inner Tube RC 4-1/2" x 6m Remet | O-Ring, 4-1/2" Remet/Metzke | Circlip, 4-1/2" Remet        |
| 2 | Rod RC 4-1/2" x 3m Long Remet | Inner Tube RC 4-1/2" x 3m Remet | O-Ring, 4-1/2" Remet/Metzke | Circlip, 4-1/2" Remet        |
| 3 | Rod RC 4" x 6m Long Remet     | Inner Tube RC 4" x 6m Remet     | O-Ring, 4" Remet            | Circlip, 4" Remet/Metzke     |
| 4 | Rod RC 4" x 6m Long Remet     | Inner Tube RC 4" x 3m Remet     | O-Ring, 4" Remet            | Circlip, 4" Remet/Metzke     |
| 5 | Rod RC 3-1/2" x 6m Long Remet | Inner Tube RC 3-1/2" x 6m Remet | O-Ring, 3-1/2" Remet/Metzke | Circlip, 3-1/2" Remet/Metzke |
| 6 | Rod RC 3-1/2" x 3m Long Remet | Inner Tube RC 3-1/2" x 3m Remet | O-Ring, 3-1/2" Remet/Metzke | Circlip, 3-1/2" Remet/Metzke |



### Metzke

|   | A                              | 1                                | 2                           | 3                            |
|---|--------------------------------|----------------------------------|-----------------------------|------------------------------|
| 1 | Rod RC 4-1/2" x 6m Long Metzke | Inner Tube RC 4-1/2" x 6m Metzke | O-Ring, 4-1/2" Metzke/Remet | Circlip, 4-1/2" Metzke/Remet |
| 2 | Rod RC 4-1/2" x 3m Long Metzke | Inner Tube RC 4-1/2" x 3m Metzke | O-Ring, 4-1/2" Metzke/Remet | Circlip, 4-1/2" Metzke/Remet |
| 3 | Rod RC 4" x 6m Long Metzke     | Inner Tube RC 4" x 6m Metzke     | O-Ring, 4" Metzke           | Circlip, 4" Metzke           |
| 4 | Rod RC 4" x 6m Long Metzke     | Inner Tube RC 4" x 3m Metzke     | O-Ring, 4" Metzke           | Circlip, 4" Metzke           |
| 5 | Rod RC 3-1/2" x 6m Long Metzke | Inner Tube RC 3-1/2" x 6m Metzke | O-Ring, 3-1/2" Metzke/Remet | Circlip, 3-1/2" Metzke/Remet |
| 6 | Rod RC 3-1/2" x 3m Long Metzke | Inner Tube RC 3-1/2" x 3m Metzke | O-Ring, 3-1/2" Metzke/Remet | Circlip, 3-1/2" Metzke/Remet |





## Surface Drilling Top Hammer

- Top Hammer Drill Bits ..... PAGE 54
- Top Hammer Drill Rods ..... PAGE 56
- Top Hammer Coupling Sleeves ..... PAGE 58
- Top Hammer Shank Adaptors ..... PAGE 58

## Why do you use top hammer drilling

Availability, Variety of drill bit designs, and low operating costs make top hammer drilling an advantageous method in many different industries but with the widespread application inevitably follows an equally wide range of demands and challenges.

Versatile and flexible, top hammer drilling is used by various industries all over the world, Arguably, the biggest advantage of top hammer drilling is the size, availability and cost of drilling rigs.

The rigs can be taken to challenging job locations, drilling contractors usually have machines available with short notice, and they tend to be cheaper than DTH or rotary drilling rigs.

On the drilling consumable side, the top hammer drill string is also cost-efficient, fast to set up and, thanks to the wide range of available bit designs, top hammer bits can always be optimised for the ground conditions.

The advantages and possibilities of top hammer drilling do, however, not just mean a broad range of possible applications, but also an equally broad range of clients and demands. Increased automation, longer bit durability, and improved efficiency are among the requirements that need to be met by developers.



## Ideal for mining and underground operations

Ideal for drilling narrow and short boreholes (down to 1 inch wide and up to 40m in length) in hard rock, top hammer drills are primarily used in mining, construction, and for quarrying of rock material.

Top Hammer drilling should be the default choice for all holes with a width between 1 ½ - 4inch and a depth up to around 30m. Ground conditions do not impact so much on the choice of drilling methodology, but it obviously has a great impact on the tool selection. An exception to this is specialty applications like tunnel forepoling, where weak ground conditions mean that forepoling is necessary – which in turn automatically calls for top hammer methodology.

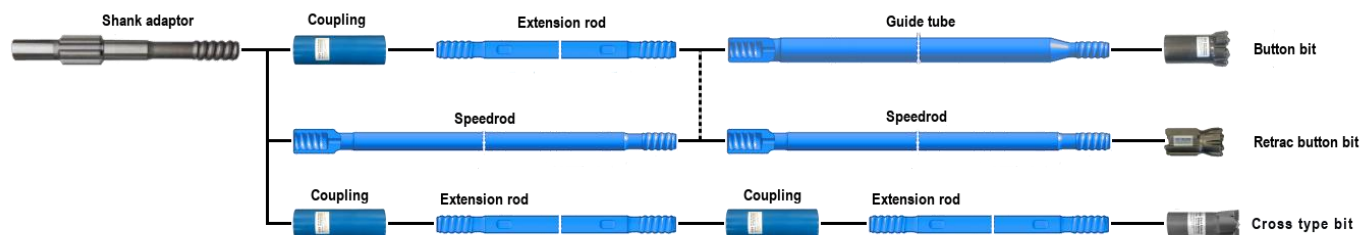
Specifically, the Top Hammer method is widely preferred and used in underground mining operations because of the possibility of using water to flush out cuttings. Unlike other technologies, which flush out with air, this improves the underground work environment by minimising the impact of drilling dust into the air.

On top of this, top hammer drilling allows for a larger number of smaller holes enabling more accurate and controlled blasting, something which is usually critical in underground operations.

Lastly, top hammer drilling is also required for bolting operations to secure tunnels, and although the drilling machines used for bolting and production drilling can be slightly different, they share the same drilling methodology and require the same skillset from operators.



# TOP HAMMER DRILL STRING



## T51 SURFACE DRILLING BITS

| BITS                                                                                | DIMENSIONS |        | Buttons, mm   |               | Angle | Flushing Hole, mm |               | Part Number          | Compatibility             |
|-------------------------------------------------------------------------------------|------------|--------|---------------|---------------|-------|-------------------|---------------|----------------------|---------------------------|
|                                                                                     | Imperial   | Metric | Front No Size | Gauge No Size |       | Front No Size     | Gauge No Size |                      |                           |
|    | 3 1/2"     | 89mm   | 6x10          | 8x11          | 35°   | 4x12              | -             | TH-R89FF8-T51-TK     | 90513764                  |
|                                                                                     | 3 1/2"     | 89mm   | 6x12          | 8x14          | 40°   | 4x12              | -             | TH-R89DC8-T51-TK     | 90513813                  |
|  | 4"         | 102mm  | 6x14          | 8x14          | 35°   | 4x13              | -             | TH-N102FF8-T51-TV    | 90510807                  |
|                                                                                     | 4"         | 102mm  | 6x14          | 8x16          | 40°   | 4x14              | -             | TH-N102DC8-T51-TV    | 90510343                  |
|                                                                                     | 4"         | 102mm  | 6x11          | 8x14          | 35°   | 4x14              | -             | TH-N102DC8-T51-TV-B  | 90510824                  |
|  | 4"         | 102mm  | 6x11          | 8x14          | 35°   | 2x12              | -             | TH-R102DC8-T51-TV/M  | 90510825                  |
|                                                                                     | 4"         | 102mm  | 6x11          | 8x14          | 35°   | 2x12              | -             | TH-R102CVB-T51-TV    | -                         |
|  | 4 1/2"     | 115mm  | 6x14          | 8x16          | 35°   | 2x13              | -             | TH-N115FF8-T51-TV    | 7516-1915-S48<br>90510340 |
|                                                                                     | 4 1/2"     | 115mm  | 6x14          | 9x14          | 35°   | 2x13              | -             | TH-N115DC8-T51-TV    | 90510874                  |
|  | 4 1/2"     | 115mm  | 7x14          | 9x14          | 35°   | 3x13              | -             | TH-R115FF9-T51-TV-M  | 90510344                  |
|                                                                                     | 4 1/2"     | 115mm  | 7x14          | 9x14          | 35°   | 3x13              | -             | TH-R115DC-T51-TV-M   | -                         |
|                                                                                     | 4 1/2"     | 115mm  | 7x14          | 9x14          | 35°   | 3x13              | -             | TH-R115DC8-T51-TV-B  | -                         |
|                                                                                     | 4 1/2"     | 115mm  | 7x14          | 9x14          | 35°   | 3x13              | -             | TH-R115DC8-T51-TV-SB | -                         |
|  | 5"         | 127mm  | 6x14          | 8x16          | 35°   | 4x14              | -             | TH-N127FF8-T51-TV    | 90510360                  |
|                                                                                     | 5"         | 127mm  | 6x14          | 8x16          | 35°   | 4x14              | -             | TH-N127DC8-T51-TV    | 90513815                  |
|                                                                                     | 5"         | 127mm  | 6x14          | 8x16          | 35°   | 4x14              | -             | TH-N127CVB-T51-TV    | 7516-4927-S48<br>90513757 |
|  | 5"         | 127mm  | 7x14          | 8x16          | 35°   | 2x14              | -             | TH-R127FF8-T51-TV    | -                         |
|                                                                                     | 5"         | 127mm  | 7x14          | 8x16          | 35°   | 2x14              | -             | TH-R127DC-T51-TV-M   | 7516-4927-S48<br>90513757 |
|  | 5 1/2"     | 140mm  | 6x15          | 8x15          | 35°   | 2x15              | -             | TH-N140DC-T51-TV     | 90515254                  |
|  | 5 1/2"     | 140mm  | 7x15          | 9x15          | 35°   | 3x15              | -             | TH-R140DC8-T51-TV    | 90515254                  |

## EL60 SURFACE DRILLING BITS

| BITS                                                                                | DIMENSIONS |        | Buttons, mm   |               | Angle | Flushing Hole, mm |               | Part Number            |
|-------------------------------------------------------------------------------------|------------|--------|---------------|---------------|-------|-------------------|---------------|------------------------|
|                                                                                     | Imperial   | Metric | Front No Size | Gauge No Size |       | Front No Size     | Gauge No Size |                        |
|    | 4"         | 102mm  | 7x12          | 8x13          | 35°   | 2x12              | -             | TH-N102DC8-EL60-TV-SPH |
|    | 4"         | 102mm  | 6x12          | 8x13          | 35°   | 2x12              | -             | TH-R102DC8-EL60-TV-SPH |
|    | 4 1/2"     | 115mm  | 6X11          | 8X13          | 40°   | 4X12              | -             | TH-N115DC-EL60-TV      |
|    | 4 1/2"     | 115mm  | 6x11          | 8x13          | 40°   | 4x12              | -             | TH-R115DC-EL60-TV      |
|    | 5"         | 127mm  | 6X14          | 8X14          | 35°   | 2X13              | -             | TH-N127DC8-EL60-TV-SPH |
|    | 5"         | 127mm  | 6x14          | 8x14          | 35°   | 4x13              | -             | TH-R127DC8-EL60-TV-SPH |
|   | 5 1/2"     | 140mm  | 6X14          | 8X14          | 35°   | 4X14              | -             | TH-N140DC8-EL60-TV-SPH |
|  | 5 1/2"     | 140mm  | 7x14          | 9x14          | 35°   | 3x14              | -             | TH-R140DC8-EL60-TV-SPH |

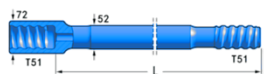
## BT60 SURFACE DRILLING BITS

| BITS                                                                                | DIMENSIONS |        | Buttons, mm   |               | Angle | Flushing Hole, mm |               | Part Number          |
|-------------------------------------------------------------------------------------|------------|--------|---------------|---------------|-------|-------------------|---------------|----------------------|
|                                                                                     | Imperial   | Metric | Front No Size | Gauge No Size |       | Front No Size     | Gauge No Size |                      |
|  | 4"         | 102mm  | 6x12          | 8X13          | 35°   | 4X12              | -             | TH-N102DC8-BT60-TV   |
|  | 4"         | 102mm  | 6x12          | 8x13          | 35°   | 4x12              | -             | TH-R102DC8-BT60-TV   |
|  | 4 1/2"     | 115mm  | 6X11          | 8X13          | 40°   | 2X12              | -             | TH-N115DC8-BT60-TV   |
|  | 4 1/2"     | 115mm  | 7x11          | 9x13          | 40°   | 3x12              | -             | TH-R115DC8-BT60-TV-M |

## M/F SPEED RODS

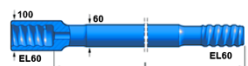
| RODS | Dimensions |        |          |        | Part Number | Compatibility |
|------|------------|--------|----------|--------|-------------|---------------|
|      | Length, L  |        | Diameter |        |             |               |
|      | Imperial   | Metric | Imperial | Metric |             |               |

### T51



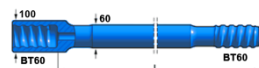
|     |        |    |      |                      |                          |
|-----|--------|----|------|----------------------|--------------------------|
| 12' | 3660mm | 2" | 52mm | ROD-TH-T51-3660-MF-O | 7326-5537-70<br>90515311 |
| 14' | 4300mm | 2" | 52mm | ROD-TH-T51-4300-MF   | 7326-5543-85<br>90515314 |
| 20' | 6100mm | 2" | 52mm | ROD-TH-T51-6100-MF-O | 7326-5561-85<br>90515557 |
| 24' | 7300mm | 2" | 52mm | ROD-TH-T51-7300-MF   | -                        |

### EL60



|     |        |        |      |                     |        |
|-----|--------|--------|------|---------------------|--------|
| 12' | 3660mm | 2 3/8" | 60mm | ROD-TH-EL60-3660-MF | -      |
| 14' | 4300mm | 2 3/8" | 60mm | ROD-TH-EL60-3660-MF | 210250 |
| 20' | 6100mm | 2 3/8" | 60mm | ROD-TH-EL60-3660-MF | 210268 |
| 24' | 7300mm | 2 3/8" | 60mm | ROD-TH-EL60-3660-MF | -      |

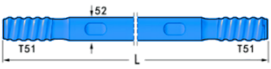
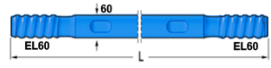
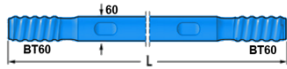
### BT60



|     |        |        |      |                     |   |
|-----|--------|--------|------|---------------------|---|
| 12' | 3660mm | 2 3/8" | 60mm | ROD-TH-BT60-3660-MF | - |
| 14' | 4300mm | 2 3/8" | 60mm | ROD-TH-BT60-4300-MF | - |
| 20' | 6100mm | 2 3/8" | 60mm | ROD-TH-BT60-6100-MF | - |
| 24' | 7300mm | 2 3/8" | 60mm | ROD-TH-BT60-7300-MF | - |



## EXTENSION RODS

| RODS                                                                                               | Dimensions |        |          |        | Part Number          | Compatibility             |
|----------------------------------------------------------------------------------------------------|------------|--------|----------|--------|----------------------|---------------------------|
|                                                                                                    | Length, L  |        | Diameter |        |                      |                           |
|                                                                                                    | Imperial   | Metric | Imperial | Metric |                      |                           |
| <b>T51</b><br>    | 11"        | 280mm  | 2"       | 52mm   | ROD-TH-T51-280-MM    | -                         |
|                                                                                                    | 3'         | 915mm  | 2"       | 52mm   | ROD-TH-T51-915-MM    | -                         |
|                                                                                                    | 12'        | 3660mm | 2"       | 52mm   | ROD-TH-T51-3660-MM   | 7326-5337C-30<br>90515299 |
|                                                                                                    | 14"        | 4300mm | 2"       | 52mm   | ROD-TH-T51-4300-MM   | 7326-5343C-30<br>90515300 |
|                                                                                                    | 20'        | 6100mm | 2"       | 52mm   | ROD-TH-T51-6100-MM   | 7326-5361C-30<br>90515301 |
|                                                                                                    | 24'        | 7300mm | 2"       | 52mm   | ROD-TH-T51-7300-MM   | -                         |
| <b>EL60</b><br>   | 3'         | 915mm  | 2 3/8"   | 60mm   | ROD-TH-EL60-915-MM   | 203011                    |
|                                                                                                    | 12'        | 3660mm | 2 3/8"   | 60mm   | ROD-TH-EL60-3660-MM  | 200529                    |
|                                                                                                    | 14"        | 4300mm | 2 3/8"   | 60mm   | ROD-TH-EL60-4300-MM  | 200530                    |
|                                                                                                    | 20'        | 6100mm | 2 3/8"   | 60mm   | ROD-TH-EL60-6100-MM  | 200543                    |
|                                                                                                    | 24'        | 7300mm | 2 3/8"   | 60mm   | ROD-TH-EL60-7300-MM  | -                         |
| <b>BT60</b><br> | 3'         | 915mm  | 2 3/8"   | 60mm   | ROD-TH-BT60-915-MM   | -                         |
|                                                                                                    | 12'        | 3660mm | 2 3/8"   | 60mm   | ROD-TH- BT60-3660-MM | -                         |
|                                                                                                    | 14"        | 4300mm | 2 3/8"   | 60mm   | ROD-TH- BT60-4300-MM | -                         |
|                                                                                                    | 20'        | 6100mm | 2 3/8"   | 60mm   | ROD-TH- BT60-6100-MM | -                         |
|                                                                                                    | 24'        | 7300mm | 2 3/8"   | 60mm   | ROD-TH- BT60-7300-MM | -                         |

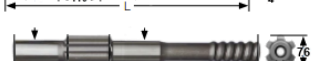
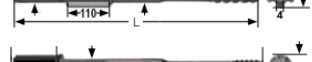
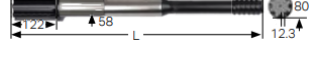
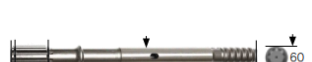
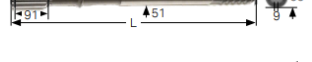
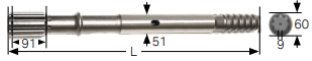
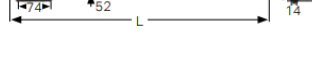
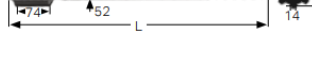
## T51 GUIDE TUBES

| GUIDE TUBE                                                                                         | Length   |        | Diameter |        | Part Number              | Compatibility            |
|----------------------------------------------------------------------------------------------------|----------|--------|----------|--------|--------------------------|--------------------------|
|                                                                                                    | Imperial | Metric | Imperial | Metric |                          |                          |
| <b>T51</b><br>  | 12'      | 3660mm | 3"       | 76mm   | TH-GTUBE-T51-3600-FF-76  | -                        |
|                                                                                                    | 12'      | 3660mm | 3"       | 76mm   | TH-GTUBE-T51-3600-MF-76  | 7957-7637-70<br>94502641 |
| <b>EL60</b><br> | 12'      | 3660mm | 3 1/2"   | 87mm   | TH-GTUBE-EL60-3660-MF-87 |                          |
|                                                                                                    | 14'      | 4300mm | 3 1/2"   | 87mm   | TH-GTUBE-EL60-4300-MF-87 | 270097                   |
| <b>BT60</b><br> | 12'      | 3660mm | 3 1/2"   | 87mm   | TH-GTUBE-BT60-3660-MF-87 |                          |
|                                                                                                    | 14'      | 4300mm | 3 1/2"   | 87mm   | TH-GTUBE-BT80-4300-MF-87 |                          |

## COUPLING SLEEVES

| COUPLING SLEEVES                                                                  | Thread | Dimensions |        |             |        | Part Number             | Compatibility |
|-----------------------------------------------------------------------------------|--------|------------|--------|-------------|--------|-------------------------|---------------|
|                                                                                   |        | Length, L  |        | Diameter, D |        |                         |               |
|                                                                                   |        | Imperial   | Metric | Imperial    | Metric |                         |               |
|  | T51    | 7 7/8"     | 225mm  | 2 51/64"    | 71mm   | TH-COUP-T51             | 7316-3671     |
|                                                                                   | T51    | 9 1/4"     | 235mm  | 3 1/32"     | 77mm   | TH-COUP-T51-77/SS235    | 90515743      |
|                                                                                   | T51    | 9 1/4"     | 235mm  | 3 1/32"     | 77mm   | TH-COUP-T51-77/SS235-SB | 90515745      |
|                                                                                   | T51    | 9 1/4"     | 235mm  | 3 1/4"      | 82mm   | TH-COUP-T51-82/SS235-SB | -             |
|                                                                                   | EL60   | 7 1/2"     | 190mm  | 2 13/32"    | 61mm   | TH-COUP-EL60-300        | -             |

## SHANK ADAPTORS

| SHANK ADAPTOR                                                                       | Drifter Model    | Thread | Length, L | Part Number                  | Compatibility |
|-------------------------------------------------------------------------------------|------------------|--------|-----------|------------------------------|---------------|
|    | COP 4050ME       | EL60   | 700mm     | TH-SHANK-COP4050/S-T51       | 7600-3712-01  |
|   | COP3060          | T45    | 830mm     | TH-SHANK-T51-COP3060/T45     | -             |
|  | COP2160EX/2560EX | T51    | 770mm     | TH-SHANK-2160/2560EX-T51     | 7306-3689-01  |
|  | HPR2             | T51    | 915mm     | TH-SHANK-T51-HPR2/GD5000     | -             |
|  | HPR2-60          | T51    | 1040mm    | TH-SHANK-HPR2-60-T51         | -             |
|  | HPR2-60          | EL60   | 1040mm    | TH-SHANK-HPR2-60-EL60        | -             |
|  | HPR2-70          | T51    | 1040mm    | TH-SHANK-HPR2-70-T51         | -             |
|  | HD612            | T45    | 720mm     | TH-SHANK-HD612-T45           | 7305-3663-01  |
|  | HD715            | T51    | 885mm     | TH-SHANK-HD715-T51           | 7306-7424-01  |
|  | HC120R           | T45    | 670mm     | TH-SHANK-HC120R-T45          | 90516212      |
|  | HC120R           | T51    | 670mm     | TH-SHANK-HC120R-T51          | 7306-7528-02  |
|  | HC160            | T51    | 805mm     | TH-SHANK-HC160R-T51          | 90516047      |
|  | HL700            | T51    | 650mm     | TH-SHANK-HL700/650           | 7305-6008-01  |
|  | HL1500           | T51    | 760mm     | TH-SHANK-T51-1500-D80/L760   | 7600-6022-03  |
|  | HL1500           | BT60   | 760mm     | TH-SHANK-BT60-1500-D65/L760  |               |
|  | HL1500           | BT60   | 760mm     | TH-SHANK-BT60-1500-D80/L760  |               |
|  | HL1500PE         | T51    | 760mm     | TH-SHANK-T51-1500PE-D65/L760 | 90003702      |



## Rotary Drilling Tools

- IADC Code ..... PAGE 61
- Drilling String ..... PAGE 63
- Blast Hole Rotary Bits ..... PAGE 66

## RECOMMENDED SAFETY PROCEDURES

The mining industry continues to demand even higher levels of safety and productivity. In order to meet these requirements, we work continuously to develop even safer products and to produce comprehensive manuals enabling safer and effective use of our products.



### IT'S ALL ABOUT EVERYONE'S HEALTH

Helping you to ensure a safer workplace and healthier workforce is of the utmost importance to us. The well-being of any person coming into contact with our equipment is paramount. Therefore, we strive to identify and assess potential risk factors that could threaten the health of you and your employees. All the products in our catalogue are designed to meet safety requirements.

### DRESS RIGHT FROM HEAD TO TOE

You must wear appropriate personal protective equipment (PPE) at all times. This is what we strongly recommend, to help avoid injury:

- Safety helmet
- Hearing protection
- Safety glasses
- Protective high visibility clothing
- Respiratory protection
- Safety boots
- Any site-specific PPE as required

### BE AWARE OF ALL SAFETY PROCEDURES

We ask that you start by obeying all instructions given. Never work under an unsupported rood or close to potential pinch point locations. Beware of the potential hazards of a loose roof and ribs and scale down roof ribs prior to bolting. It is important to bolt early in the mining process – as soon as safely and practically possible.

Safe work procedures should incorporate inspection before the machine operates and also through regular monitoring based upon mining conditions, safety and management systems. Workers should be provided with safety information, instruction and training on transportation, installation, operational care and disposal of drilling tools.

### MAKE A RISK ANALYSIS BEFORE YOU START

Pay attention to safety when planning all of your work. Before you start, always take your time to go through all operations. Identify any potential risks and take appropriate measures to avoid them. If necessary, seek expert advice on how to help minimize risks. Finally, make sure that you have the right resources to perform all tasks in the safest manner possible.

Please check [www.safeworkaustralia.gov.au](http://www.safeworkaustralia.gov.au) or [www.canada.ca/en/services/jobs/workplace/health-safety.html](http://www.canada.ca/en/services/jobs/workplace/health-safety.html) for more information.

# IADC Codes – Rotary Rock Bits

## International Association of Drilling Contractors

IADC Codes make it easier for drillers to describe what kind of rock bit they are looking for to the supplier. Black Diamond follows the IADC bit classification system in which the first three digits classify the bit according to the formation it is designed to drill and the bearing/seal design used.



### Example 5-4-5-R:

#### First Digit

- a. 1, 2 and 3 designate STEEL TOOTH BITS with 1 for soft, 2 for medium and 3 for hard formations
- b. 4, 5, 6, 7 and 8 designate TUNGSTEN CARBIDE INSERT BITS for varying formation hardness with 4 being the softest and 8 being the hardest.

#### Second Digit

1, 2, 3 and 4 are further breakdown of formation with 1 being the softest and 4 the hardest.

#### Third Digit

This digit will classify the bit according to bearing/seal type (see information on different bearing types) and special gauge wear protection as follows:

- 1. Standard open bearing roller bit/2. Standard open bearing roller bit, air-cooled
- 3. Standard open bearing roller bit with gauge protection which is defined as carbide inserts in the heel of the cone
- 4. Sealed roller bearing bit/5. Sealed roller bearing bit with gauge protection
- 6. Journal sealed bearing bit/7. Journal sealed bearing bit with gauge protection

#### Fourth Digit

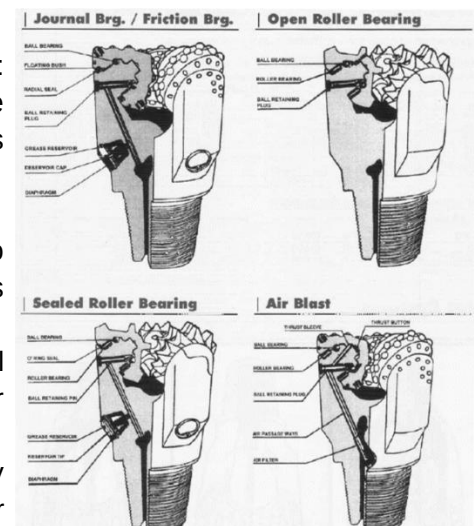
The following letter codes are used in the fourth digit position to indicate additional features:

A-Air Application / R-Reinforced Welds / C-Center Jet / S-Standard Steel Tooth / D-Deviation Control / X-Chisel insert / E-Extended Jet / Y-Conical Insert / G-Extra Gauge Protection / Z-Other Insert Shape / J-Jet Deflection

### Bearing Types

There are primarily four (4) types of bearing used in tricone drilling bits:

- 1.) STANDARD OPEN BEARING ROLLER BIT: On these bits the cones will spin freely. This type of bit has a front row of ball bearings and a back row of roller bearings.
- 2.) STANDARD OPEN BEARING ROLLER BIT FOR AIR DRILLING: Cones are similar to #1, but have air injection directly to the cones to cool the bearings. Air flows into the cone through the passage ways inside the pin. (Not for mud applications)
- 3.) SEALED BEARING ROLLER BITS: These bits have an O-Ring seal with a grease reservoir for bearing cooling. The seal acts as a barrier against mud and cuttings to protect the bearings.
- 4.) JOURNAL BEARING ROLLER BITS: These bits are strictly oil/grease cooled worth nose bearings, O-Ring seal and a race for maximum performance.



Please check <https://www.iadc.org/drillbits/> for more information

# Product Features

## Fast Penetration

The cutting structures are designed to perform efficiently and increase the bit life of a variety of insert shapes.

## Carbide

Multiple grade selection for different rows of inserts based on function.

### INTERIOR ROW INSERTS

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



### GAGE ROW INSERTS

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



## Optimised nozzle orientation

Nozzle size and orientation are optimised for efficient evacuation of cuttings.

### BACKFLOW VALVES

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

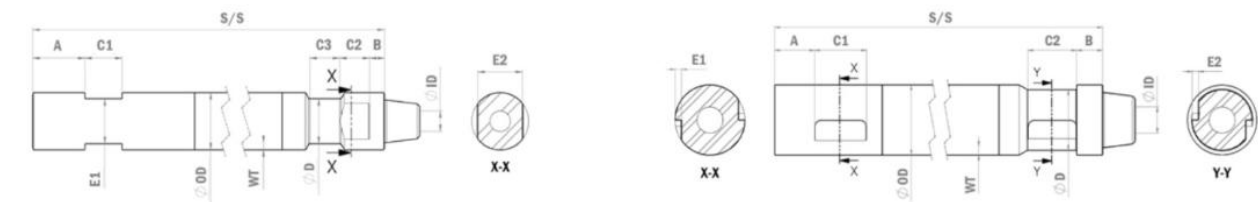


# Rotary Drill String

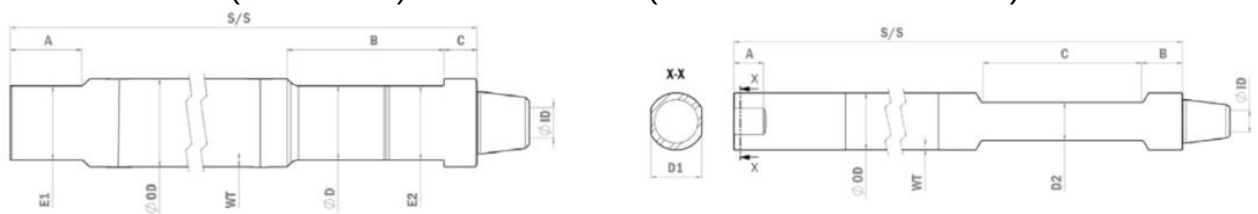


| Rotary Drill String |                   |
|---------------------|-------------------|
| 1                   | Shock Sub         |
| 2                   | Saver Sub/Top Sub |
| 3                   | Drill pipe        |
| 4                   | Starter pipe      |
| 5                   | Bit Sub           |
| 6                   | Roller Stabilizer |
| 7                   | Rotary Deck Bush  |

CAT(REEDRILL, SKS, SKF, MD) CAT(BUCYRUS)



ATLAS COPCO(PIT-VIPER) Sandvik Driltech(T25KW/D25/40/50/75/90)



## Rotary Drilling Pipe

| Pipe type | Connection type | Thread type | OD     | Should to Should(SS) Length | Flats | Wall Thickness |
|-----------|-----------------|-------------|--------|-----------------------------|-------|----------------|
| SKS/SKF   | BOX-PIN         |             | 7"     |                             | 127   |                |
| PIT VIPER | PIN-PIN         | API or Beco | 7-5/8" | 6ft/25ft/30ft/35ft/40ft...  | 140   | 1" or 3/4"     |
| DRILLTECH | BOX-BOX         |             | 8"     |                             | 165   |                |



## Bit Sub/Saver Sub/Spindle Sub

| Pipe type | Connection type | Thread type | OD     | Should to Should(SS) Length | Flats |
|-----------|-----------------|-------------|--------|-----------------------------|-------|
| SKS/SKF   | BOX-PIN         |             | 7"     |                             | 127   |
| PIT VIPER | PIN-PIN         | API or Beco | 7-5/8" | 17"/19"/37"/42"             | 140   |
| DRILLTECH | BOX-BOX         |             | 8"     |                             | 165   |



# BLACK DIAMOND DRILLING SERVICES AUSTRALIA

## World-class drilling equipment and tools

### CLOUDBREAK PIT VIPER 271

7" (178mm) Drill String / Min OD 165mm / 146mm Spanner Flats

| Spindle Sub |                                |
|-------------|--------------------------------|
| Part #      | SUB-PREG568BBEC0412-178/SSL800 |
| Pin Thread  | 6 5/8" API                     |
| Box Thread  | 4 1/2" BECO                    |
| Shoulder    | 800mm                          |
| Weight      | 146kg                          |

| Saver Sub  |                         |
|------------|-------------------------|
| Part #     | SUB-PBBEC0412-178/SS400 |
| Pin Thread | 4 1/2" API              |
| Box Thread | 4 1/2" BECO             |
| Shoulder   | 400mm                   |
| Weight     | 67kg                    |

| Drill Pipe x 2 |                               |
|----------------|-------------------------------|
| Part #         | ROD-ROT-178/25FT/25.4 BECO412 |
| Pin Thread     | 4 1/2" BECO                   |
| Box Thread     | 4 1/2" BECO                   |
| Shoulder       | 7620mm                        |
| Weight         | 785kg                         |

| Extension Sub |                                |
|---------------|--------------------------------|
| Part #        | SUB-PBEC0412BREG412-178/SS1800 |
| Pin Thread    | 4 1/2" BECO                    |
| Box Thread    | 4 1/2" API                     |
| Shoulder      | 1800mm                         |
| Weight        | 315kg                          |

| Lifting Bail |                        |
|--------------|------------------------|
| Part #       | TOOL-LBAIL-BECO 412-AL |
| Box Thread   | 4 1/2 BECO             |
| Part #       | TOOL-LBAIL-REG658-AL   |
| Box Thread   | 6 5/8 API              |
| Part #       | TOOL-LBAIL-REG412-AL   |
| Box Thread   | 4 1/2" API             |

| Bit Basket               |  |
|--------------------------|--|
| RIG-BBASKET-PV271-ROT203 |  |
| RIG-BBASKET-PV271-ROT229 |  |

| Deck Bushes             |  |
|-------------------------|--|
| 3250D Triple Race       |  |
| DBUSH -TR-PV271-178/325 |  |
| 3250D Light Weight      |  |
| DBUSH -TR-PV271-178/325 |  |

| Bit Sub (9 7/8" Rotary) |                            |
|-------------------------|----------------------------|
| Part #                  | SUB-P421B658REG-178/SS1800 |
| Pin Thread              | 4 1/2" API                 |
| Box Thread              | 6 5/8" API                 |
| Shoulder                | 1200mm                     |
| Weight                  | 230kg                      |

| Bit Sub (9" Rotary) |                         |
|---------------------|-------------------------|
| Part #              | SUB-PB412REG-178/SS1200 |
| Pin Thread          | 4 1/2" API              |
| Box Thread          | 4 1/2" API              |
| Shoulder            | 1200mm                  |
| Weight              | 220kg                   |



# Blast Hole Rotary Bits

| IADC Code | Bit Size       | Bit Description                                                                                                             | Compressive Strength |             | Ground Description                                                                                                                                                                                                                                                  | Bearing Type                  | Circulation Type | Cutting Structure                                                                                                     | Shirtail Protection                                              | WOB(lbs)                                                                   | Thread Type                                                                            | Weight                                       |
|-----------|----------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------|
|           |                |                                                                                                                             | MPA                  | PSI         |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
| 435       | 200mm(7 7/8")  | TCI sealed roller bearing bit with gauge protection for soft formations with low compressive strength and high drillability | 65-85                | 9000-12000  | Long intervals of very soft poorly compacted shales, dolomites, sandstones, clays, salts and limestones                                                                                                                                                             | Roller-Ball-<br>Roller-Thrust | Jet Air          | Inner and Nose Rows: Conical<br>Gage Rows: Chisel<br>Gage Bevel Protection: Round                                     | Hardmetal and wear resistant carbide on shirtail lip and lug     | 9880-39500<br>9880-39500<br>9880-39500<br>24500-61250<br>6 5/8" API REG    | 4 1/2" API REG<br>4 1/2" API REG<br>4 1/2" API REG<br>6 5/8" API REG<br>6 5/8" API REG | 34kg<br>38kg<br>50kg<br>65kg<br>74kg<br>98kg |
|           | 216mm(8 1/2")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 229mm(9")      |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 251mm(9 7/8")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 270mm(10 5/8") |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
| 535       | 311mm(12 1/4") | TCI sealed roller bearing bit with gauge protection for soft to medium soft formations with low compressive strength        | 85-158               | 12000-23000 | Medium hard and abrasive rocks such as sandstones with streaks of quartz, hard limestone or chert, hematite ores, hard well compacted abrasive rock such as: sandstones with quartz binder, dolomites, quartzite shales, magma and metamorphic coarse-grained rocks | Roller-Ball-<br>Roller-Thrust | Jet Air          | Inner and Nose Rows: Conical<br>Gage Rows: Chisel<br>Gage Bevel Protection: Round                                     | Hardmetal on lug; Wear resistant carbide on shirtail lip and lug | 15750-39380<br>15750-39380<br>15750-39380<br>24500-61250<br>6 5/8" API REG | 4 1/2" API REG<br>4 1/2" API REG<br>4 1/2" API REG<br>6 5/8" API REG<br>6 5/8" API REG | 34kg<br>38kg<br>50kg<br>65kg<br>74kg<br>98kg |
|           | 200mm(7 7/8")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 216mm(8 1/2")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 229mm(9")      |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 251mm(9 7/8")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
| 545       | 270mm(10 5/8") | TCI sealed roller bearing bit with gauge protection for soft to medium soft formations with low compressive strength        | 85-186               | 12000-27000 | Medium hard and abrasive rocks such as sandstones with streaks of quartz, hard limestone or chert, hematite ores, hard well compacted abrasive rock such as: sandstones with quartz binder, dolomites, quartzite shales, magma and metamorphic coarse-grained rocks | Roller-Ball-<br>Roller-Thrust | Jet Air          | Inner and Nose Rows: Conical<br>Gage Rows: Chisel<br>Gage Bevel Protection: Round                                     | Hardmetal and wear resistant carbide on shirtail lip and lug     | 15750-39380<br>15750-39380<br>15750-39380<br>24500-61250<br>6 5/8" API REG | 4 1/2" API REG<br>4 1/2" API REG<br>4 1/2" API REG<br>6 5/8" API REG<br>6 5/8" API REG | 34kg<br>38kg<br>50kg<br>65kg<br>74kg<br>98kg |
|           | 311mm(12 1/4") |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 200mm(7 7/8")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 216mm(8 1/2")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 229mm(9")      |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
| 615       | 251mm(9 7/8")  | TCI sealed roller bearing bit with gauge protection for soft to medium soft formations with low compressive strength        | 85-100               | 12000-14500 | Medium hard and abrasive rocks such as sandstones with streaks of quartz, hard limestone or chert, hematite ores, hard well compacted abrasive rock such as: sandstones with quartz binder, dolomites, quartzite shales, magma and metamorphic coarse-grained rocks | Roller-Ball-<br>Roller-Thrust | Jet Air          | Inner and Nose Rows: Conical<br>Gage Rows: Chisel<br>Gage Bevel Protection: Round                                     | Hardmetal and wear resistant carbide on shirtail lip and lug     | 19750-49380<br>19750-49380<br>19750-49380<br>24500-61250<br>6 5/8" API REG | 4 1/2" API REG<br>4 1/2" API REG<br>4 1/2" API REG<br>6 5/8" API REG<br>6 5/8" API REG | 34kg<br>38kg<br>50kg<br>65kg<br>74kg<br>98kg |
|           | 270mm(10 5/8") |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 311mm(12 1/4") |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 200mm(7 7/8")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 216mm(8 1/2")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
| 635       | 229mm(9")      | TCI sealed roller bearing bit with gauge protection for medium hard formations with high compressive strength               | 100-150              | 14500-23000 | Hard, well compacted rocks such as: hard silica limestones, quartzite streaks, pyrite ores, hematite ores, magnetic ores, chromium ores, phosphorite ores and granites                                                                                              | Roller-Ball-<br>Roller-Thrust | Jet-Air          | Inner and Nose Rows: Conical<br>Gage Rows: Conical<br>Gage Bevel Protection: Flat-top carbide on shirtail lip and lug | Hardmetal on lug; Wear resistant carbide on shirtail lip and lug | 23630-47250<br>23630-47250<br>23630-47250<br>24500-61250<br>6 5/8" API REG | 4 1/2" API REG<br>4 1/2" API REG<br>4 1/2" API REG<br>6 5/8" API REG<br>6 5/8" API REG | 34kg<br>38kg<br>50kg<br>65kg<br>74kg<br>98kg |
|           | 251mm(9 7/8")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 270mm(10 5/8") |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 311mm(12 1/4") |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 200mm(7 7/8")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
| 725       | 216mm(8 1/2")  | TCI sealed roller bearing bit with gauge protection for hard semi-abrasive formations                                       | 100-150              | 14500-23000 | Very hard, well compacted rocks such as hard silica limestones, quartzite streaks, pyrite ores, hematite ores, magnetite ores, chromium ores, phosphorite ores and granites                                                                                         | Roller-Ball-<br>Roller-Thrust | Jet-Air          | Inner and Nose Rows: Ogive<br>Gage Rows: Conical<br>Gage Bevel Protection: Round                                      | Hardmetal on lug; Wear resistant carbide on shirtail lip and lug | 39500-59250<br>39500-59250<br>39500-59250<br>24500-61250<br>6 5/8" API REG | 4 1/2" API REG<br>4 1/2" API REG<br>4 1/2" API REG<br>6 5/8" API REG<br>6 5/8" API REG | 34kg<br>38kg<br>50kg<br>65kg<br>74kg<br>98kg |
|           | 229mm(9")      |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 251mm(9 7/8")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 270mm(10 5/8") |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 311mm(12 1/4") |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
| 845       | 200mm(7 7/8")  | TCI sealed roller bearing bit with gauge protection for extremely hard and abrasive formations                              | 100-150              | 14500-23000 | Extremely hard, well compacted rock such as: hard silica limestones, quartzite streaks, pyrite ores, hematite ores, magnetite ores, chromium ores, phosphorite ores and granites                                                                                    | Roller-Ball-<br>Roller-Thrust | Jet Air          | Inner and Nose Rows: Ovoid<br>Gage Rows: Ovoid<br>Gage Bevel Protection: Flat-top carbide on shirtail lip and lug     | Hardmetal on lug; Wear resistant carbide on shirtail lip and lug | 49375-79000<br>49375-79000<br>49375-79000<br>24500-61250<br>6 5/8" API REG | 4 1/2" API REG<br>4 1/2" API REG<br>4 1/2" API REG<br>6 5/8" API REG<br>6 5/8" API REG | 34kg<br>38kg<br>50kg<br>65kg<br>74kg<br>98kg |
|           | 216mm(8 1/2")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 229mm(9")      |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 251mm(9 7/8")  |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |
|           | 270mm(10 5/8") |                                                                                                                             |                      |             |                                                                                                                                                                                                                                                                     |                               |                  |                                                                                                                       |                                                                  |                                                                            |                                                                                        |                                              |

Based on the IADC Bit Classification System located in the IADC Drilling Manual, 11<sup>th</sup> Ed. – Redesigned, 2007

## IADC435

## Bit Description

| Bit Size (mm)           | IADC Code | Pin Connection          | Weight (Kg)        |
|-------------------------|-----------|-------------------------|--------------------|
| 200/216/229/251/270/311 | 435       | 4 1/2" & 6 5/8" API REG | 34/38/50/65/74/104 |

IADC: 435 – TCI sealed roller bearing bit with gauge protection for soft formations with low compressive strength and high drillability.

### Compressive Strength:

- 65-85 MPA
- 9,000-12,000 PSI



### Ground Description:

Long intervals of very soft poorly compacted shales, dolomites, sandstones, clays, salts and limestones.

| Product Specification                           | Technical                                                     |
|-------------------------------------------------|---------------------------------------------------------------|
| <b>Bearing Type</b>                             | <b>Operating Suggestions</b>                                  |
| Roller-Ball-Roller-Thrust Button/Sealed Bearing | Weight on Bit: 9,880-39,500                                   |
| <b>Circulation Type</b>                         | Rotary Speed: 80 – 110 RPM                                    |
| Jet Air                                         | Air Back Pressure: 0.2 – 0.4                                  |
| <b>Cutting Structure</b>                        |                                                               |
| Inner and Nose Rows: Ogive                      | Gage Row: Chisel                                              |
| Gage Level Protection: Round                    | Hardmetal and wear resistant carbide on shirrtail lip and lug |

Based on the IADC Bit Classification System located in the IADC Drilling Manual, 11<sup>th</sup> Ed. – Redesigned, 2007

## IADC545

## Bit Description

| Bit Size (mm)           | IADC Code | Pin Connection          | Weight (Kg)        |
|-------------------------|-----------|-------------------------|--------------------|
| 200/216/229/251/270/311 | 545       | 4 1/2" & 6 5/8" API REG | 34/38/50/65/74/104 |

IADC: 545 – TCI sealed roller bearing bit with gauge protection for soft to medium formations with low compressive strength.

### Compressive Strength:

- 155 - 193 MPA
- 22,500 – 28,000 PSI

### Ground Description:

Medium hard and abrasive rocks such as sandstone with streaks of quartz, hard limestone or chert, hematite ores, hard well compacted abrasive rock such as: sandstones with quartz binder, dolomites, quartzite shales, magma and metamorphic coarse-grained rocks

| Product Specification                           | Technical                                                     |
|-------------------------------------------------|---------------------------------------------------------------|
| <b>Bearing Type</b>                             | <b>Operating Suggestions</b>                                  |
| Roller-Ball-Roller-Thrust Button/Sealed Bearing | Weight on Bit: 18,000 – 45,000                                |
| <b>Circulation Type</b>                         | Rotary Speed: 80 – 110 RPM                                    |
| Jet Air                                         | Air Back Pressure: 0.2 – 0.4                                  |
| <b>Cutting Structure</b>                        |                                                               |
| Inner and Nose Rows: Conical                    | Gage Row: Off-set Chisel                                      |
| Gage Level Protection: Round                    | Hardmetal and wear resistant carbide on shirrtail lip and lug |

Based on the IADC Bit Classification System located in the IADC Drilling Manual, 11<sup>th</sup> Ed. – Redesigned, 2007

## IADC635

## Bit Description

| Bit Size (mm)           | IADC Code | Pin Connection          | Weight (Kg)        |
|-------------------------|-----------|-------------------------|--------------------|
| 200/216/229/251/270/311 | 635       | 4 1/2" & 6 5/8" API REG | 34/38/50/65/74/104 |

IADC: 635 – TCI sealed roller bearing bit with gauge protection for medium hard formations with high compressive strength.

### Compressive Strength:

- 85 - 100 MPA
- 12,000 – 14,500 PSI



### Ground Description:

Hard, well compacted rocks such as: hard silica limestones, quartzite streaks, pyrite ores, hematite ores, magnetite ores, chromium ores, phosphorite ores and granites

| Product Specification                           | Technical                                                         |
|-------------------------------------------------|-------------------------------------------------------------------|
| <b>Bearing Type</b>                             | <b>Operating Suggestions</b>                                      |
| Roller-Ball-Roller-Thrust Button/Sealed Bearing | Weight on Bit: 19,750 – 49,380                                    |
| <b>Circulation Type</b>                         | Rotary Speed: 80 – 110 RPM                                        |
| Jet Air                                         | Air Back Pressure: 0.2 – 0.4                                      |
| <b>Cutting Structure</b>                        |                                                                   |
| Inner and Nose Rows: Conical                    | Gage Row: Chisel                                                  |
| Gage Level Protection: Round                    | Hardmetal on lug; Wear resistant carbide on shirttail lip and lug |

Based on the IADC Bit Classification System located in the IADC Drilling Manual, 11<sup>th</sup> Ed. – Redesigned, 2007

## IADC645A

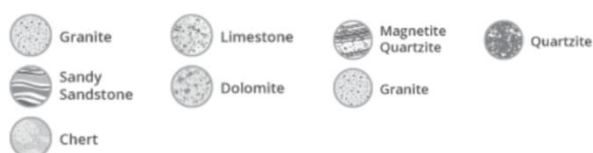
## Bit Description

| Bit Size (mm)           | IADC Code | Pin Connection          | Weight (Kg)        |
|-------------------------|-----------|-------------------------|--------------------|
| 200/216/229/251/270/311 | 654A      | 4 1/2" & 6 5/8" API REG | 34/38/50/65/74/104 |

IADC: 645 – TCI sealed roller bearing bit with gauge protection for medium hard formations with high compressive strength.

### Compressive Strength:

- 85 - 100 MPA
- 12,000 – 14,500 PSI



### Ground Description:

Hard, well compacted rocks such as: hard silica limestones, quartzite streaks, pyrite ores, hematite ores, magnetite ores, chromium ores, phosphorite ores, magnetite and granites

| Product Specification                           | Technical                                                         |
|-------------------------------------------------|-------------------------------------------------------------------|
| <b>Bearing Type</b>                             | <b>Operating Suggestions</b>                                      |
| Roller-Ball-Roller-Thrust Button/Sealed Bearing | Weight on Bit: 19,750 – 49,380                                    |
| <b>Circulation Type</b>                         | Rotary Speed: 80 – 110 RPM                                        |
| Jet Air                                         | Air Back Pressure: 0.2 – 0.4                                      |
| <b>Cutting Structure</b>                        |                                                                   |
| Inner and Nose Rows: Conical                    | Gage Row: Conical                                                 |
| Gage Level Protection: Conical                  | Hardmetal on lug; Wear resistant carbide on shirttail lip and lug |

Based on the IADC Bit Classification System located in the IADC Drilling Manual, 11<sup>th</sup> Ed. – Redesigned, 2007

## IADC735

## Bit Description

| Bit Size (mm)           | IADC Code | Pin Connection          | Weight (Kg)        |
|-------------------------|-----------|-------------------------|--------------------|
| 200/216/229/251/270/311 | 735       | 4 1/2" & 6 5/8" API REG | 34/38/50/65/74/104 |

IADC: 735 – TCI sealed roller bearing bit with gauge protection for hard semi-abrasive and abrasive formations.

### Compressive Strength:

- 155 - 192 MPA
- 22,500 – 28,000 PSI



### Ground Description:

Hard, well compacted rocks such as: hard silica limestones, quartzite streaks, pyrite ores, hematite ores, magnetite ores, chromium ores, phosphorite ores and granites

| Product Specification                           | Technical                                                     |
|-------------------------------------------------|---------------------------------------------------------------|
| <b>Bearing Type</b>                             | <b>Operating Suggestions</b>                                  |
| Roller-Ball-Roller-Thrust Button/Sealed Bearing | Weight on Bit: 15,750 – 39,380                                |
| <b>Circulation Type</b>                         | Rotary Speed: 80 – 110 RPM                                    |
| Jet Air                                         | Air Back Pressure: 0.2 – 0.4                                  |
| <b>Cutting Structure</b>                        |                                                               |
| Inner and Nose Rows: Conical                    | Gage Row: Chisel                                              |
| Gage Level Protection: Flat-top                 | Hardmetal and wear resistant carbide on shirttail lip and lug |

Based on the IADC Bit Classification System located in the IADC Drilling Manual, 11<sup>th</sup> Ed. – Redesigned, 2007

## IADC845

## Bit Description

| Bit Size (mm)           | IADC Code | Pin Connection          | Weight (Kg)        |
|-------------------------|-----------|-------------------------|--------------------|
| 200/216/229/251/270/311 | 845       | 4 1/2" & 6 5/8" API REG | 34/38/50/65/74/104 |

IADC: 845 – TCI sealed roller bearing bit with gauge protection for extremely hard and abrasive formations.

### Compressive Strength:

- 155 - 193 MPA
- 22,500 – 28,000 PSI



### Ground Description:

Hard, well compacted rocks such as: hard silica limestones, quartzite streaks, pyrite ores, hematite ores, magnetite ores, chromium ores, phosphorite ores and granites

| Product Specification                           | Technical                                                     |
|-------------------------------------------------|---------------------------------------------------------------|
| <b>Bearing Type</b>                             | <b>Operating Suggestions</b>                                  |
| Roller-Ball-Roller-Thrust Button/Sealed Bearing | Weight on Bit: 9,880 – 39,500                                 |
| <b>Circulation Type</b>                         | Rotary Speed: 80 – 110 RPM                                    |
| Jet Air                                         | Air Back Pressure: 0.2 – 0.4                                  |
| <b>Cutting Structure</b>                        |                                                               |
| Inner and Nose Rows: Ovoid                      | Gage Row: Conical                                             |
| Gage Level Protection: Flat-top                 | Hardmetal and wear resistant carbide on shirttail lip and lug |

Based on the IADC Bit Classification System located in the IADC Drilling Manual, 11<sup>th</sup> Ed. – Redesigned, 2007

01



03



02



04



## Drill Rigs

Full Hydraulic Multifunction Drilling Rig Parameters

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Crawler Hydraulic Wells-Geothermal Drilling Rig Parameters

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Hydraulic Open-Air Blast Hole Drilling Rig Parameters

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Integrated Hydraulic Drilling Rig Parameters

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## FULL HYDRAULIC MULTIFUNCTION DRILLING RIG PARAMETERS

| Parameter                     | Type                           |                                |
|-------------------------------|--------------------------------|--------------------------------|
|                               | HJG – M165                     | HJG – M311                     |
| Aperture                      | 140~180mm                      | 203~311mm                      |
| Drilling Depth                | 24m                            | 24m                            |
| Adaptive Rock                 | $f \geq 8$                     |                                |
| Rotation torque               | 4000Nm                         | 6000Nm                         |
| Rotary speed                  | 0~60rpm                        | 0~40rpm                        |
| Thrust capacity               | 40kN                           | 75kN                           |
| Feed stroke                   | 4380mm                         | 4380mm                         |
| Lifting speed                 | 0.5m/s                         | 0.3m/s                         |
| Hammer model                  | HD65                           | HD85/HD110                     |
| Drill rod diameter            | 110mm                          | 146mm                          |
| Drill rod length              | 4m x 6                         | 4m x 6                         |
| Travel speed                  | 2.5Km/h 3Km/h                  | 2.5Km/h 3Km/h                  |
| Grade ability                 | 25°                            | 25°                            |
| Rising Height from the ground | 450mm                          | 450mm                          |
| Air pressure                  | 1.38~3.2Mpa                    | 1.38~3.2Mpa                    |
| Air consumption               | $\geq 25\text{m}^3/\text{min}$ | $\geq 28\text{m}^3/\text{min}$ |
| Engine power                  | 75kW                           | 93kW                           |
| Dimensions                    | Length x Width x Height        |                                |
| On transportation             | 9000x2900x3400mm               | 9000x2900x3400mm               |
| On working ground             | 7700x2900x7800mm               | 7700x2900x7800mm               |
| Gross weight                  | 17T                            | 18T                            |

## CRAWLER HYDRAULIC WELLS-GEOTHERMAL DRILLING RIG PARAMETERS

| Parameter          | Type                           |                                |                                |
|--------------------|--------------------------------|--------------------------------|--------------------------------|
|                    | HJG – W830C                    | Hjg – W830A                    | HJG – W850A                    |
| Apeture            | 105~311mm                      | 105~311mm                      | 130~350mm                      |
| Drilling Depth     | 300m                           | 300m                           | 500m                           |
| Cylinder legs      | Common legs                    | High legs                      | High legs                      |
| Adaptive Rock      |                                | $f \geq 8$                     |                                |
| Rotation torque    | 4000Nm                         | 3400Nm 6900Nm                  | 4250Nm 8500Nm                  |
| Rotary speed       | 0~100rpm                       | 0~110rpm 0~55rpm               | 0~180rpm 0~90rpm               |
| Thrust capacity    | 60kN                           | 60kN                           | 60kN                           |
| Feed stroke        | 3700mm                         | 3700mm                         | 5300mm                         |
| Lifting capacity   | 120kN                          | 120kN                          | 200kN                          |
| Hammer model       | HD45/HD55/HD65                 | HD45/HD55/HD65                 | HD65/HD85/HN10                 |
| Drill rod diameter | 76mm, 89mm                     | 76mm, 89mm                     | 89mm, 102mm                    |
| Drill rod length   | 3m                             | 3m                             | 4.5m                           |
| Travel speed       | 2.5Km/h                        | 2.5Km/h                        | 3.2Km/h                        |
| Grade ability      | 21°                            | 21°                            | 21°                            |
| 300mm              | 300mm                          | 300mm                          |                                |
| Air pressure       | 1.05~2.46Mpa                   | 1.05~2.46Mpa                   | 1.05~3.5Mpa                    |
| Air consumption    | $\geq 18\text{m}^3/\text{min}$ | $\geq 18\text{m}^3/\text{min}$ | $\geq 25\text{m}^3/\text{min}$ |
| Engine power       | 93kW                           | 93kW                           | 132kW                          |
| Dimensions         | Length x Width x Height        |                                |                                |
| On transportation  | 5800x2210x2850mm               | 5800x2210x2850mm               | 8085x2250x3200mm               |
| On working ground  | 4920x2210x6700mm               | 4700x2210x6700mm               | 5498x2250x8941mm               |
| Gross weight       | 8.8T                           | 9.5T                           | 12.5T                          |

## HYDRAULIC OPEN-AIR BLAST HOLE DRILLING RIG PARAMETERS

| Parameter          | Type                           |                                |
|--------------------|--------------------------------|--------------------------------|
|                    | HJG – B138                     | HJG – B168                     |
| Aperture           | 90~152mm                       | 105~180mm                      |
| Drilling Depth     | 30m                            | 30M                            |
| Adaptive Rock      | $f \geq 8$                     |                                |
| Rotation torque    | 3000Nm                         | 4000Nm                         |
| Rotary speed       | 0~72rpm                        |                                |
| Thrust capacity    | 32kN                           | 32kN                           |
| Feed stroke        | 4000mm                         | 4000mm                         |
| Lifting capacity   | 32kN                           | 32kN                           |
| Lifting speed      | 0.5m/s                         | 0.5m/s                         |
| Hammer model       | HD45/HD55                      | HD65/HD85                      |
| Drill rod diameter | 76mm, 89mm                     | 89mm, 114mm                    |
| Travel speed       | 2.5Km/h 3.8Km/h                | 2.5Km/h 3.8Km/h                |
| Grade ability      | 30°                            | 30°                            |
| Air pressure       | 1.05~2.46Mpa                   | 1.38~2.46Mpa                   |
| Air consumption    | $\geq 18\text{m}^3/\text{min}$ | $\geq 21\text{m}^3/\text{min}$ |
| Engine power       | 75kW                           | 75kW                           |
| Dimensions         | Length x Width x Height        |                                |
| On transportation  | 6170x2150x2480mm               | 6170x2150x2480mm               |
| On working ground  | 4360x2150x5380mm               | 4360x2150x5380mm               |
| Gross weight       | 6.5T                           | 6.8T                           |

## INTEGRATED HYDRAULIC DTH DRILLING RIG PARAMETERS

| Parameter                     | Type                           |                                |
|-------------------------------|--------------------------------|--------------------------------|
|                               | HJG – D120                     | HJG – D165                     |
| Aperture                      | 90~150mm                       | 152~180mm                      |
| Drilling Depth                | 28M                            | 28M                            |
| Adaptive Rock                 | $f \geq 8$                     |                                |
| Rotation torque               | 3000Nm                         | 4000Nm                         |
| Rotary speed                  | 10~100rpm                      |                                |
| Thrust capacity               | 35kN                           | 40kN                           |
| Feed stroke                   | 4380mm                         | 4380MM                         |
| Lifting speed                 | 0.8m/s                         | 0.8m/s                         |
| Hammer model                  | HD45/HD55                      | HD55/HD65                      |
| Drill rod diameter            | 89MM, 102MM                    | 102MM, 114MM                   |
| Drill rod length              | 4m                             | 4m                             |
| Travel speed                  | 2.5Km/h 3Km/h                  | 2.5Km/h 3Km/h                  |
| Grade ability                 | 25°                            | 25°                            |
| Rising height from the ground | 430mm                          | 430mm                          |
| Air pressure                  | 1.7Mpa                         | 2.4Mpa                         |
| Air consumption               | $\geq 17\text{m}^3/\text{min}$ | $\geq 25\text{m}^3/\text{min}$ |
| Engine power                  | 287kW                          | 332kW                          |
| Dimensions                    | Length x Width x Height        |                                |
| On transportation             | 11000x2500x3280mm              | 11550x2716x3400mm              |
| On working ground             | 7800x2500x8410mm               | 7920x2716x8410mm               |
| Gross weight                  | 15.5T                          | 23T                            |

Black Diamond Drilling can custom manufacture equipment to suit your drilling needs.  
Please contact one of our representatives to discuss your equipment needs.



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