

# BUSINESS BROCHURE

PDC Bit & Tricone Bit  
DRILL BIT MANUFACTURER



**Hebei Haoqi Drilling Equipment Co., Ltd.**

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**15 YEARS** OF PROFESSIONAL  
MANUFACTURING EXPERIENCE

*Hebei Haoqi Drilling Equipment Co., Ltd.*



# COMPANY PROFILE

## About us

Hebei Haoqi drilling equipment Co.,Ltd was established in 2010 , engaged in the bit manufacturing industry for more than 10 years, specializing in the manufacture of PDC bit, tricone bit , mud motor and reamer which can be used in water wells , mining, coalbed methane geothermal field, oil and gas field, rotary excavation, trenchless fields and other fields. The annual production capacity of 10,000 drill bits and the inventory of more than 3,000 new drill bits can ensure the fastest delivery time.

The factory has always focused on quality by advanced technology and high-efficiency management. To make sure our bits quality stable, we produce as per "8S" and execute according to the ISO9001:2008 and ISO14001:2004, API Spec7-1. Now Haoqi has established strategic corporation relationship with all the oil-fields in China, also sold products to America, Russia, Mid-east, Indonesia and so on.



## Certificate



# Workshop & Equipment (Partial)



## Production Equipment



## Production Process



## Product & PDC Bit



## Product & Tricone Bit

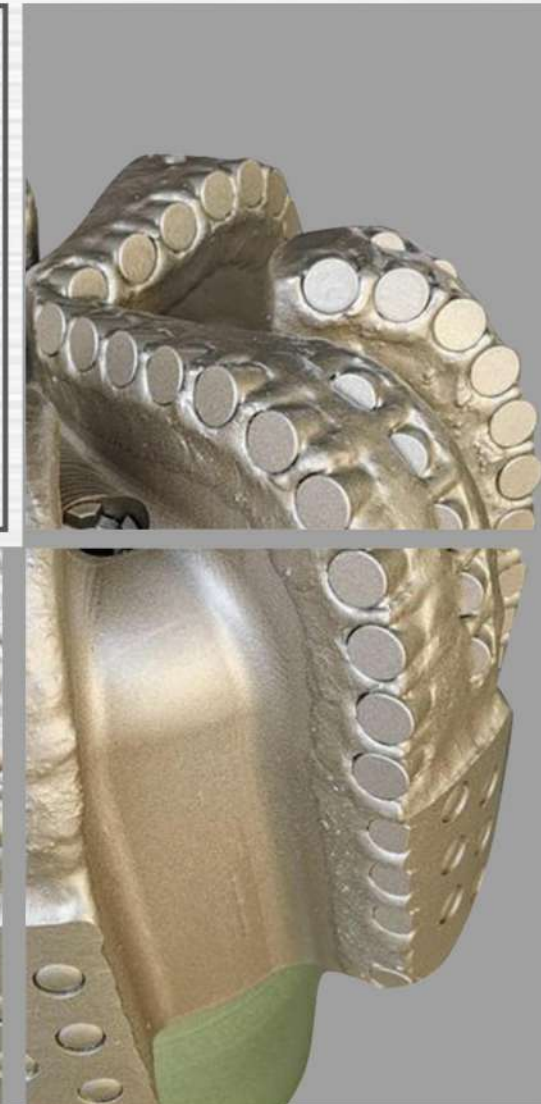


# ***PDC BIT***



High-quality products and customized services

PDC BIT



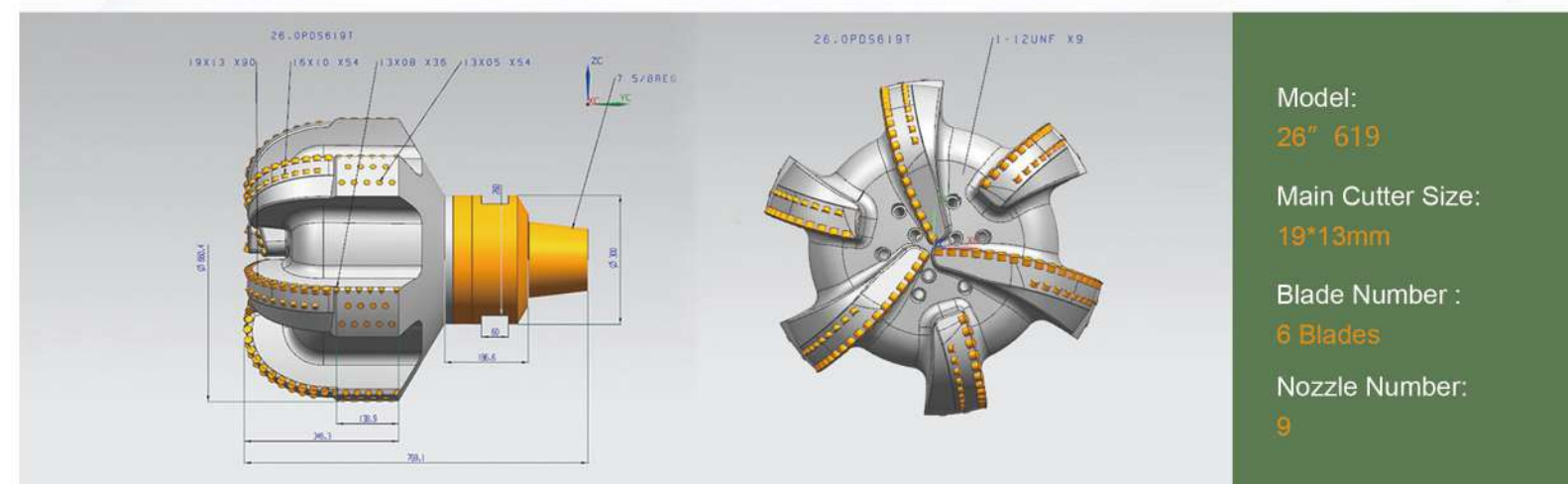
## Guidance of Choosing PDC Bit

| Formations Grading | Compressive Strength | Formation Description                                                                     | Rock Types                                               | IADC Code     |
|--------------------|----------------------|-------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------|
| 1                  | <4000PSI             | Viscous soft formations with low compressive strength                                     | clay, siltstone sandstone                                | M/S112~M/S223 |
| 2                  | <8000PSI             | Soft formations with low compressive strength and high drillability                       | silt rock, marl lignite, sandstone siltstone hard gypsum | M/S222~M/S333 |
| 3                  | <12000PSI            | Viscous soft formations with low compressive strength                                     | silt rock, marl lignite, siltstone hard gypsum, tuff     | M323~M434     |
| 4                  | <16000PSI            | Medium hard to hard formations with high compressive strength and abrasive thin interbeds | mudstone limestone hard gypsum                           | M333~M434     |
| 5                  | <24000PSI            | Hard and tight formations with very high compressive strength                             | limstone hard gypsum dolomite                            | M434~M634     |
| 6                  | <32000PSI            | Hard formations with very high compressive strength and some abrasive interbeds           | calcareous shale siliceous sandstone siltstone           | M613~M844     |
| 7                  | >32000PSI            | Very hard and high abrasive strength formations                                           | quartzite igneous rock                                   | M713~M844     |

## 15 years **PDC BIT** Manufacturing experience

We design, customize and manufacture oil and gas tools with an objective to provide class leading technologies that reduce your cost of drilling.

Because PDC bits are increasingly required to drill through challenging sections in one run optimizing hydraulic efficiency is a major consideration in the design of the high-efficiency PDC bits from HAOQI. Every HAOQI PDC bit is the product of ongoing analysis and lab testing, designed to achieve the most efficient balance between open area and blade geometry—especially in low horsepower-per-square-inch (HSI) environments. Features such as fully mapped and optimized diverging junk slots, multiple nozzle orientations, and enhanced computational fluid dynamics modeling make these bits the most efficient PDC drill bits in the industry.



### Bit shank thread and recommended make up torque

| Bit size (in) | API regular pin (in) | Recommended make up torque (kN.m) |
|---------------|----------------------|-----------------------------------|
| 3 7/8~4 1/2   | 2 3/8                | 4~4.8                             |
| 4 5/8~5       | 2 7/8                | 6~7.5                             |
| 5 1/2~6 3/4   | 3 1/2                | 9.5~12                            |
| 7 1/2~8 3/4   | 4 1/2                | 16~22                             |
| 9 1/2~13 5/8  | 6 5/8                | 38~43                             |
| 14 3/4~17 1/2 | 7 5/8                | 46~54                             |

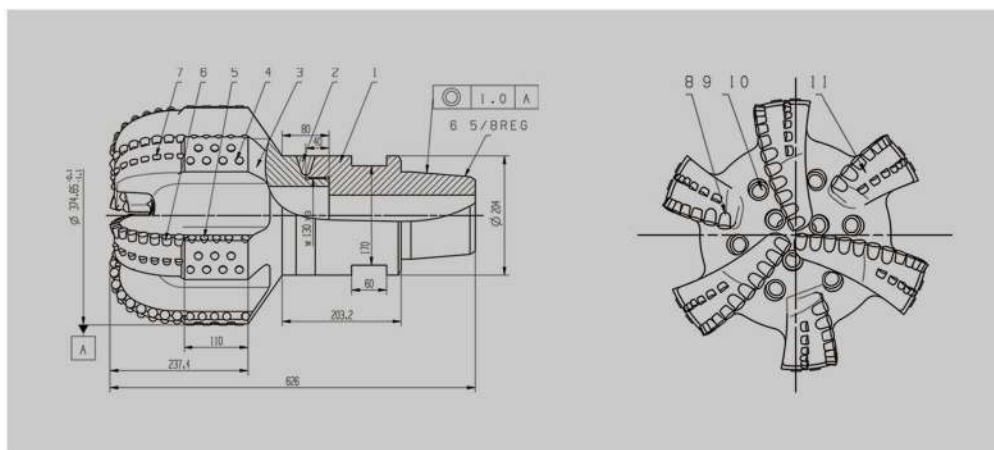
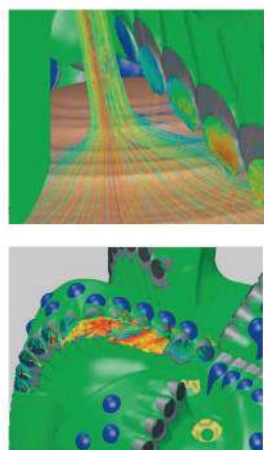


## PDC BIT Technological Expertise

### Engineering and Modeling

Computational fluid dynamics (CFD) analysis

Efficient hydraulics for improved performance and lower drilling costs. HAOQI BIT design engineers use CFD to model the interaction of drilling fluids with the bit and the wellbore. Complex algorithms enable the simulation of a wide variety of downhole conditions, allowing engineers to evaluate various blade and nozzle configurations to optimize flow patterns for cuttings removal. Ensuring the cutting structure is always drilling virgin formation improves bit performance. Extensive use is made of this sophisticated technique to maximize the available hydraulic energy, providing bits that will drill at the lowest-possible cost per foot.



#### 1.Cutting Teeth

Combined with the sharp cutting characteristics of tungsten carbide material, the aggressiveness and wear resistance of the drill bit can be improved by rationally configuring high-quality small-size PDC cutters and maximizing the local cutters equivalent density.



#### 2.Gauge Surface

Premium arc PDC cutter gauge can reduce the abrasion of rock on the bit's body and increase wear resistance and stability of the drill bit body.



#### 3.Nozzle

Interchangeable screw nozzles can effectively flush the impact cutting debris.



#### 4.Gauge cutter

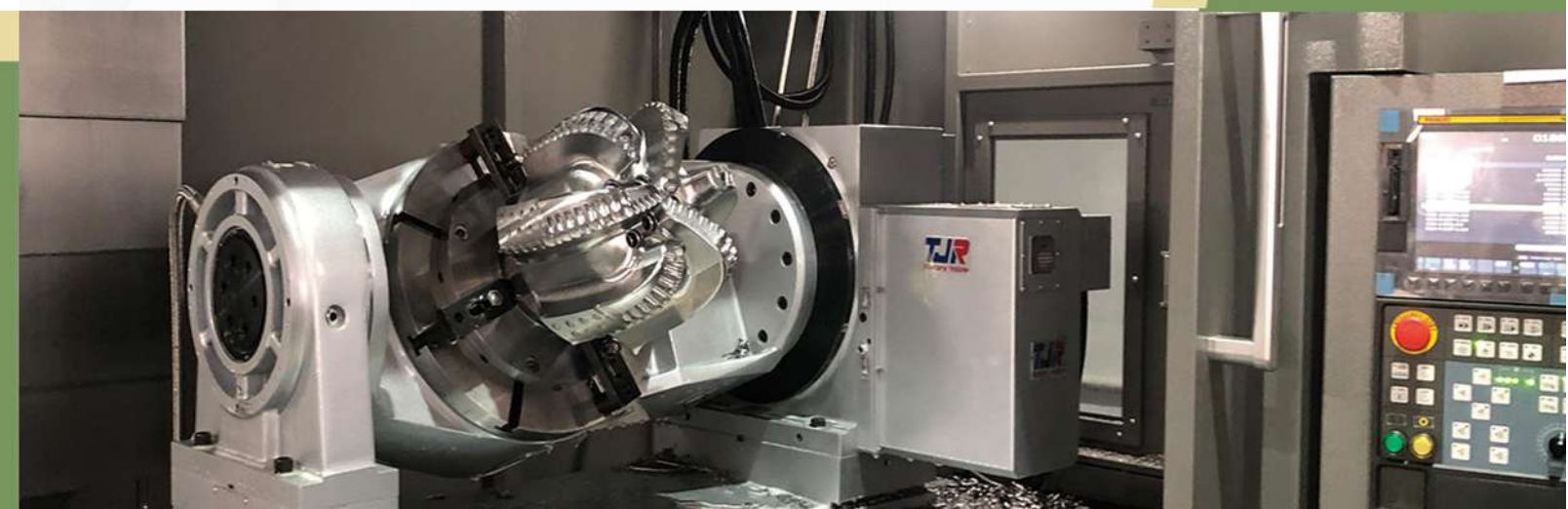
Gauge cutters can absorb high stress effectively and minimize cutter fracturing and wearing, thus enhance the wear resistance of cutters.

#### Double Row High Abrasion Resistant Bits

Bits with double row cutters are custom designed for high impact or high abrasion areas where durability and ROP are the primary concerns. These bits are best utilized in sandstones and carbonate formations.

#### High ROP Shale Optimized Bits

These bits are designed with bullet body, thin and tall blades and high junk slot area to prevent bit balling and hence deliver excellent ROP. These bits are always optimized for good hydraulics that maximizes cooling and cleaning of cutters.



## Leading technology **PDC BIT**

### Reduce your drilling cost per meter



HAOQI BIT possesses state of the art manufacturing facilities supported with advanced designing and engineering, R&D and quality control processes to ensure consistent high standards of manufacturing.

- 1.DART Drill Bit Design and Selection Process  
Maximize performance with the right bit for the right application.
- 2.Materials Research  
Improve drill bit durability and longevity.
- 3.Drilling Technology Laboratory  
Shorten the lead time between concept and product introduction.
- 4.HAOQI BIT Experimental Test Facility  
Redefine drilling performance with an advanced knowledge of drilling environments.
- 5.Product Evaluation Laboratory  
Strengthen performance and reliability through diagnostics.

## Directional: Gauge Pad Design

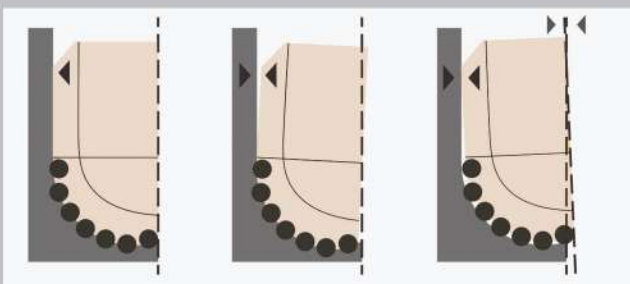
### Gauge Pad Features:



Passive Step Active 1 Active 2 Active 3

HAOQI BIT offers a wide range of gauge configurations, depending on the requirements for: Dog leg and/or Gauge pad wear resistance.

### Step Gauge & Bit Tilt



Conventional Gauge Tangent Orient



### RSS & Motor

Gauge pad relief allows the bit to tilt and change direction.



## Details determine quality

Quality comes from profession



### 5 1/2" HS413

Blades: 4  
Connection Thread: 2 7/8 API REG  
Nozzle Qty : 13/32\*4 16/32\*1  
Cutter Size : 13\*13mm  
WOB (kN/mm) : 20-80  
RPM (r/min) : 60-300



### 7 7/8" HS419

Blades: 4  
Connection Thread : 4 1/2 API REG  
Nozzle Qty : 20/32\*7  
Cutter Size : 19\*19mm  
WOB (kN/mm) : 20-110  
RPM (r/min) : 60-300



### 9 7/8" HS416

Blades: 4  
Connection Thread : 6 5/8 API REG  
Nozzle Qty : 20/32\*6  
Cutter Size : 16\*13mm  
WOB (kN/mm) : 20-110  
RPM (r/min) : 60-260



### 10 5/8" HS716

Blades: 7  
Connection Thread : 6 5/8 API REG  
Nozzle Qty : 14/32\*6  
Cutter Size : 16\*13mm  
WOB (kN/mm) : 20-140  
RPM (r/min) : 60-260



### 12 1/4" HS716

Blades: 7  
Connection Thread : 6 5/8 API REG  
Nozzle Qty : 14/32\*8  
Cutter Size : 16\*13mm  
WOB (kN/mm) : 20-160  
RPM (r/min) : 60-260



# *Tricone Bit*



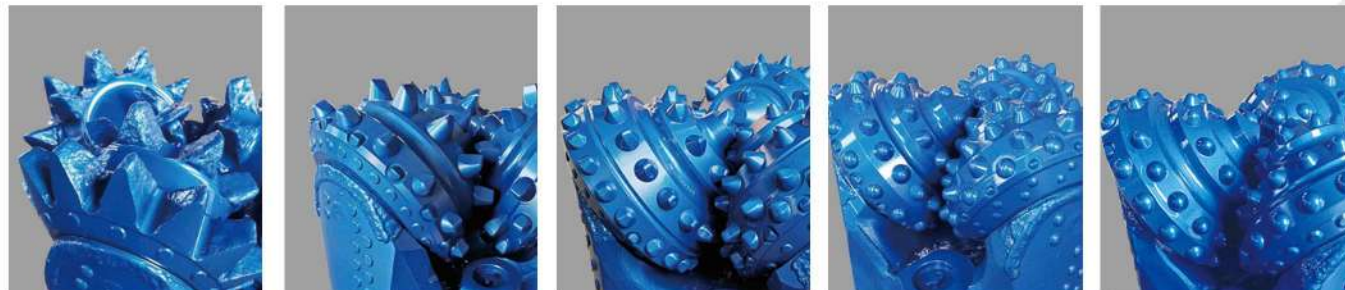
High-quality products and customized services

TRICONE BIT



## Guidance of Choosing Tricone Bit

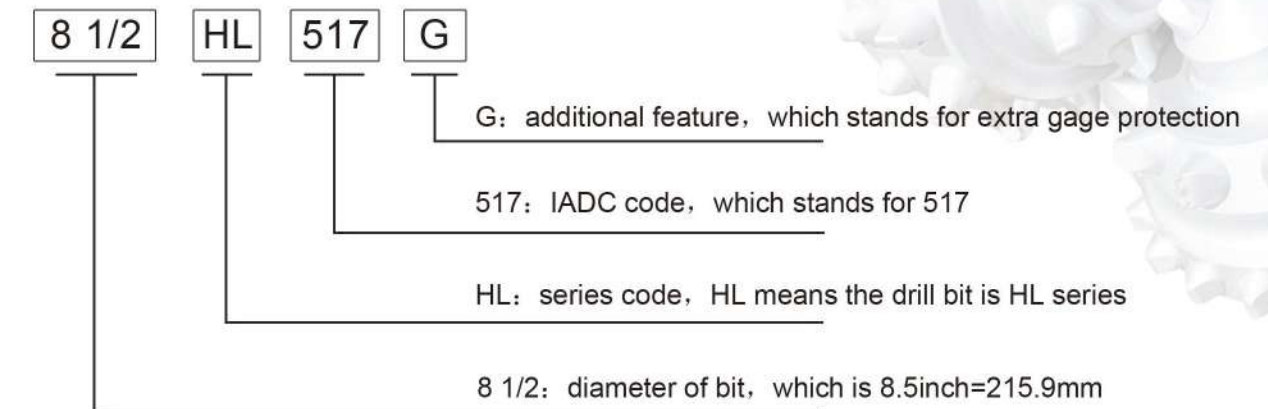
|             | IADC code | Formation                                                                          | Rock Types                                                                                                                   |
|-------------|-----------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Steel Tooth | 111-117   | Soft formation with low compressive strength and high drillability.                | very soft shale、 mudstone clay、 soil layer、 plaster                                                                          |
|             | 121-127   |                                                                                    | mudstone、 soft shale、 soft sandstone unconsolidated rock、 tuff                                                               |
|             | 131-137   |                                                                                    | shale、 soft limestone                                                                                                        |
|             | 214-225   | High compressive strength medium-hard formations.                                  | shale、 soft limestone                                                                                                        |
|             | 315-317   | Semi-abrasive or abrasive hard formations.                                         | hard limestone                                                                                                               |
| TCI         | 415-447   | Soft formation with low compressive strength and high drillability.                | soft shale、 clay layer                                                                                                       |
|             | 515-517   | Soft to medium hard formation with low compressive strength and high drillability. | mudstone、 soft shale loose sandstone                                                                                         |
|             | 525-527   |                                                                                    | medium shale、 sandstone、 shale                                                                                               |
|             | 535-547   |                                                                                    | sandstone、 serpentine medium soft limestone                                                                                  |
|             | 615-617   | Medium-hard formation with high compressive strength.                              | hard shale、 limestone、 sandstone Iron ore、 shale、 Mica schist marble、 granite、 dolomites、 diabase                            |
|             | 625-637   | Medium-hard formation with high compressive strength.                              | dolomite、 hard limestone、 grave hard sandstone、 limestone quartzite、 basalt、 hard shale taconite、 rhyplite、 pyrite、 hematite |



### 1. Tricone Bit Naming

The model number of tricone bit is consisted of four parts, namely diameter code, series code, IADC code and additional feature code.

Example: 8 1/2 HL 517G

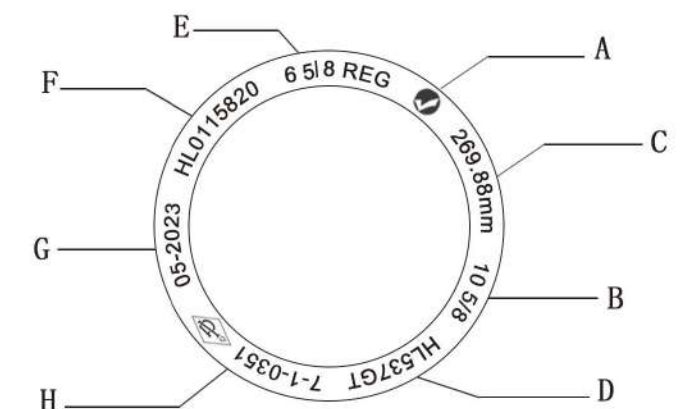


### 2. Additional Feature

| Code | Additional feature    | C | Center nozzle             |
|------|-----------------------|---|---------------------------|
| G    | Extra gage protection | L | Strengthening block       |
| K    | Wide-top tooth        | X | Wedge-shaped tooth        |
| T    | Special gear gauge    | Y | Conical-ended shape tooth |

### 3. Bit Identification

|   |                           |
|---|---------------------------|
| A | Company Logo              |
| B | Tricone Bit Specification |
| C | Diameter                  |
| D | IADC Code                 |
| E | Connection Thread         |
| F | Serial Number             |
| G | Assemble Date             |
| H | Standard API 7-1-0351     |



# HK Series Tricone Bit



The HK series drill bit adopts sliding bearing rubber seal, which can withstand high drilling pressure at normal speed, and can be used in extremely soft to medium hard formations with different cutting structures.

## Product Description:

1. In the form of sliding bearing, B4 wear-resistant alloy layer is overlaid on the surface of the bearing. and silver is plated on the inner hole of the tooth wheel, so as to improve the bearing capacity and anti seizing capacity.
2. The bearing O-ring is made of high saturated fluorinated nitrile rubber, which has good wear resistance and high temperature resistance; the compression ratio and section diameter of the seal ring are optimized to improve the sealing performance of the seal ring; the lip seals adopted to improve the reliability of the seal.
3. Vacuum pumping and oil filling are adopted, and the oil storage pressure balance system can balance the internal and external pressure difference of the bearing, provide good lubrication guarantee for the bearing system at the same time.
4. The bit is made of cemented carbide inserts with high strength and toughness for oil. According to the compressive strength and drillability of different formation, the specific cutting structure, inserts shape and inserts material are selected to ensure the wear resistance and toughness of inserts can reach the optimal matching and have a high ROP. The steel bit adopts the wear-resistant weldingmaterial independently developed and the wear-resistant material is fully wrapped on the tooth surface, which not only maintain the high mechanical drilling speed of the steel bit, but also improve the cutting tooth life of the bit.

| Bit Size |       | API Thread | Bit Model                                       |
|----------|-------|------------|-------------------------------------------------|
| in       | mm    | in         |                                                 |
| 4 1/2    | 114.3 | 2 3/8      | HK117、HK217、HK517、HK537                         |
| 5 1/4    | 133.4 | 3 1/2      | HK117、HK137、HK217、HK517、HK537                   |
| 5 1/2    | 139.7 | 3 1/2      | HK117、HK217、HK517、HK537                         |
| 6        | 152.4 | 3 1/2      | HK117、HK217、HK517、HK537、HK617、HK637             |
| 6 1/8    | 155.6 | 3 1/2      | HK517、HK537、HK617、HK637                         |
| 6 1/4    | 158.8 | 3 1/2      | HK517、HK537、HK617、HK637                         |
| 6 1/2    | 165.1 | 3 1/2      | HK117、HK217、HK517、HK537、HK617、HK637             |
| 6 3/4    | 171.5 | 3 1/2      | HK517、HK537、HK617、HK637                         |
| 7 1/2    | 190.5 | 4 1/2      | HK117、HK127、HK517、HK537、HK617、HK637             |
| 7 5/8    | 193.7 | 4 1/2      | HK517、HK537、HK617、HK637                         |
| 7 7/8    | 200   | 4 1/2      | HK117、HK127、HK437、HK517、HK527、HK537、HK617、HK637 |
| 8 1/2    | 215.9 | 4 1/2      | HK437、HK517、HK527、HK537、HK617、HK637             |
| 8 3/4    | 222.3 | 4 1/2      | HK437、HK517、HK527、HK537、HK617、HK637             |
| 9 1/2    | 241.3 | 6 5/8      | HK117、HK437、HK517、HK527、HK537、HK617、HK637       |
| 9 5/8    | 244.5 | 6 5/8      | HK117、HK437、HK517、HK527、HK537、HK617、HK637       |
| 9 7/8    | 250.8 | 6 5/8      | HK117、HK437、HK517、HK527、HK537、HK617、HK637       |
| 10 5/8   | 269.9 | 6 5/8      | HK117、HK437、HK517、HK527、HK537、HK617、HK637       |
| 11 5/8   | 295.3 | 6 5/8      | HK117、HK437、HK517、HK527、HK537、HK617、HK637       |
| 12 1/4   | 311.2 | 6 5/8      | HK117、HK437、HK517、HK527、HK537、HK617、HK637       |
| 13 3/4   | 346.1 | 6 5/8      | HK117、HK437、HK517、HK527、HK537、HK617、HK637       |
| 14 3/4   | 374.7 | 7 5/8      | HK117、HK437、HK517、HK527、HK537、HK617、HK637       |

Note: Drill bit sizes and models not shown in the table can be designed and developed according to user needs

| Bit pressure and speed parameter table |           |           |           |           |           |           |           |
|----------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Model                                  | HK417     | HK437     | HK517     | HK527     | HK537     | HK547     | HK617     |
| WOB(kN/mm)                             | 0.35-0.90 | 0.35-0.95 | 0.35-1.05 | 0.35-1.05 | 0.35-1.05 | 0.35-1.05 | 0.35-1.05 |
| RPM(r/min)                             | 140-70    | 140-60    | 120-50    | 120-50    | 110-40    | 110-40    | 80-40     |
| Model                                  | HK627     | HK637     | HK647     | HK737     | HK117     | HK127     | HK217     |
| WOB(kN/mm)                             | 0.35-1.05 | 0.70-1.20 | 0.70-1.20 | 0.70-1.20 | 0.35-0.90 | 0.35-1.00 | 0.35-1.05 |
| RPM(r/min)                             | 80-40     | 70-40     | 70-40     | 70-40     | 150-80    | 150-70    | 150-60    |



## HK Series Tricone Bit



5 1/2" HK537GTL

CONNECTION THREAD: 2 7/8 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 240~60



6 3/4" HK637GYL

CONNECTION THREAD: 3 1/2 REG  
WOB (kN/mm) : 0.50~1.09  
RPM (r/min) : 200~40



7 7/8" HK537GT

CONNECTION THREAD: 4 1/2 REG  
WOB (kN/mm) : 0.50~1.09  
RPM (r/min) : 200~40



11 5/8" HK517GT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 240~60



12 1/4" HK437GKT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~1.01  
RPM (r/min) : 240~60



12 1/4" HK537GKT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 240~60



8 1/2" HK517GT

CONNECTION THREAD: 4 1/2 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 240~60



9 7/8" HK637GYT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.50~1.09  
RPM (r/min) : 200~40



10 5/8" HK617GYTL

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.50~1.09  
RPM (r/min) : 200~40



12 1/4" HK117G

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~0.90  
RPM (r/min) : 170~80



17 1/2" HK117GT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~0.90  
RPM (r/min) : 170~80



24" HK117G

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~0.90  
RPM (r/min) : 170~80

# HL Series Tricone Bit



HL series bit is a kind of rock breaking tool indispensable for geological exploration, oil drilling and various drilling industries. Its strong stability, high reliability, good hydraulic effects, high rock breaking efficiency and long service life make it for rotary drilling, motor drilling , high temp drilling ,deep drilling and other drilling conditions.

## Product Description:

### Steel Tooth

- 1) The optimized tooth structure makes the wearing-resistant alloy welded on the tooth surface and tooth top thicker and more offensive, effectively improving the wearing resistance of the teeth and greatly increasing the rate of penetration.
- 2) Through new welding technologies, new welding materials are welded on the surface of the inner row teeth and outer row teeth, thus making the teeth more wear-resistant.

### TCI

The technical engineers choose the tungsten carbide teeth with higher wearing resistance and stronger toughness for the poor working environment under high speed drilling conditions. Meanwhile, they use the computer simulation software to optimize the teeth structure and teeth placement to reduce repeated crushing, mitigate teeth wearing and lift the rate of penetration. Therefore, the drilling pressure can be spread over each tooth of the three cones in a more balanced way to ensure a balanced, stable and lasting state.

Bit pressure and speed parameter table

| Model      | HL417     | HL437     | HL517     | HL527     | HL537     | HL547     | HL617     |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| WOB(kN/mm) | 0.35-1.01 | 0.35-0.95 | 0.35-1.05 | 0.35-1.05 | 0.35-1.04 | 0.50-1.09 | 0.50-1.09 |
| RPM(r/min) | 240-60    | 240-60    | 240-60    | 240-60    | 240-60    | 200-40    | 200-40    |
| Model      | HL627     | HL637     | HL647     | HL117     | HL127     | HL137     | HL217     |
| WOB(kN/mm) | 0.50-1.09 | 0.50-1.09 | 0.50-1.17 | 0.35-0.90 | 0.35-1.00 | 0.35-1.05 | 0.50-1.20 |
| RPM(r/min) | 200-40    | 200-40    | 200-40    | 170-80    | 170-70    | 140-60    | 120-50    |

| Bit Size |       | API Thread | Bit Model                                              |
|----------|-------|------------|--------------------------------------------------------|
| in       | mm    | in         |                                                        |
| 4 1/2    | 114.3 | 2 3/8      | HL117, HL217, HL517, HL537                             |
| 5 1/4    | 133.4 | 3 1/2      | HL117, HL137, HL217, HL517, HL537                      |
| 5 1/2    | 139.7 | 3 1/2      | HL117, HL217, HL517, HL537                             |
| 6        | 152.4 | 3 1/2      | HL117, HL217, HL517, HL537, HL617, HL637               |
| 6 1/8    | 155.6 | 3 1/2      | HL517, HL537, HL617, HL637                             |
| 6 1/4    | 158.8 | 3 1/2      | HL517, HL537, HL617, HL637                             |
| 6 1/2    | 165.1 | 3 1/2      | HL117, HL217, HL517, HL537, HL617, HL637               |
| 6 3/4    | 171.5 | 3 1/2      | HL517, HL537, HL617, HL637                             |
| 7 1/2    | 190.5 | 4 1/2      | HL117, HL127, HL517, HL537, HL617, HL637               |
| 7 5/8    | 193.7 | 4 1/2      | HL517, HL537, HL617, HL637                             |
| 7 7/8    | 200   | 4 1/2      | HL117, HL127, HL437, HL517, HL527, HL537, HL617, HL637 |
| 8 1/2    | 215.9 | 4 1/2      | HL437, HL517, HL527, HL537, HL617, HL637               |
| 8 3/4    | 222.3 | 4 1/2      | HL437, HL517, HL527, HL537, HL617, HL637               |
| 9 1/2    | 241.3 | 6 5/8      | HL117, HL437, HL517, HL527, HL537, HL617, HL637        |
| 9 7/8    | 250.8 | 6 5/8      | HL117, HL437, HL517, HL527, HL537, HL617, HL637        |
| 10 5/8   | 269.9 | 6 5/8      | HL117, HL437, HL517, HL527, HL537, HL617, HL637        |
| 11 5/8   | 295.3 | 6 5/8      | HL117, HL437, HL517, HL527, HL537, HL617, HL637        |
| 12 1/4   | 311.2 | 6 5/8      | HL117, HL437, HL517, HL527, HL537, HL617, HL637        |
| 13 3/4   | 346.1 | 6 5/8      | HL117, HL437, HL517, HL527, HL537, HL617, HL637        |
| 14 3/4   | 374.7 | 7 5/8      | HL117, HL437, HL517, HL527, HL537, HL617, HL637        |
| 15 1/2   | 393.7 | 7 5/8      | HL117, HL437, HL517, HL527, HL537, HL617, HL637        |
| 17 1/2   | 444.5 | 7 5/8      | HL117, HL515, HL517, HL535, HL537                      |

Note: Drill bit sizes and models not shown in the table can be designed and developed according to user needs



## HL Series Tricone Bit



5 1/2" HL517GL

CONNECTION THREAD: 3 1/2 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 240~60



7 7/8" HL517GKT

CONNECTION THREAD: 4 1/2 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 240~60



8 1/2" HL527GXT

CONNECTION THREAD: 4 1/2 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 240~60



12 1/4" HL617GYT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.50~1.09  
RPM (r/min) : 200~40



13 3/4" HL517GT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.50~1.09  
RPM (r/min) : 200~40



14 3/4" HL617GYTL

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.50~1.09  
RPM (r/min) : 200~40



9 7/8" HL437GTC

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~1.01  
RPM (r/min) : 240~60



10 5/8" HL537GTL

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 240~60



11 5/8" HL517GKT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 240~60



15 1/2" HL537GT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~1.04  
RPM (r/min) : 200~40



17 1/2" HL517G

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~0.90  
RPM (r/min) : 170~80

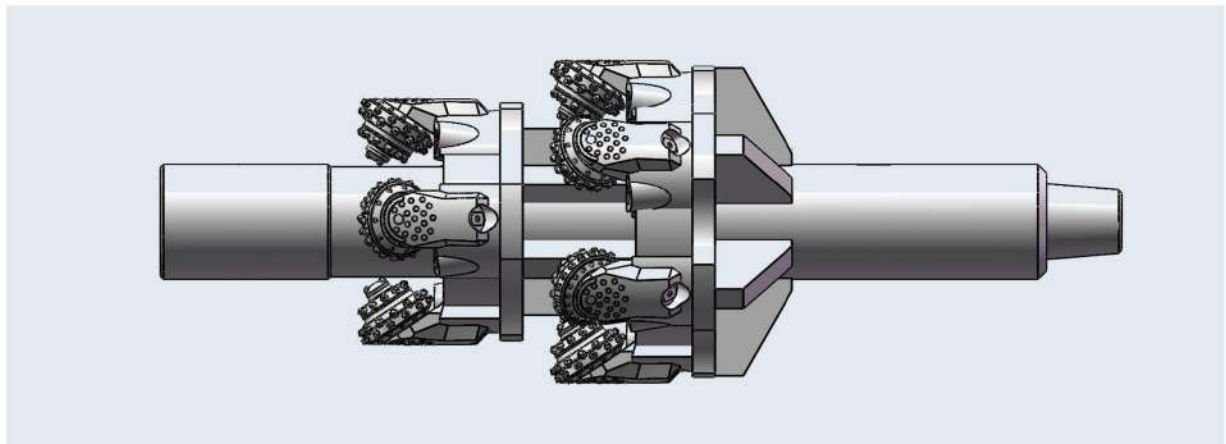


12 1/4" HL117GT

CONNECTION THREAD: 6 5/8 REG  
WOB (kN/mm) : 0.35~0.90  
RPM (r/min) : 170~80

## HDD ROCK REAMER

The roller cone rock reamer is a common rock reaming tool for non-excavation and crossing construction industries. Our company produces various types of roller reamers suitable for various types of non-excavation and crossing drilling rigs, suitable for various strata, and the size covers 220- 1600mm.



### Trenchless bit configuration table

| Items | Reamer       | Segments |       |        |        |
|-------|--------------|----------|-------|--------|--------|
|       | Diameter(mm) | 8 1/2    | 9 7/8 | 12 1/4 | 13 5/8 |
| 1     | 300          | 3        | /     | /      | /      |
| 2     | 400          | 5        | 4     | /      | /      |
| 3     | 500          | 6        | 5     | 4      | /      |
| 4     | 600          | 7        | 6~7   | 5~6    | 5      |
| 5     | 700          | 7        | 7~8   | 6~7    | 6      |
| 6     | 800          | /        | /     | 7~8    | 7      |
| 7     | 900          | /        | /     | 8~9    | 8~9    |
| 8     | 1000         | /        | /     |        | 9~10   |
| 9     | 1100         | /        | /     |        | 10~11  |
| 10    | 1200         | /        | /     |        | 12~13  |
| 11    | 1300         | /        | /     |        | 10~11  |
| 12    | 1400         | /        | /     |        | 12~13  |
| 13    | 1500         | /        | /     |        | 13~14  |

Note:1) The configuration of the trenchless bit can be adjusted according to customer requirements, formation, drilling rig model or any other construction requirements;  
2) Different types of plate or barrel centralizing structures can be applied according to customer requirements.

HDD Tools



## Structural features

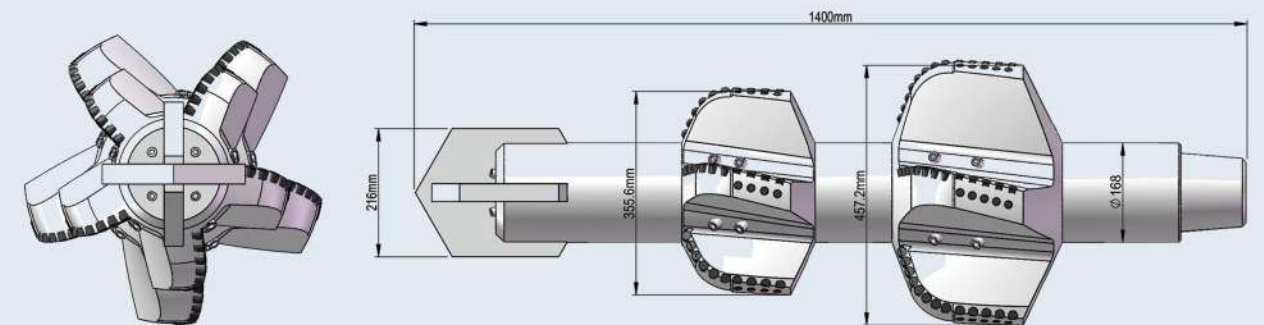
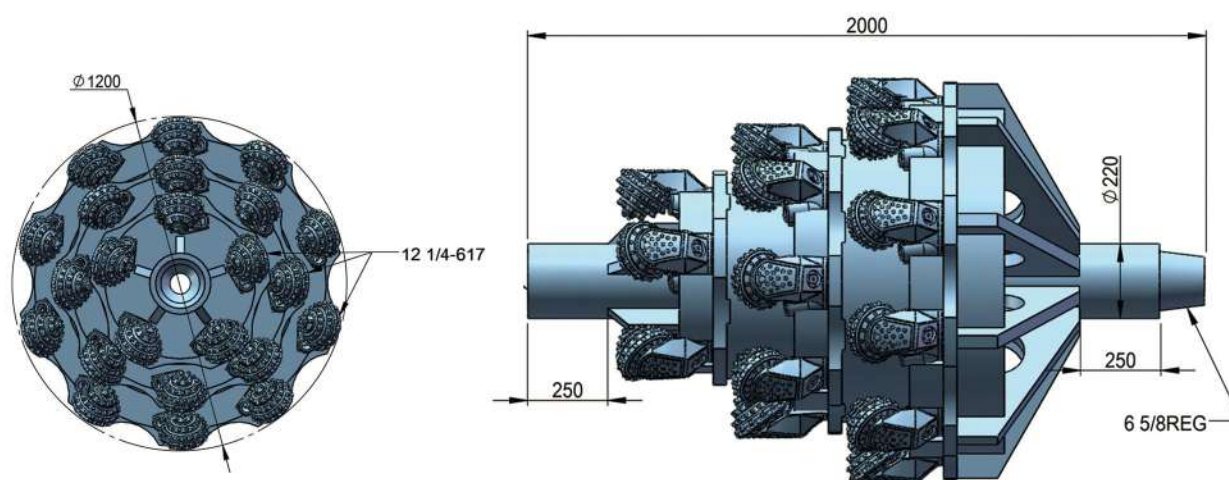
1. According to the different construction conditions on site, select the appropriate palm type and quantity ratio to ensure product life and construction efficiency.



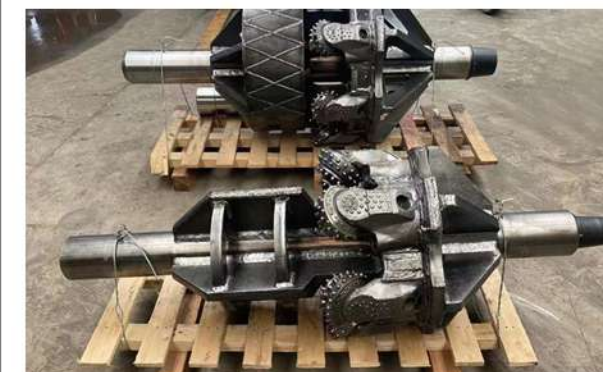
2. Using high-quality single roller cone, from accessories to finishing and assembly are completed in strict accordance with high standards, and the quality is controllable.



3. The multi-layer and multi-channel welding process reduces thermal damage and enhances the tensile strength of the reamer.



## Reference picture



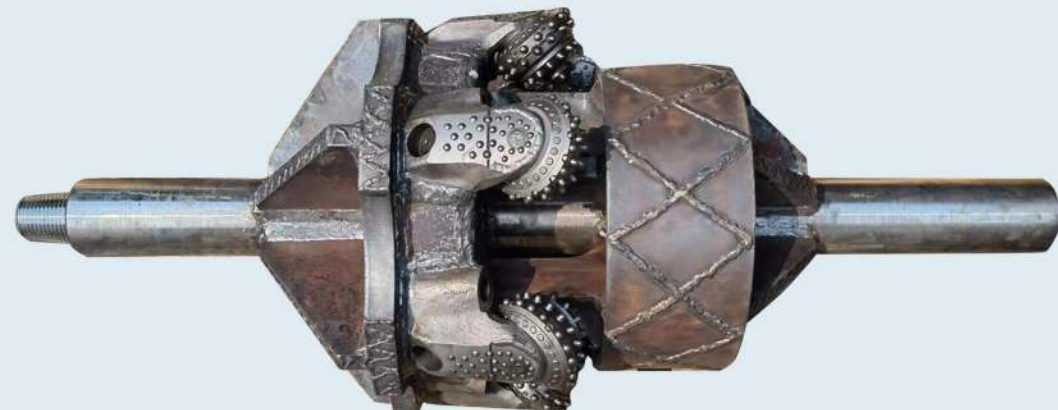
Reference picture 1

| Diameter | Trenchless bit type      | Connection thread |
|----------|--------------------------|-------------------|
| 18 1/2"  | 12 1/4" 617 Metal seal*4 | 3 1/2" IF         |



Reference picture 2

| Diameter | Trenchless bit type      | Connection thread |
|----------|--------------------------|-------------------|
| 28"      | 13 5/8" 617 Metal seal*6 | 4" IF             |



Reference picture 3

| Diameter | Trenchless bit type      | Connection thread |
|----------|--------------------------|-------------------|
| 20"      | 12 1/4" 537 Metal seal*4 | 3 1/2" IF         |



Reference picture 4

| Diameter | Trenchless bit type      | Connection thread |
|----------|--------------------------|-------------------|
| 31"      | 13 5/8" 617 Metal seal*8 | 4 1/2" IF         |



## Single Roller Cone

- Metal-sealed sliding bearing structure, hard alloy surfacing on the surface of the bearing tooth brush inner hole Silver plated to improve load carrying capacity anti-seize and bearing stability.
- Optimal design of tooth row, number of teeth, and main cutting teeth adopt conical teeth which are suitable for drilling in hard and brittle formations.
- The precision designed and processed new oil storage lubrication system applies new synthetic grease to improve the bearing internal. The external pressure balances the speed, better protects the bearing sealing system and improves reliability.
- In order to adapt to directional and horizontal drilling, the full palm back teeth with gradient changes in height and exposed tooth height are adopted.

### Structural features



As a component, the single roller bit is alternately installed on the thin-wal shaft to form a rotary drilling. Among them, the two and three toothed wheels need to be welded to achieve the full coverage of the broken ring.

The single roller bit is composed of a single cone and a lug matched by a bearing. According to different strata and construction requirements, different cutting structures can be selected: wear resistant carbide are welded and cemented carbide inserts are inserted on the back of the lug.

12 1/4" trenchless bit



8 1/2" trenchless bit



9 7/8" trenchless bit



13 5/8" trenchless bit



### Reference picture



## Mud Motor

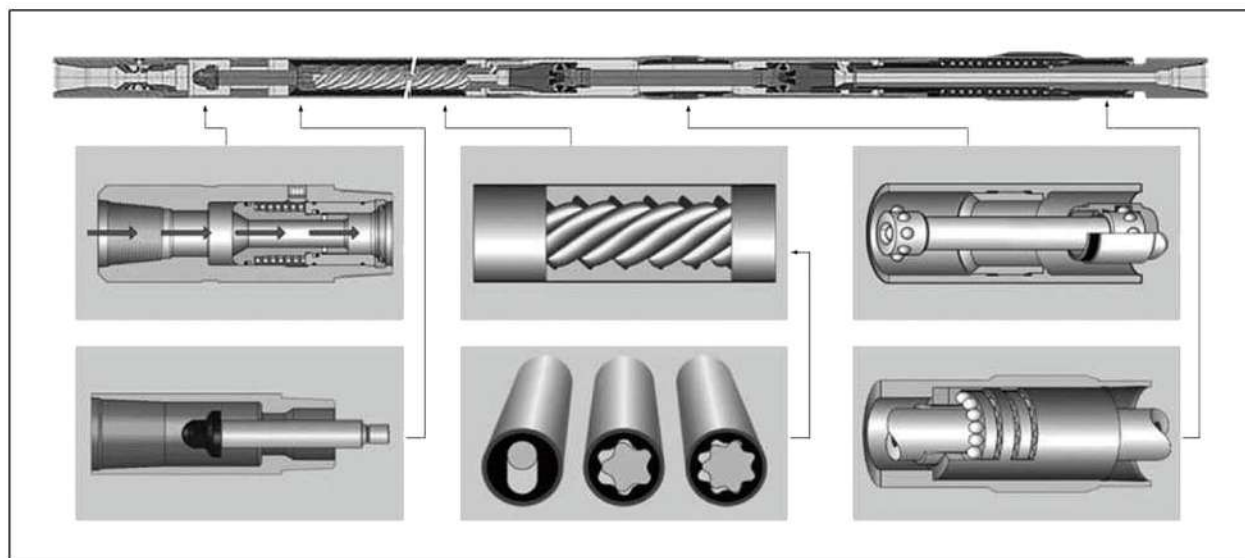
The screw drilling tool uses mud and clear water as the power medium, which is transported to the bottom of the hole through the center hole of the drill pipe. It is essentially an energy conversion device that converts liquid pressure into mechanical energy. When drilling, the screw drilling tool directly drives the core tube and the drill bit connected to the drive shaft at the bottom of the hole to rotate, and the entire drill string is only a channel for conveying high-pressure work and a rod for supporting the counter torque of the drill bit, without rotary motion.

Drilling with screw drilling tools has many advantages compared with conventional drilling, such as greatly reduced drill pipe wear and high drilling speed. It is the main tool for drilling directional holes, and it has played a role in drilling non-excavation fields.



## Constitution

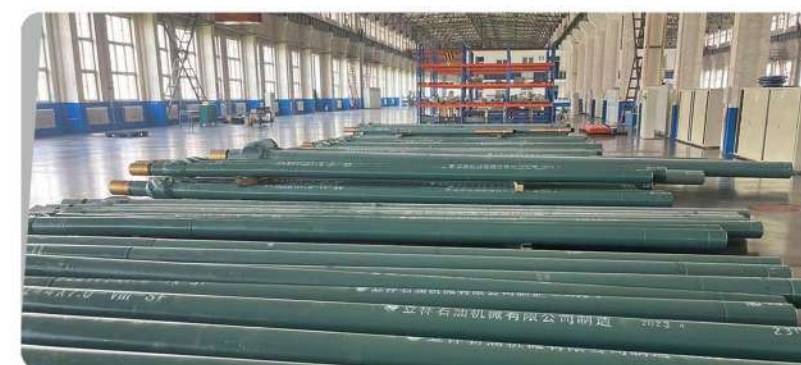
Downhole motor is composed of four assemblies of by-pass valve, motor, cardan shaft and drive shaft.



## Working Principle

Downhole motor is a kind of downhole dynamic drilling tool upon the power of drilling mud. Mud stream from the outlet of mud pump flows through a by-pass valve into the motor. This stream produces pressure loss between inlet and outlet of the pump, to push the rotor into rotating, and to transmit the torque and speed to the bit. The downhole motor property mainly depends upon its property parameters.

## Reference picture





Mud Motor Technology Parameters

| Model       | mm  | in    | Bit size            | Connection Thread | Flow Rate<br>lpm<br>gpm | Rotary Speed | Max Pressure Loss<br>Mpa<br>Psi | Max Torque<br>N.m<br>lb-ft | Max Pressure<br>KN<br>lb | Max Output Power<br>KW<br>hp |
|-------------|-----|-------|---------------------|-------------------|-------------------------|--------------|---------------------------------|----------------------------|--------------------------|------------------------------|
| 5LZ89-3.0   | 89  | 3 1/2 | 114-149 4 1/2-5 7/8 | 2 3/8REG 2 3/8REG | 190-568 50-150          | 80-240       | 3.14 455                        | 1016 750                   | 35 7700                  | 22 30                        |
| 5LZ89-4.0   | 89  | 3 1/2 | 114-149 4 1/2-5 7/8 | 2 3/8REG 2 3/8REG | 190-568 50-150          | 82-246       | 4.19 608                        | 1315 970                   | 35 7700                  | 29 40                        |
| 7LZ95-4.0   | 95  | 3 3/4 | 118-149 4 5/8-5 7/8 | 2 7/8REG 2 7/8REG | 303-606 80-160          | 130-260      | 4.19 608                        | 1325 977                   | 55 12375                 | 31 43                        |
| 7LZ95-6.7   | 95  | 3 3/4 | 118-149 4 5/8-5 7/8 | 2 7/8REG 2 7/8REG | 303-606 80-160          | 127-254      | 7.02 1018                       | 2284 1685                  | 55 12375                 | 52 71                        |
| 5LZ105-4.0  | 105 | 4 1/8 | 121-152 4 3/4-6     | 2 7/8REG 2 7/8REG | 378-757 100-200         | 123-247      | 4.19 608                        | 1745 1287                  | 55 12375                 | 39 53                        |
| 6LZ105-6.0  | 105 | 4 1/8 | 121-152 4 3/4-6     | 2 7/8REG 2 7/8REG | 454-946 120-250         | 142-297      | 6.28 910                        | 2694 1987                  | 55 12375                 | 74 101                       |
| 7LZ105-6.0  | 105 | 4 1/8 | 121-152 4 3/4-6     | 2 7/8REG 2 7/8REG | 454-946 120-250         | 133-277      | 6.28 910                        | 2884 2127                  | 55 12375                 | 73 99                        |
| 9LZ105-4.0  | 105 | 4 1/8 | 121-152 4 3/4-6     | 2 7/8REG 2 7/8REG | 454-946 120-250         | 120-251      | 4.19 608                        | 2078 1532                  | 55 12375                 | 47 64                        |
| 5LZ120-3.0  | 120 | 4 3/4 | 149-200 5 7/8-7 7/8 | 3 1/2REG 3 1/2REG | 568-1136 150-300        | 116-232      | 3.14 455                        | 2060 1519                  | 100 22500                | 44 60                        |
| 5LZ120-4.0  | 120 | 4 3/4 | 149-200 5 7/8-7 7/8 | 3 1/2REG 3 1/2REG | 568-1324 150-350        | 118-276      | 4.19 608                        | 2707 1997                  | 100 22500                | 44 60                        |
| 7LZ120-4.5  | 120 | 4 3/4 | 149-200 5 7/8-7 7/8 | 3 1/2REG 3 1/2REG | 454-1040 120-275        | 80-182       | 4.71 684                        | 3557 2624                  | 100 22500                | 69 94                        |
| 7LZ120-5.0  | 120 | 4 3/4 | 149-200 5 7/8-7 7/8 | 3 1/2REG 3 1/2REG | 454-1040 120-275        | 80-182       | 5.24 760                        | 3958 2920                  | 100 22500                | 67 91                        |
| 5LZ140-3.0  | 140 | 5 1/2 | 171-213 6 3/4-8 3/8 | 4 1/2REG 4 1/2REG | 567-1325 150-350        | 94-219       | 3.14 455                        | 2548 1879                  | 100 22500                | 68 92                        |
| 5LZ140-4.0  | 140 | 5 1/2 | 171-213 6 3/4-8 3/8 | 4 1/2REG 4 1/2REG | 567-1325 150-350        | 94-219       | 4.19 608                        | 3398 2506                  | 100 22500                | 78 105                       |
| 7LZ140-4.0  | 140 | 5 1/2 | 171-213 6 3/4-8 3/8 | 4 1/2REG 4 1/2REG | 757-1514 200-400        | 86-172       | 4.19 608                        | 4893 3609                  | 100 22500                | 118 160                      |
| 7LZ159-5.0  | 159 | 6 1/4 | 200-216 7 7/8-8 1/2 | 4 1/2REG 4 1/2REG | 946-1892 250-500        | 102-204      | 5.24 760                        | 6257 4616                  | 160 36000                | 125 170                      |
| C7LZ159-5.0 | 159 | 6 1/4 | 200-216 7 7/8-8 1/2 | 4 1/2REG 4 1/2REG | 946-1892 250-500        | 85-170       | 5.24 760                        | 7913 5837                  | 160 36000                | 72 98                        |
| LZ165-7.0   | 165 | 6 1/2 | 200-251 7 7/8-9 7/8 | 4 1/2REG 4 1/2REG | 378-1325 100-350        | 160-563      | 4.19 608                        | 1390 1026                  | 100 22500                | 182 248                      |
| 4LZ165-7.0  | 165 | 6 1/2 | 200-251 7 7/8-9 7/8 | 4 1/2REG 4 1/2REG | 946-1892 250-500        | 134-268      | 7.32 1062                       | 7382 5445                  | 160 36000                | 69 94                        |
| 5LZ165-3.5  | 165 | 6 1/2 | 200-251 7 7/8-9 7/8 | 4 1/2REG 4 1/2REG | 757-1514 200-400        | 112-224      | 3.67 532                        | 3390 2501                  | 160 36000                | 209 285                      |



Mud Motor Technology Parameters

| Model        | mm  | in    | Bit size              | Connection Thread | Flow Rate |          | Rotary Speed | Max Pressure Loss |      | Max Torque  | Max Pressure | Max Output Power |     |
|--------------|-----|-------|-----------------------|-------------------|-----------|----------|--------------|-------------------|------|-------------|--------------|------------------|-----|
|              |     |       |                       |                   | lpm       | gpm      |              | Mpa               | Psi  | N.m         | KN           | KW               | hp  |
| 3LZ172-6.0   | 172 | 6 3/4 | 213-251 8 3/8-9 7/8   | 4 1/2REG 4 1/2REG | 1136-1893 | 300-500  | 160-266      | 6.28              | 910  | 6341 4677   | 170 38250    | 156              | 212 |
| 4LZ172-7.0   | 172 | 6 3/4 | 213-251 8 3/8-9 7/8   | 4 1/2REG 4 1/2REG | 1136-2271 | 300-600  | 140-280      | 7.32              | 1062 | 8623 6360   | 170 38250    | 220              | 299 |
| 5LZ172-4.0   | 172 | 6 3/4 | 213-251 8 3/8-9 7/8   | 4 1/2REG 4 1/2REG | 946-1893  | 250-500  | 93-186       | 4.19              | 608  | 5813 4287   | 170 38250    | 93               | 126 |
| 7LZ172-4.0   | 172 | 6 3/4 | 213-251 8 3/8-9 7/8   | 4 1/2REG 4 1/2REG | 1136-2271 | 300-600  | 80-160       | 4.19              | 608  | 8097 5973   | 170 38250    | 117              | 158 |
| 7LZ172-5.3   | 178 | 7     | 213-251 8 3/8-9 7/8   | 4 1/2REG 4 1/2REG | 1136-3028 | 300-800  | 62-164       | 5.55              | 805  | 13693 10100 | 170 38250    | 204              | 277 |
| 7LZ178-6.0   | 178 | 7     | 213-251 8 3/8-9 7/8   | 4 1/2REG 4 1/2REG | 1136-2271 | 300-600  | 80-160       | 6.28              | 910  | 12136 8952  | 170 38250    | 175              | 238 |
| 3LZ197-7.0   | 197 | 7 3/4 | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1136-2271 | 300-600  | 116-232      | 7.33              | 1063 | 10218 7537  | 200 45000    | 218              | 297 |
| 4LZ197-6.0   | 197 | 7 3/4 | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1136-2650 | 300-700  | 94-220       | 6.28              | 910  | 10750 7929  | 200 45000    | 212              | 288 |
| 4LZ197-7.0   | 197 | 7 3/4 | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1136-2271 | 300-600  | 110-220      | 7.33              | 1063 | 10959 8083  | 200 45000    | 215              | 292 |
| 5LZ197-4.0   | 197 | 7 3/4 | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1136-2650 | 300-700  | 80-188       | 4.19              | 608  | 8138 6002   | 200 45000    | 144              | 196 |
| 7LZ203-5.0   | 203 | 8     | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1136-2650 | 300-700  | 70-164       | 5.24              | 760  | 11579 8541  | 200 45000    | 175              | 238 |
| 7LZ203-5.0HR | 203 | 8     | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1136-2650 | 300-700  | 70-164       | 7.76              | 1125 | 17148 12648 | 200 45000    | 259              | 352 |
| 7LZ203-6.0   | 203 | 8     | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1136-2650 | 300-700  | 70-164       | 6.28              | 910  | 13877 10236 | 200 45000    | 210              | 285 |
| 5LZ2210-5.0  | 210 | 8 1/4 | 251-375 9 7/8-14 3/4  | 6 5/8REG 6 5/8REG | 1136-2650 | 350-700  | 81-162       | 5.24              | 760  | 11661 8601  | 300 67500    | 174              | 237 |
| 7LZ2210-5.0  | 210 | 8 1/4 | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1514-3028 | 400-800  | 79-158       | 5.24              | 760  | 13538 9985  | 300 67500    | 198              | 269 |
| 5LZ2216-6.0  | 216 | 8 1/2 | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1325-2650 | 350-700  | 81-162       | 6.28              | 910  | 13975 10308 | 320 72000    | 209              | 284 |
| 7LZ2216-3.5  | 216 | 8 1/2 | 251-311 9 7/8-12 1/4  | 6 5/8REG 6 5/8REG | 1893-4164 | 500-1100 | 62-137       | 3.67              | 530  | 14769 10894 | 320 72000    | 192              | 261 |
| 5LZ244-5.0   | 244 | 9 5/8 | 311-445 12 1/4-17 1/2 | 6 5/8REG 6 5/8REG | 2271-4542 | 600-1200 | 89-178       | 5.24              | 760  | 18451 13609 | 360 81000    | 298              | 406 |
| 5LZ244-6.0   | 244 | 9 5/8 | 311-445 12 1/4-17 1/2 | 6 5/8REG 6 5/8REG | 2271-4542 | 600-1200 | 89-178       | 6.28              | 910  | 22113 16310 | 360 81000    | 358              | 487 |
| 7LZ244-5.0   | 244 | 9 5/8 | 311-445 12 1/4-17 1/2 | 6 5/8REG 6 5/8REG | 2271-4542 | 600-1200 | 66-132       | 5.24              | 760  | 23319 17200 | 360 81000    | 287              | 390 |