



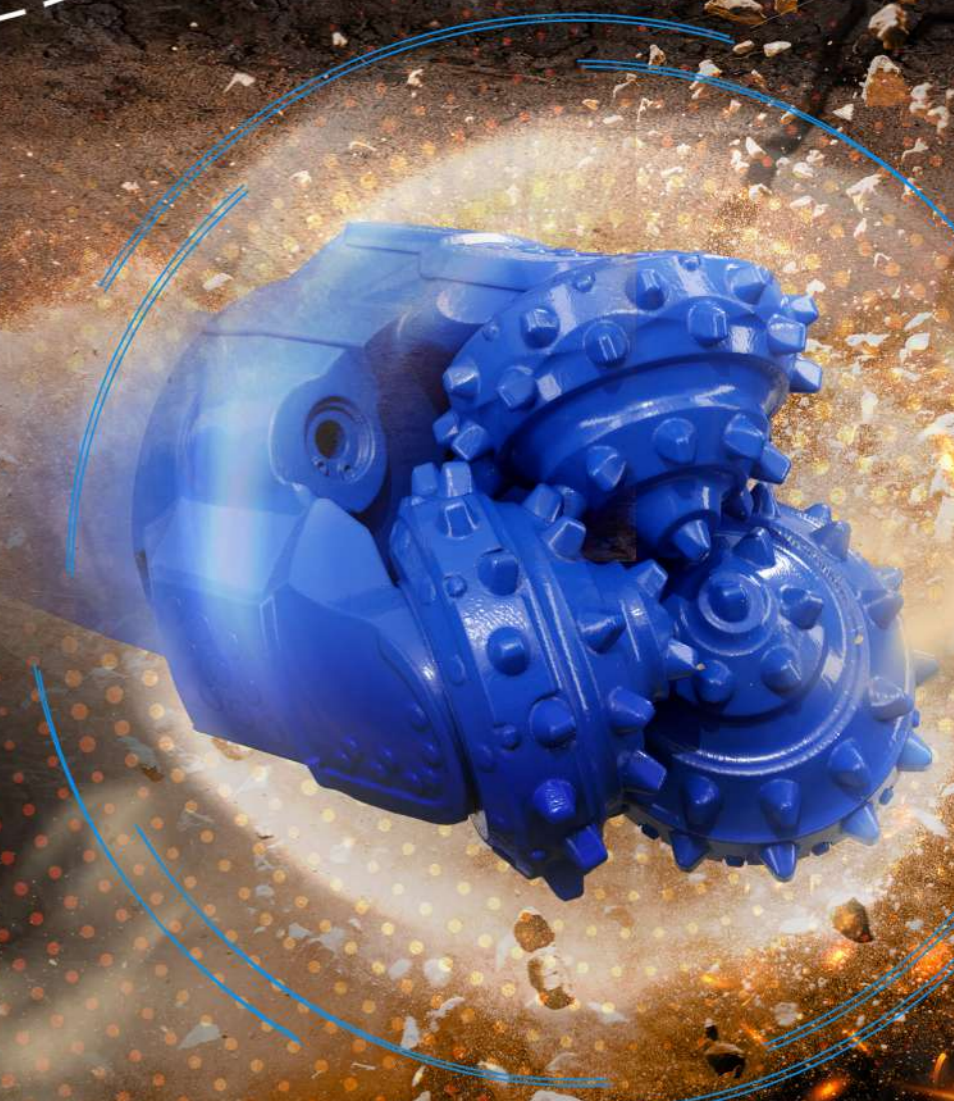
GLINIK
DRILLING TOOLS



DIRECTIONAL DRILLING

Horizontal directional drilling (HDD) is one of the most modern and increasingly popular solutions for new pipeline or cable infrastructure installations. Professionally conducted drilling allows for boring under the surface of such obstacles as built-up areas, roads, hills, rivers or protected areas of natural environment without the need to interfere with their physical state.

This professional and very practical method of building infrastructure involves the use of modern and proven drilling tools and their appropriate selection for demanding rock formations. NiUW Glinik's product offering includes a full range of drill bits and extensions dedicated to this advanced applications.



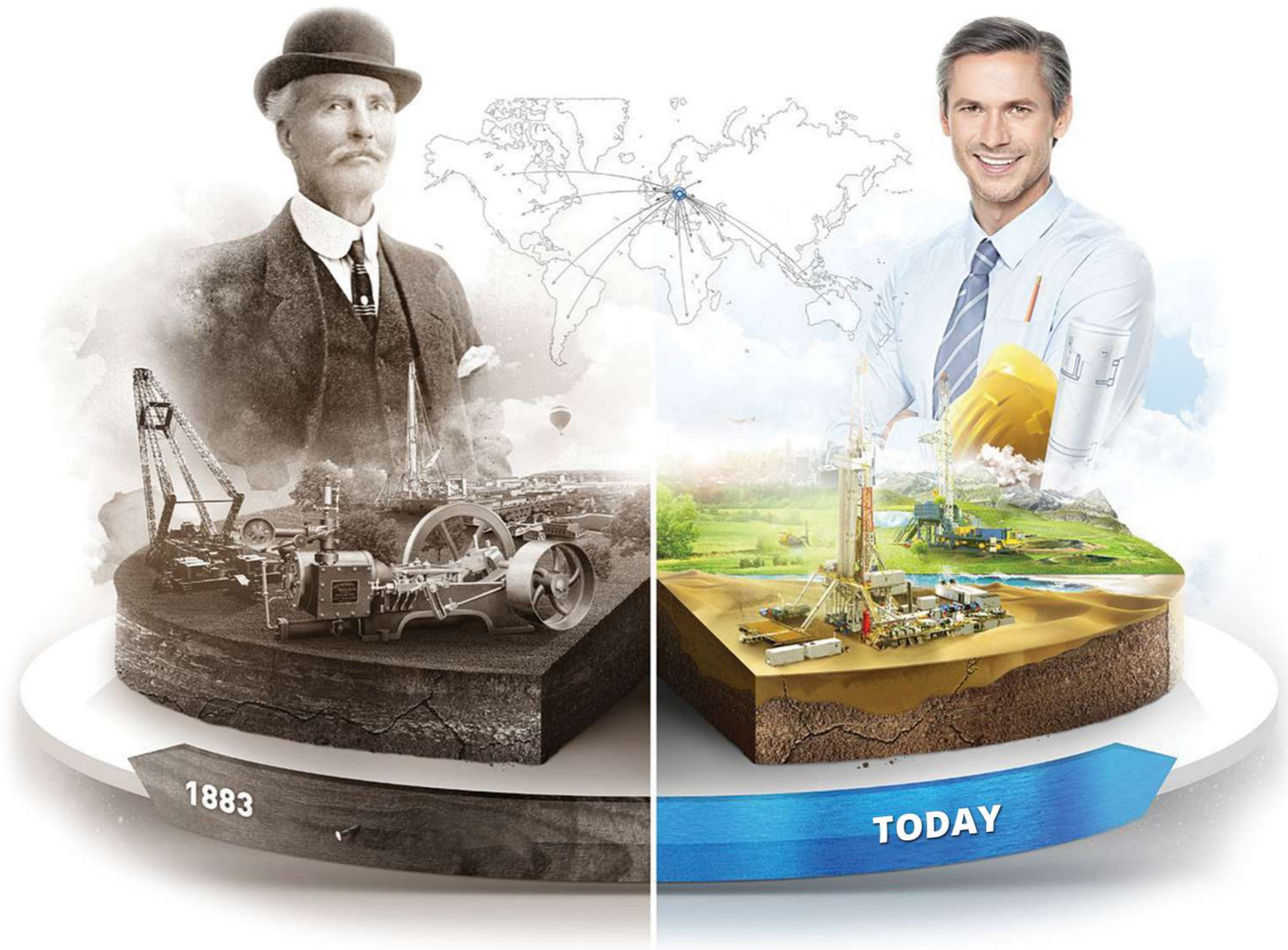


Glinik core business is the production of Drilling Tools and Equipment

For 140 years in the drilling market, Glinik has produced innovative solutions, superior products and services. Our success is attributed to their quality, which has earned the respect of our customers helping establish long-term business relationships. As an International Manufacturer, we remain a sought-after contributor of top-quality products for the oil and gas, mining, geothermal, geotechnical, HDD and water-well drilling sectors.

Our People are our most valuable asset. They provide extensive knowledge, experience and passion to stay ahead of a continuously changing industry.

We have gradually increased our presence within the international marketplace through continuous innovative advancements. Glinik's development strategy is based on its expertise in engineering (including R&D), product manufacturing and launching of new solutions globally, with our own brand or in partnership with leading global Customers.



We make changes....
Determining the future.

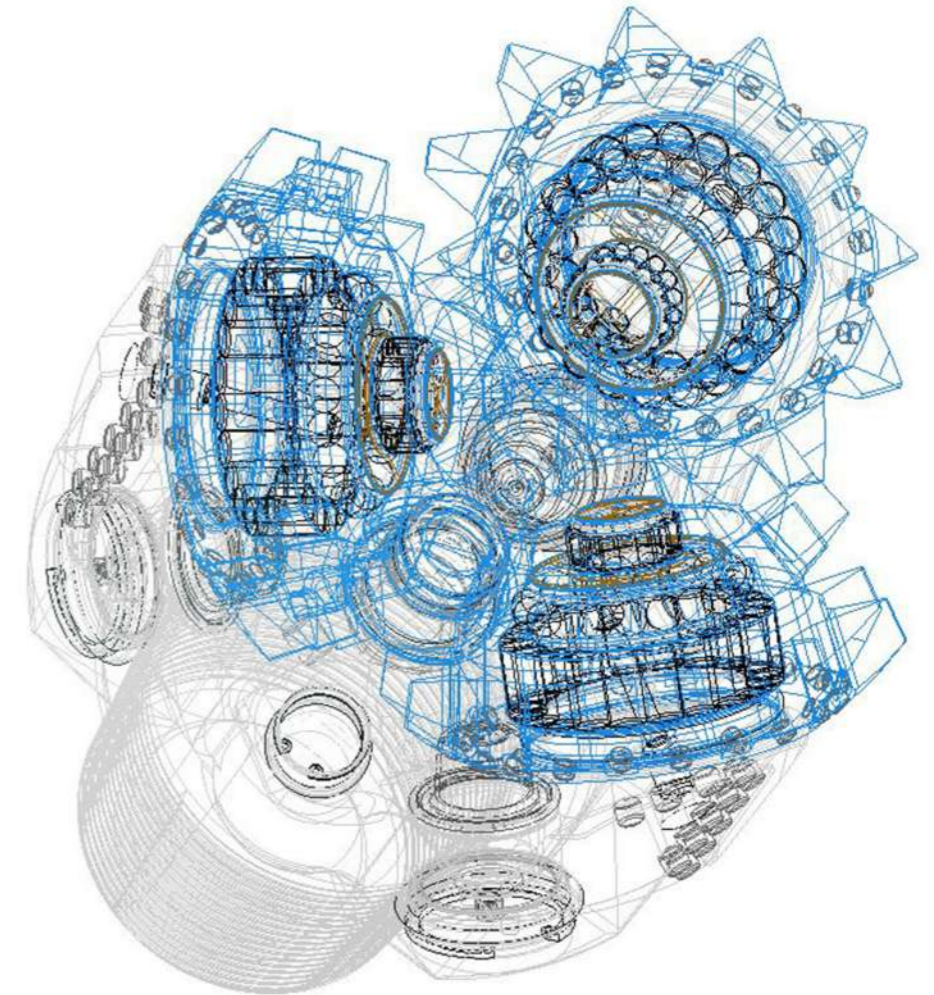
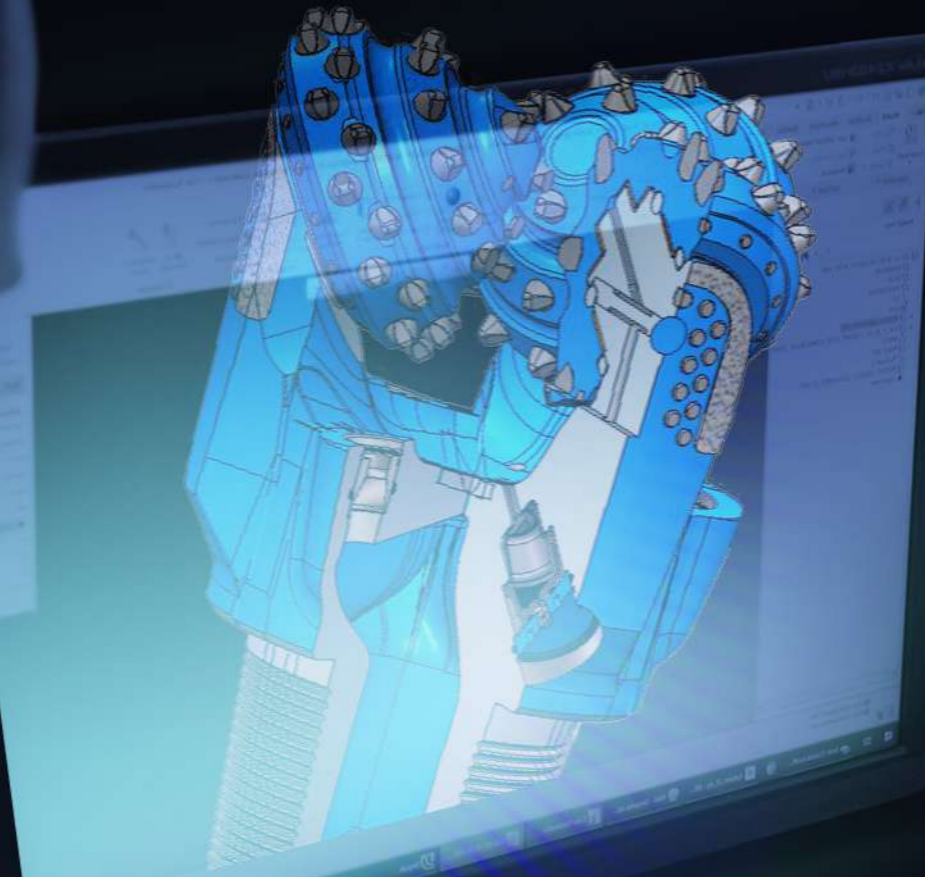


TECHNICAL INNOVATION

Glinik's Professional Design and Engineering Team is responsible for innovative solutions in the design of broadly defined drilling tools, optimization of the production process to achieve the highest quality of the final product.

Dedicated engineering personnel is involved in advanced research and development projects, enabling continuous product innovation in the areas of design and implementation of the latest technological solutions.

Experienced experts at Glinik Engineering **provide professional support** to select the most effective tools and drilling parameters for Customer defined applications

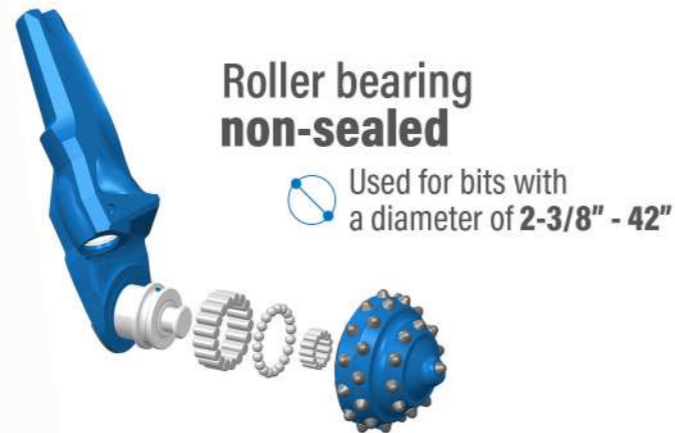


FLUSHING SYSTEM

Size of the drill bit		Nozzle dimensions			
		D	h	d	
mm	inch	mm		mm	inch (1/32)
139,7÷187,3	5-1/2÷7-3/8	20	15,1	4,0; 4,8; 6,4; 7,9; 8,7; 9,5; 11,1; 12,7; 14,3	5; 6; 8; 10; 11; 12; 14; 16; 18
190÷1066,8	7-1/2÷42	33	27	11,1; 11,9; 12,7; 14,3; 15,9; 17,5; 19,0; 20,6; 22,2; 23,8; 25,4	14; 15; 16; 18; 20; 22; 24; 26; 28; 30; 32

INNOVATIVE BEARING SYSTEMS

An ideal solution for clients looking for a tool to ensure adequate drilling efficiency at a competitive cost level. Recommended for drilling shorter intervals.



Roller bearing non-sealed

Used for bits with a diameter of **2-3/8" - 42"**

Characterized by the use of a special seal and lubrication system with a compensation system. This solution ensures much longer operational time, protecting the bearing components against migration of drilling fluid and debris.



Roller bearing sealed

Used for bits with a diameter of **5-7/8" - 28"**

Characterized by high durability and wear resistance, thanks to the use of innovative components minimizing friction in the bearing. Sealed drills are earmarked to working in the most demanding conditions. The bearing is sealed and supported by a lubrication system using a compensation system.

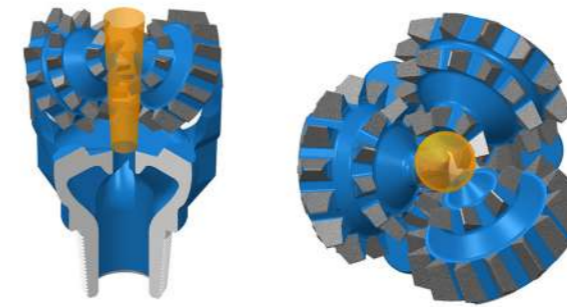


Journal bearing sealed

Used for bits with a diameter of **3-7/8" - 17-1/2"**

Center flushing

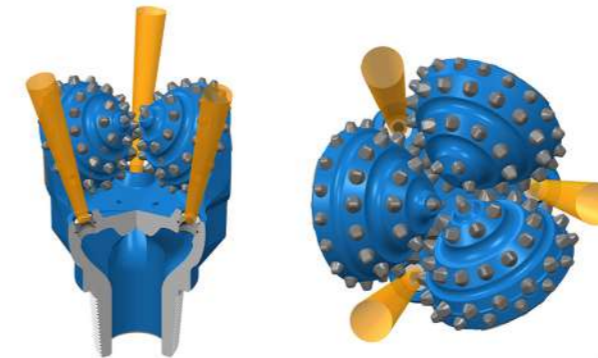
Used for bits with a diameter of **2-3/8" - 42"**



Central flushing is used for bits designed for hydrogeological and geoenvironmental drilling. For bits intended for drilling with reverse flush circulation, the design provides for the use of a central hole with the maximum diameter for a given threaded connection.

3-jet flushing

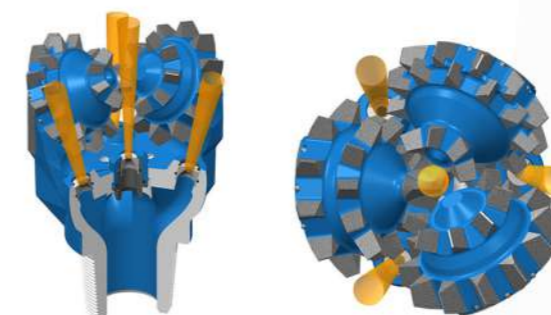
Used for bits with a diameter of **3-7/8" - 36"**



The arrangement of the nozzles and the direction of the flushing outflow allows for effective cleaning of the drill cutting structure and the bottom of the hole. This solution is designed to achieve maximum drilling progress.

Multi-jet flushing system

Used for bits with a diameter of **5-1/2" - 42"**



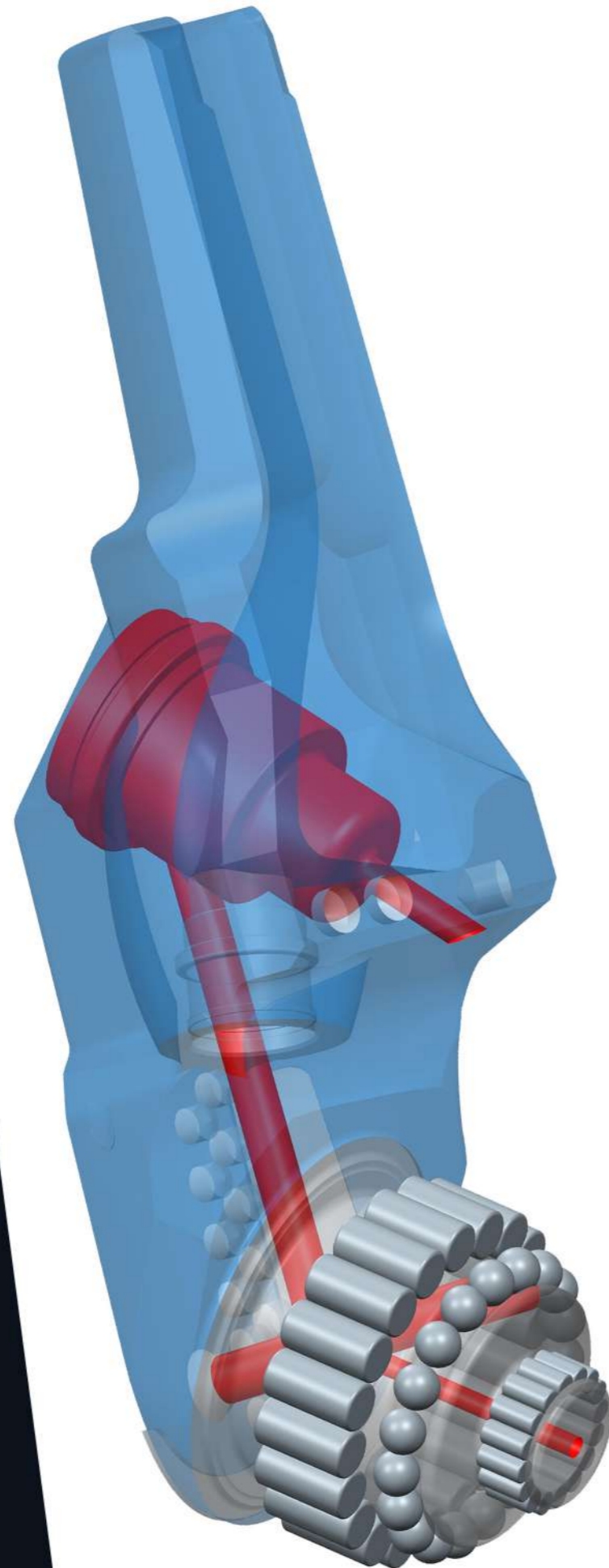
The advanced flushing system extended by additional nozzles in relation to the 3-jet flushing system allows for more effective cleaning of the cutting structure and the bottom of the hole, and thus maintaining high drilling progress.



BEARING LUBRICATION SYSTEM

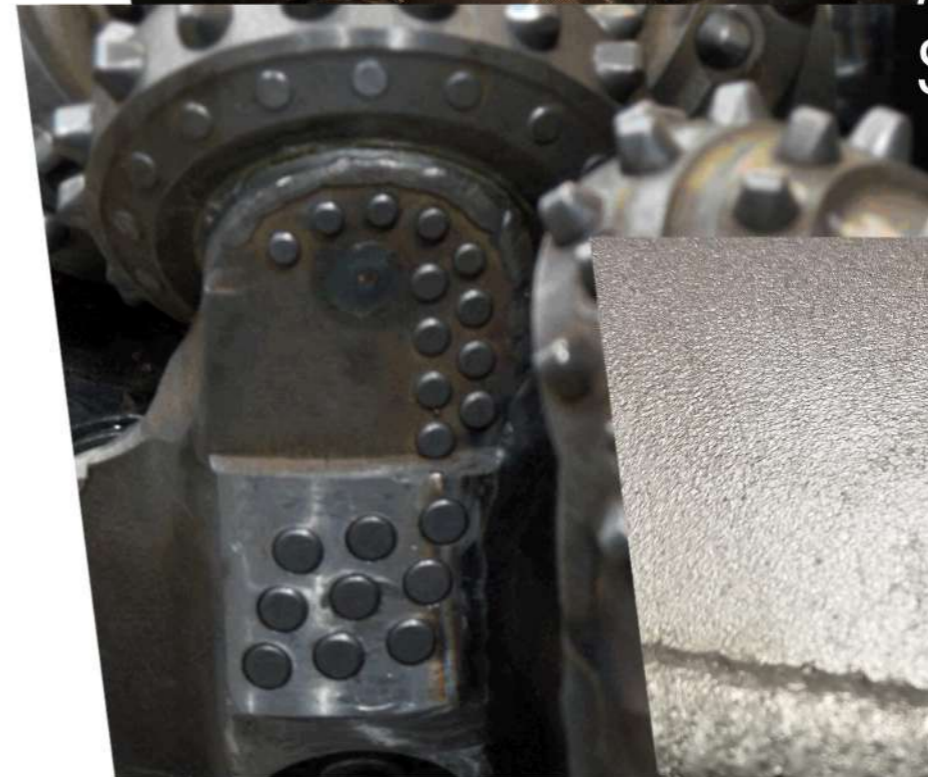
The patented compensation system supplies grease to each bearing component. The compensator keeps the grease pressure constant so that the drill bearing works effectively during the entire drilling process.

Lubrication channels are made with the utmost care delivering grease to each rolling component. The high quality seal prevents the flushing fluid from entering the bearing and protects the bit from seizure.



The protection of drill bits is accomplished using materials with the highest abrasion resistance. The protection is applied using various methods, depending on the surface material.

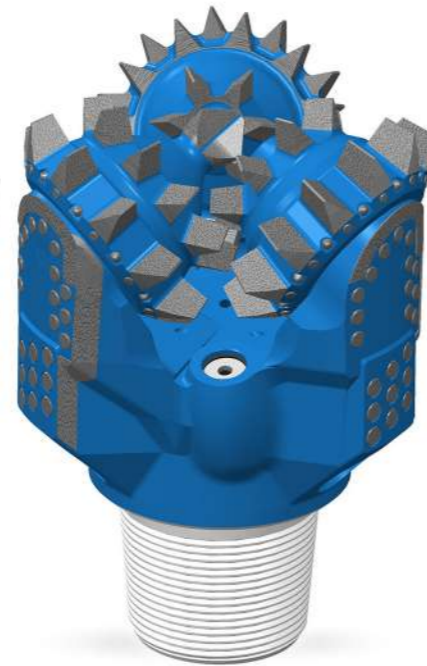
Plasma Transferred Arc Welding (PTAW) technology allows for repeatable and high quality adhesion and wear resistance.



PROTECTION OF DIAMETER AND CUTTING STRUCTURE

SOFT FORMATION DRILL BITS

12-1/4" IADC 115M



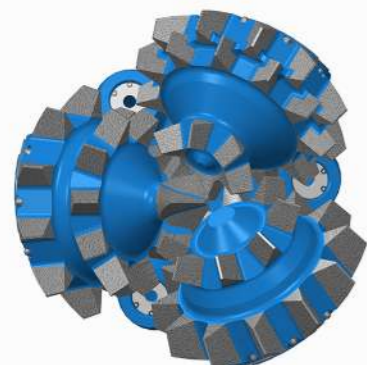
Diameter inch _____ 12-1/4"
 Diameter mm _____ 311,1mm
 Drill bit type _____ MBM1HVX
 IADC code _____ 1-1-5-M

CUTTING STRUCTURE:

Tall teeth with a small angle of sharpening.

Positioning of the cones as well as the geometry of the teeth are designed using 3D simulation. The teeth are reinforced with tungsten carbide hardfacing, which prevents tooth wear during the drilling process. In addition, the bit face is reinforced with carbide inserts which protect the drill from loss of diameter. The location of the nozzles and the direction of flow of the drilling fluid is optimized for faster cleaning of the cutting structure to achieve maximum rate of penetration (ROP).

The structure provides for the possibility of using a mud motor which significantly accelerates the drilling progress.



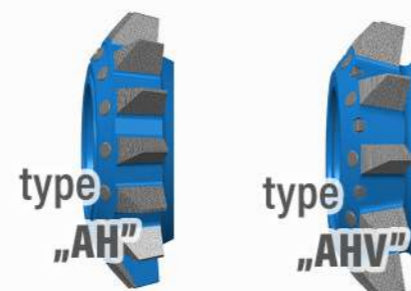
TYPES OF ROCK:

Designed for very soft, unstratified and poorly concise rocks with a high degree of water permeability, such as: shale, clay, poorly concise slate and sandstone marl limestone, salts, gypsum, coal, earthy iron ores.

Drill bits are offered in a wide range of diameters from:

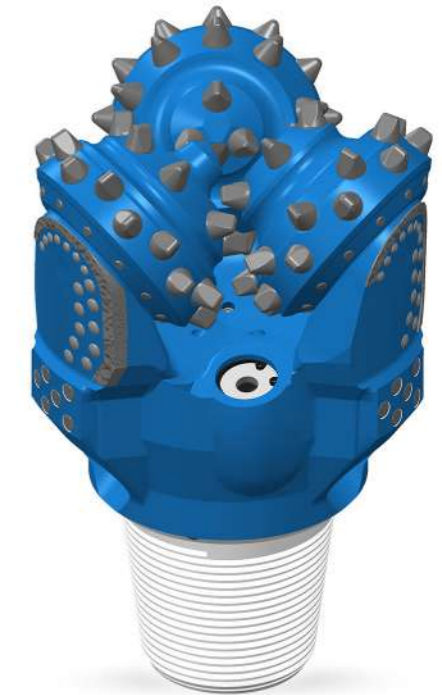
5-1/2" (139,7mm)
to 17-1/2" (444,5mm).

We offer the possibility of customized product designs for individual client needs.



We offer the option of adapting the cutting structure to the individual needs of the client.

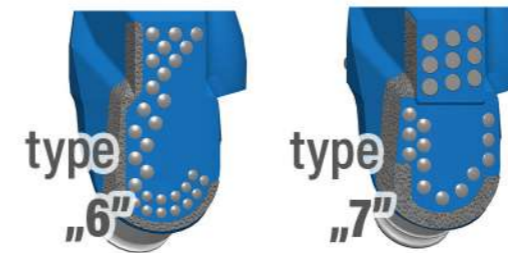
8-1/2" IADC 435M



LEG BACK PROTECTION TYPES:

As a standard, we offer **TYPE "6"** reinforcement with hardfacing on the outer surface of the segment and with inserts on the entire back surface.

For more demanding applications we offer the **TYPE "7"** reinforcement with tungsten carbide inserts located on the whole back surface with additional stabilising inserts.



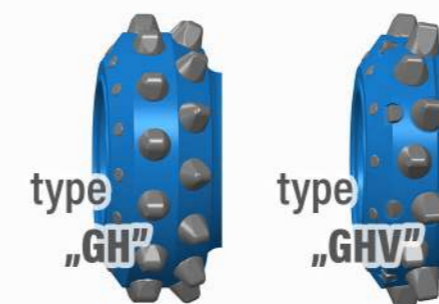
CUTTING STRUCTURE:

Tall prismatic inserts.

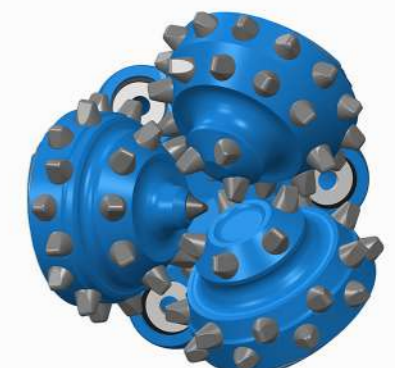
The proper location of the inserts as well as the positioning of the cones makes the drill bit able to perform long intervals in a relatively short time.

The wide range of available inserts allows you to select the optimum cutting structure for maximum drilling efficiency.

The geometry of the drill is developed using 3D simulation.



Our knowledgeable engineering team can provide consulting to select the best possible drilling solutions.



MEDIUM FORMATION DRILL BITS

8-1/2"
IADC 235M



Diameter inch _____ 8-1/2"
Diameter mm _____ 215,9mm
Drill bit type _____ MS2THX
IADC code _____ 2-3-5M

CUTTING STRUCTURE:

Medium height teeth.

A larger number of teeth and an increased tooth blade angle provide enhanced performance in more variable medium and medium-hard formations.

Additionally, the bit's cone surf row is strengthened with carbide inserts protecting the drill from loss of diameter. The location of the nozzles and the direction of the flow of drilling fluids is optimized for faster cleaning of the cutting structure and the bottom of the hole to achieve maximum drilling speeds.

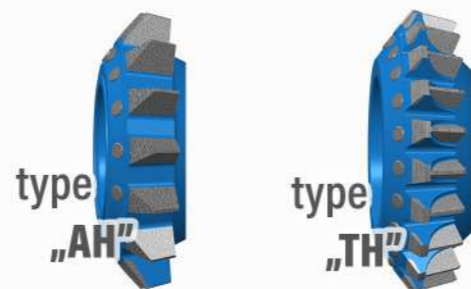
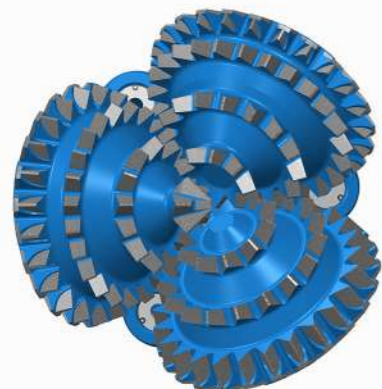
TYPES OF ROCK:

Hard and medium abrasive rocks such as: sandstones with quartz veins, hard limestone or keratinized conglomerates with iron or silica binder, crystalline dolomites, haematite ores, siderites, limonite, hard slates.

Drill bits are offered in a wide range of diameters from:

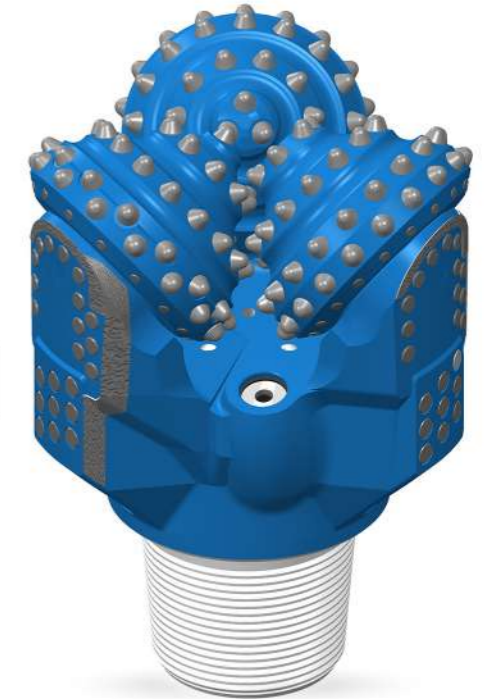
5-1/2" (139,7mm)
to 17-1/2" (444,5mm)

We offer the possibility of customized product designs for individual client needs.



We offer the option of adapting the cutting structure to the individual needs of the client

12-1/4"
IADC 637M



LEG BACK PROTECTION TYPES:

As a standard, we offer **TYPE "6"** reinforcement with hardfacing on the outer surface of the segment and with inserts on the entire back surface.

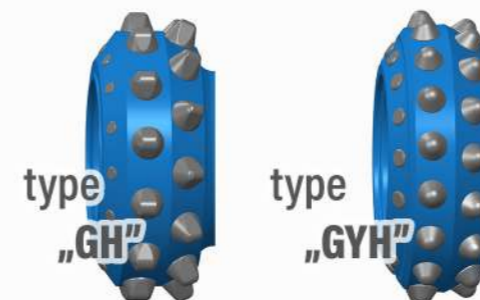
For more demanding applications we offer the **TYPE "7"** reinforcement with tungsten carbide inserts located on the whole back surface with additional stabilising inserts.



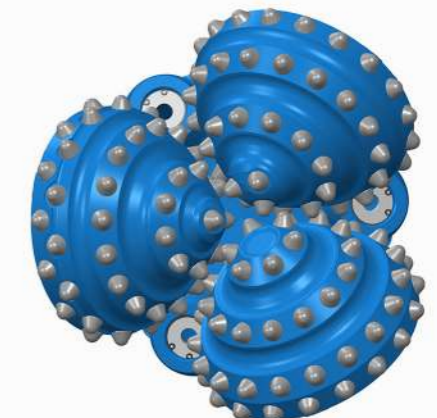
CUTTING STRUCTURE:

The prismatic inserts of high height and diameter and the relatively large offset of the bite axis in relation to the axis of the bit will ensure high mechanical speed of drilling.

The large sharpening angle of the cutting part of the inserts protects it from breaking and provides maximum strength against rounding of the outer diameter of the bit.

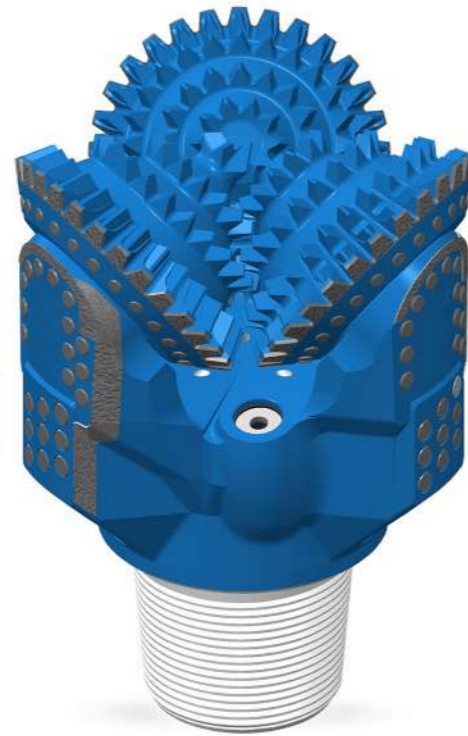


Our knowledgeable engineering team can provide consulting to select the best possible drilling solutions.



HARD FORMATION DRILL BITS

12-1/4"
IADC 315M



Diameter inch _____ 12-1/4"
Diameter mm _____ 311,1mm
Drill bit type _____ MT1THX
IADC code _____ 3-1-5-M

CUTTING STRUCTURE:

Shorter teeth with a wide sharpening angle and narrower spacing.

The teeth on border flanges have designated calibration surfaces and are reinforced with tungsten carbide inserts to ensure high durability of the drill bit and protect it from loss of diameter when drilling in hard rock formations.

TYPES OF ROCK:

Hard abrasive rocks such as: quartzite binder sandstones, hard sandstones with corn inserts, hard quartzite slates, magma and metamorphic rocks.

Drill bits are offered in a wide range of diameters from:

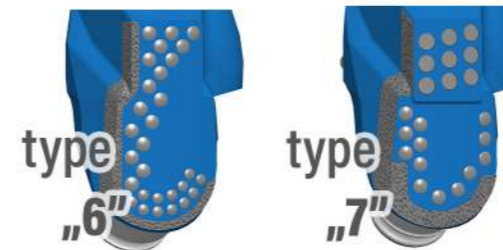
5-1/2" (139,7mm)
to 17-1/2" (444,5mm)

 We offer the option of adapting the cutting structure to the individual needs of the client

LEG BACK PROTECTION TYPES:

As a standard, we offer **TYPE "6"** reinforcement with hardfacing on the outer surface of the segment and with inserts on the entire back surface.

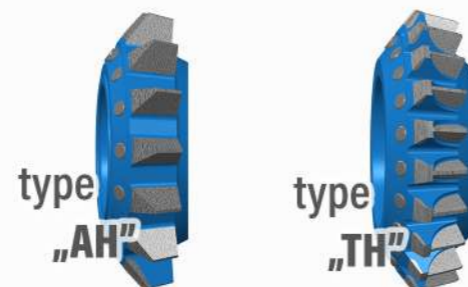
For more demanding applications we offer the **TYPE "7"** reinforcement with tungsten carbide inserts located on the whole back surface with additional stabilising inserts.



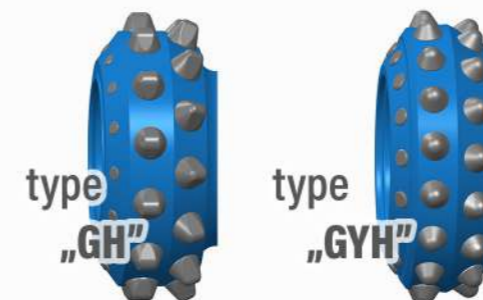
CUTTING STRUCTURE:

A large number of inserts with shorter bowl height and very wide sharpening angles as well as the narrower distances between inserts, **ensuring optimal conditions for hard rock drilling.**

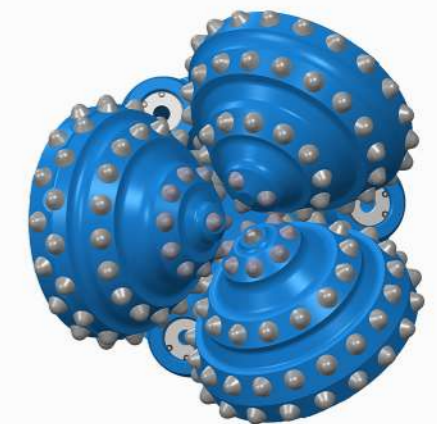
The minimum displacement of the cone axis in relation to the drill axis protects the inserts from breakage. The reinforcement of the cone face with numerous carbide inserts ensures that the diameter of the bit is maintained throughout the entire lifetime of the bit.



 We offer the option of adapting the cutting structure to the individual needs of the client.




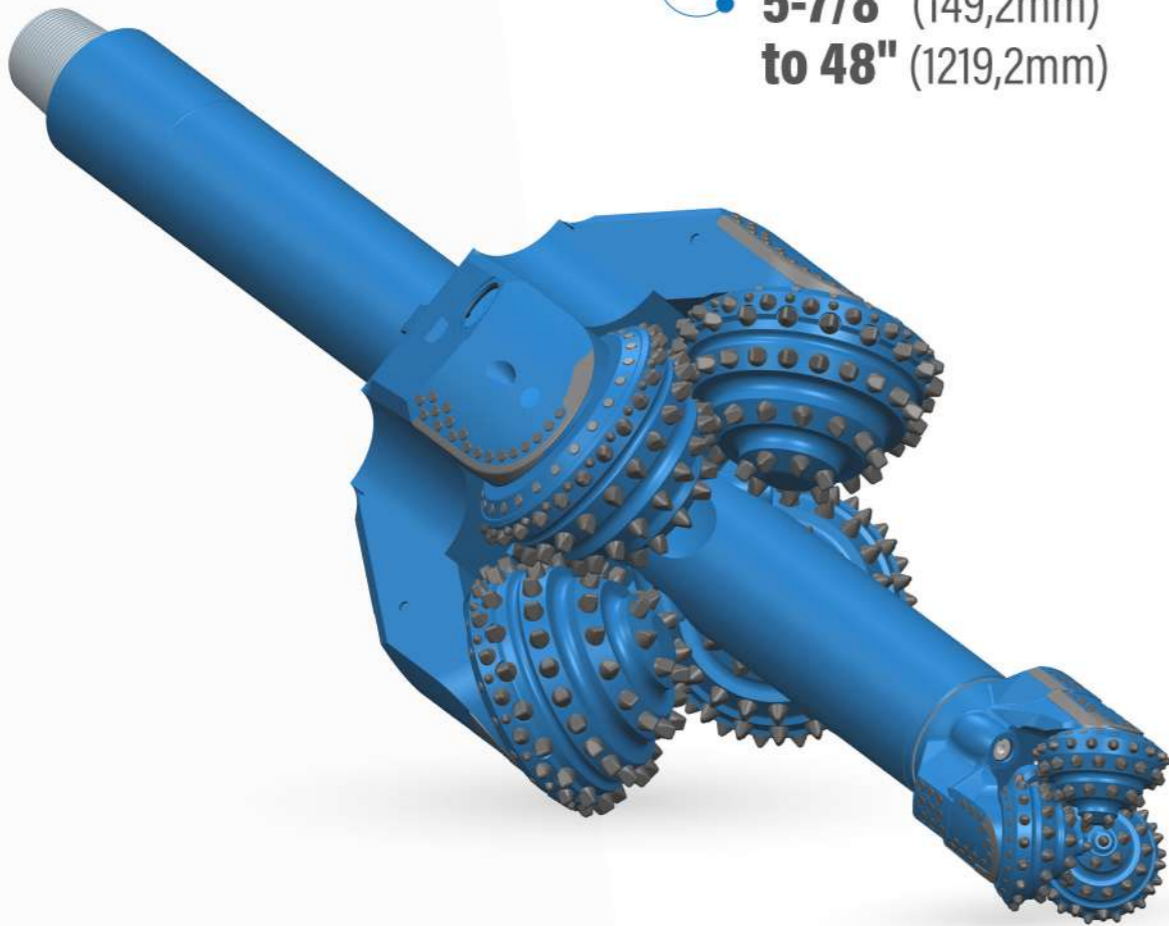
 We offer the possibility of customized product designs for individual client needs.



HOLE OPENERS

Vertical

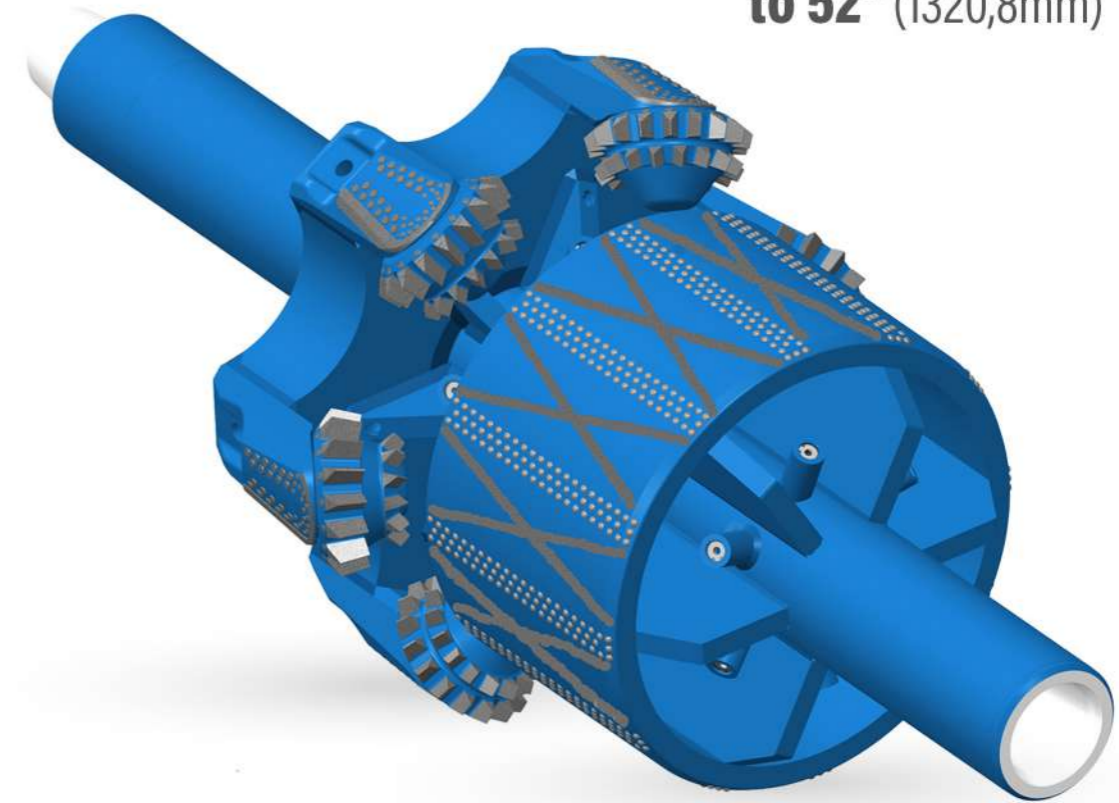
 Diameter range from
5-7/8" (149,2mm)
to 48" (1219,2mm)



The hydraulic nozzle system provides very efficient flushing of the surface to be drilled as well as the hole opener cones. Interchangeable cone assemblies are also available for all dimensions and types of hole openers. Hole openers for hydrogeological applications can be equipped with a dedicated roller cone drill bit as a pilot.

Horizontal

 Diameter range from
12-1/4" (311,1mm)
to 52" (1320,8mm)



Hole openers designed to enlarge the diameter of horizontal holes, e.g. drilling under rivers or roads. These products are equipped with replaceable nozzles enabling selection of optimal hydraulic parameters for proper rock excavation and removal of drilled material. The surface of the main body of hole openers is optimized with hardfaced surfaces and carbide inserts in order to protect against excessive friction wear caused by well walls. To ensure stable and proper operation of the whole drilling string and hole opener, it is equipped (individually upon agreement with the customer) with dedicated pilot cylinders stabilising the walls of the widened hole.

Inter-level

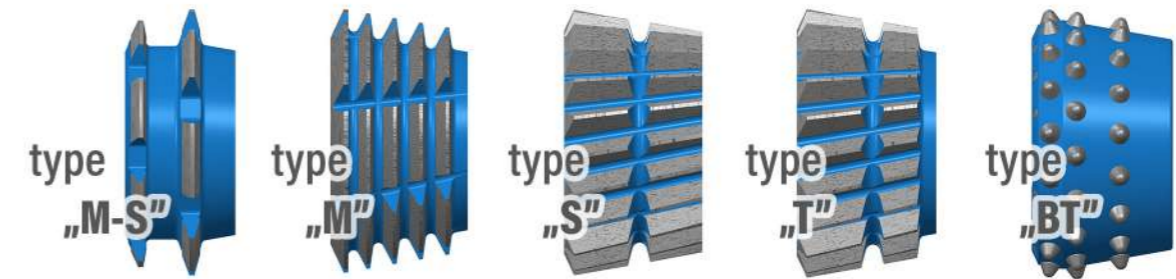
 Diameter range from **5-5/8" (142,9mm)** to **64-19/64" (1633mm)**



Hole openers used in mines where drilling can be carried out with a single hole opener or a set of several, interconnected hole openers system. The body is supplied with threaded connections enabling the assembly of further openers and a drilling string. These connectors are typical threaded connections used in drilling. Custom threaded connections are available based on client's requirement. Hole openers sets can be used as an alternative for riseboring applications.

INTERCHANGEABLE DRILLING CONE SETS

The cutting structure of the cones with both milled and insert teeth, is suitable for soft (M type), medium-hard (S type) hard (T type) and very hard (BT type) rock formations. Depending on the customer's requirements, bearings are used in a non-sealed or sealed version with pressure compensation.



OFFERED SIZE INTER-LEVEL OF HOLE OPENERS

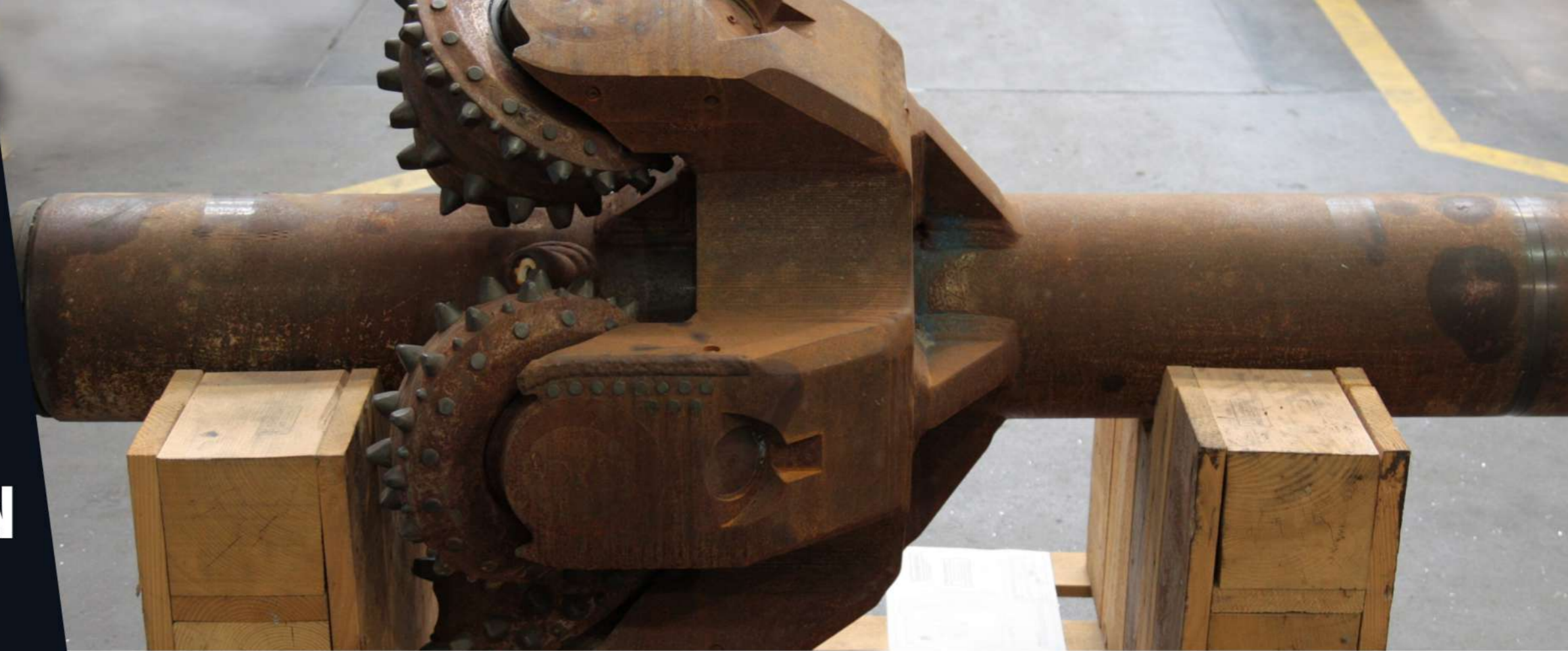
NOMINAL SIZE [mm]	THREADED CONNECTION size	type	NUMBER OF CONES	BITE SIZE [mm]	LENGTH OF THE HOLE OPENER [mm]	WEIGHT OF THE HOLE OPENER [kg]
143 / 270	3 1/2 Reg (WP)	box x pin	3	126	420	58
193 / 305	4 1/2 Reg (WP)	pin x box	3	148	510	65
270 / 406	4 1/2 Reg (WP)	box x pin	3	196	480	101
406 / 610	4 1/2 Reg (WP)	box x pin	3	280	480	228
406 / 610	6 5/8 Reg (WP)	box x box	3	280	590	25
610 / 813	6 5/8 Reg (WP)	box x box	5	280	530	417
813 / 1016	6 5/8 Reg (WP)	box x box	5	280	530	456
1016 / 1219	6 5/8 Reg (WP)	box x box	5	280	530	521
1216 / 1422	6 5/8 Reg (WP)	box x box	5	280	530	579
1422 / 1633	6 5/8 Reg (WP)	box x box	5	280	530	716



REGENERATION OF HOLE OPENERS

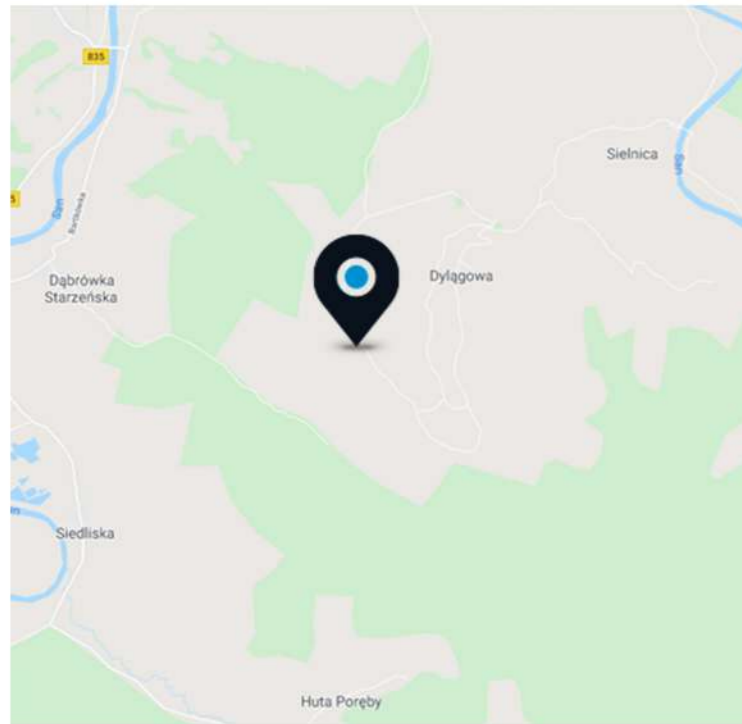
Glinik offers professional regeneration and repair services for drilling tools to reduce the overall cost of customer operations.

We are ready to repair drilling tools manufactured by Glinik, as well as those of other manufacturers. Each tool delivered for regeneration is verified for hidden defects. It is subject to a detailed technical condition assessment. Based on this assessment, the scope of repair work is determined. After extensive analysis, the customer is contacted with full information about the scope, cost and timeline of the regeneration work.



CASE STUDY

SUBCARPATHIAN DISTRICT, POLAND



14
ton

WOB

40-80 RPM

23m -
353m

Drilling
interval

3500 -
4000 l/h

Flow
Rate

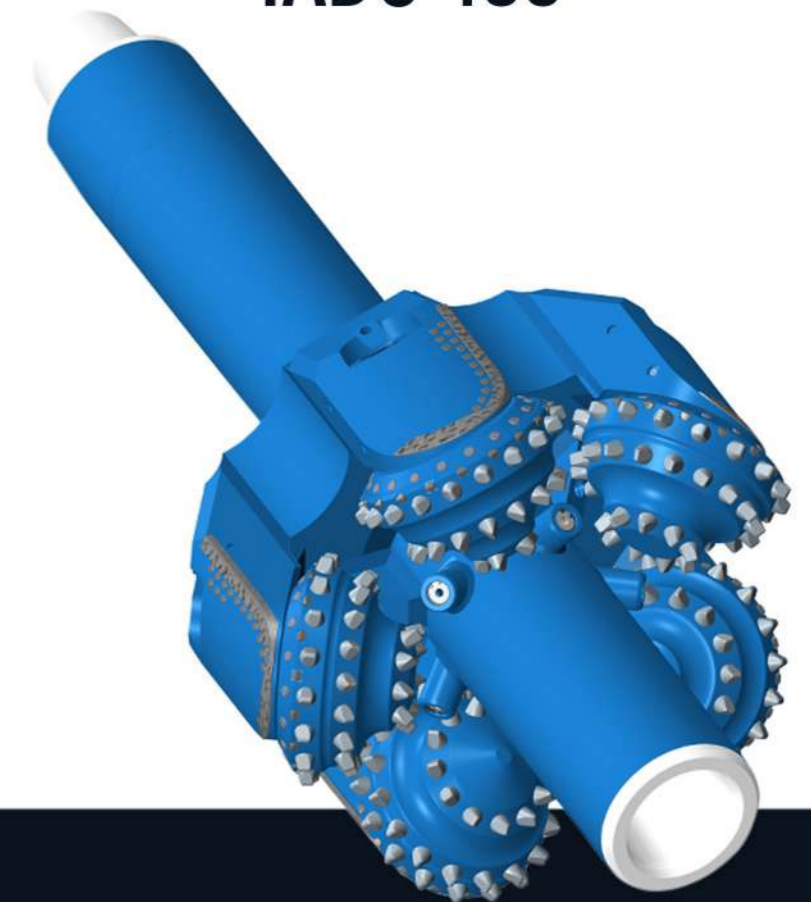
3,5
m/h

ROP

HOLEOPENER

16" x 32"

IADC 435



Holeopener was made to realize project by our customer on domestic market.

Challenges:

Drill out full interval in one run.

Drilled formation:

Inoceramic layers, upper chalk

Sandstone 70%, Siltstone 20%, Shale/ Marl 10%



EXCELLENT
QUALITY



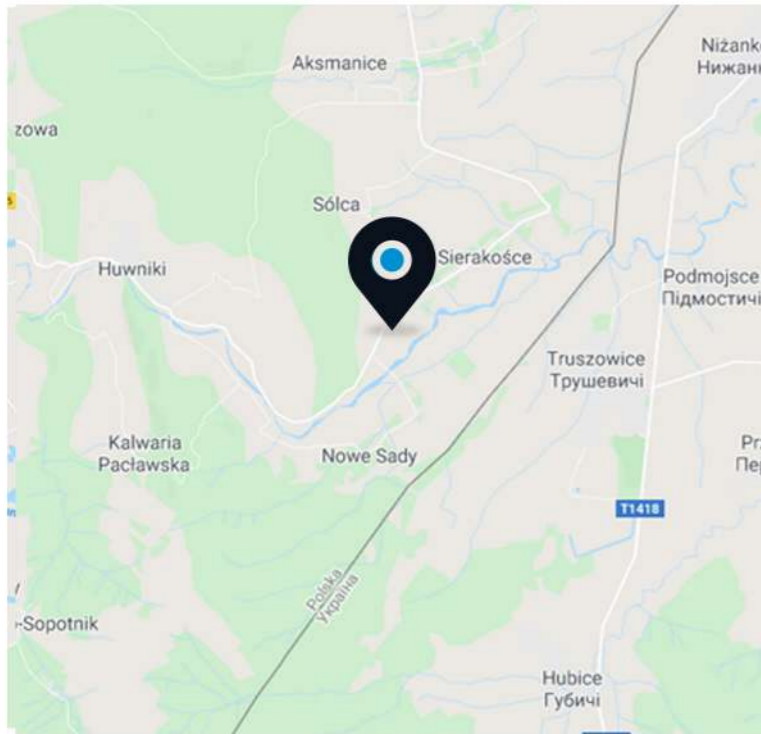
UNIQUE
PRODUCTION
TECHNOLOGY

NEARLY
140

YEARS OF
EXPERIENCE

CASE STUDY

SUBCARPATHIAN DISTRICT, POLAND



12
ton

WOB

40-50

RPM

28m - 191m

Drilling interval

3500 - 4000 l/h

Flow Rate

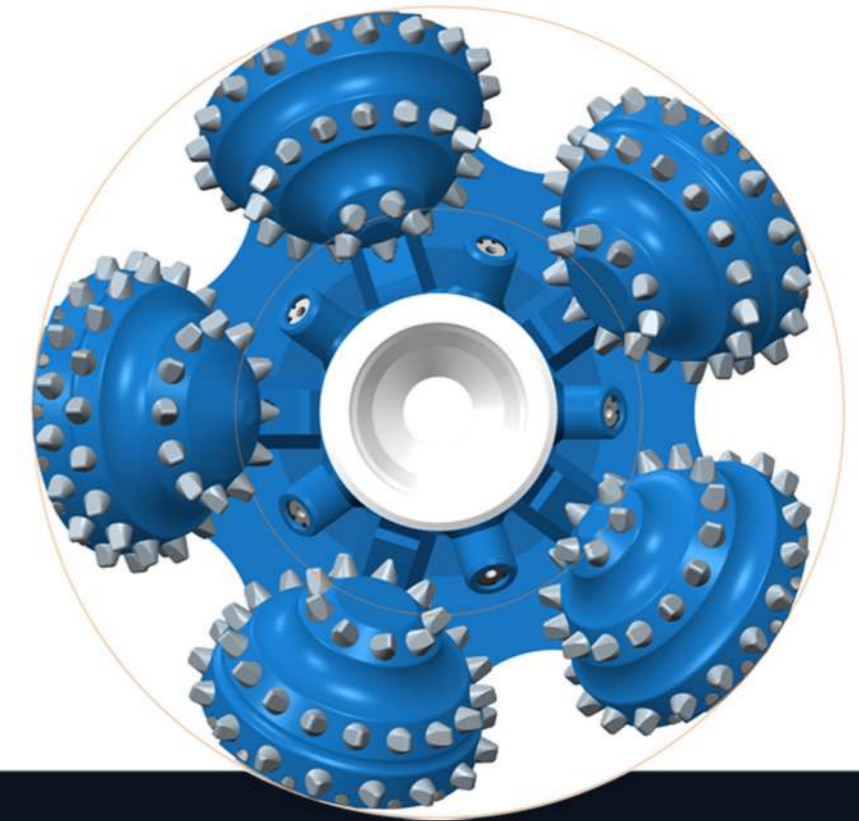
2,5
m/h

ROP

HOLEOPENER

16" x 32"

IADC 435



Due to very good drilling parameters and low wear, holeopener was assigned to perform next drilling operations during the implementation of another project by our client.

Drilled formation:

The Carpathian - Stebnic overlap

Sandstone 60%, Siltstone 40%

After two drilling operations, the tool was sent to NiUW Glinik for regeneration.



EXCELLENT
QUALITY



UNIQUE
PRODUCTION
TECHNOLOGY

NEARLY
140

YEARS OF
EXPERIENCE



QUALITY ASSURANCE

RESEARCH LABORATORY

Maintaining the highest quality standards requires verification of chosen characteristics in a controlled environment.

Glinik runs its own laboratory and cooperates with accredited certification bodies.

Research domains include metallography analysis, material strength and chemical composition, using state-of-the-art laboratory equipment.

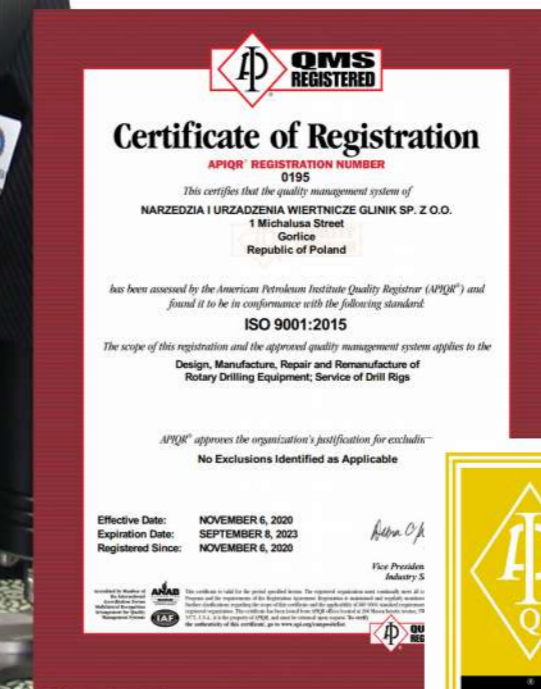


CERTIFICATES

Glinik's API Q1 and ISO 9001 certification ensures our company operates under the most rigorous standards of a quality management system for the design, manufacturing, repair and refurbishment of drilling tools.

Glinik is licensed to apply the API monogram registered mark to its stabilisers, threaded rotary connections, PDC bits, 3-cutter bits and connectors meeting the API Q1 spec 1-7 requirements.

Continuous improvement of processes, inherent to our Quality Management System, ensures meeting the most stringent requirements of our Customers.





**NARZĘDZIA I URZĄDZENIA
WIERTNICZE GLINIK SP. Z O.O.**

www.glinikdrillingtools.pl



e: niuw@glinik.com.pl

SALES DEPARTMENT:

e: sales@glinik.com.pl

t: + 48 18 35 49 706

t: + 48 18 35 49 704



**ul. Józefa Michalusa 1
38-320 Gorlice**

POLAND