GLINIK
DRILLING TOOLS

OIL & GAS

Glinik, having API certification, has confirmed its competence in meeting the most stringent requirements for the production of drilling tools. Our products are made using the highest quality systems, manufacturing methods and standards.

Our Clients' continued trust and our long history, starting in the oil industry's infancy, provides confidence that Glinik is the partner of choice for the world's largest energy related projects.

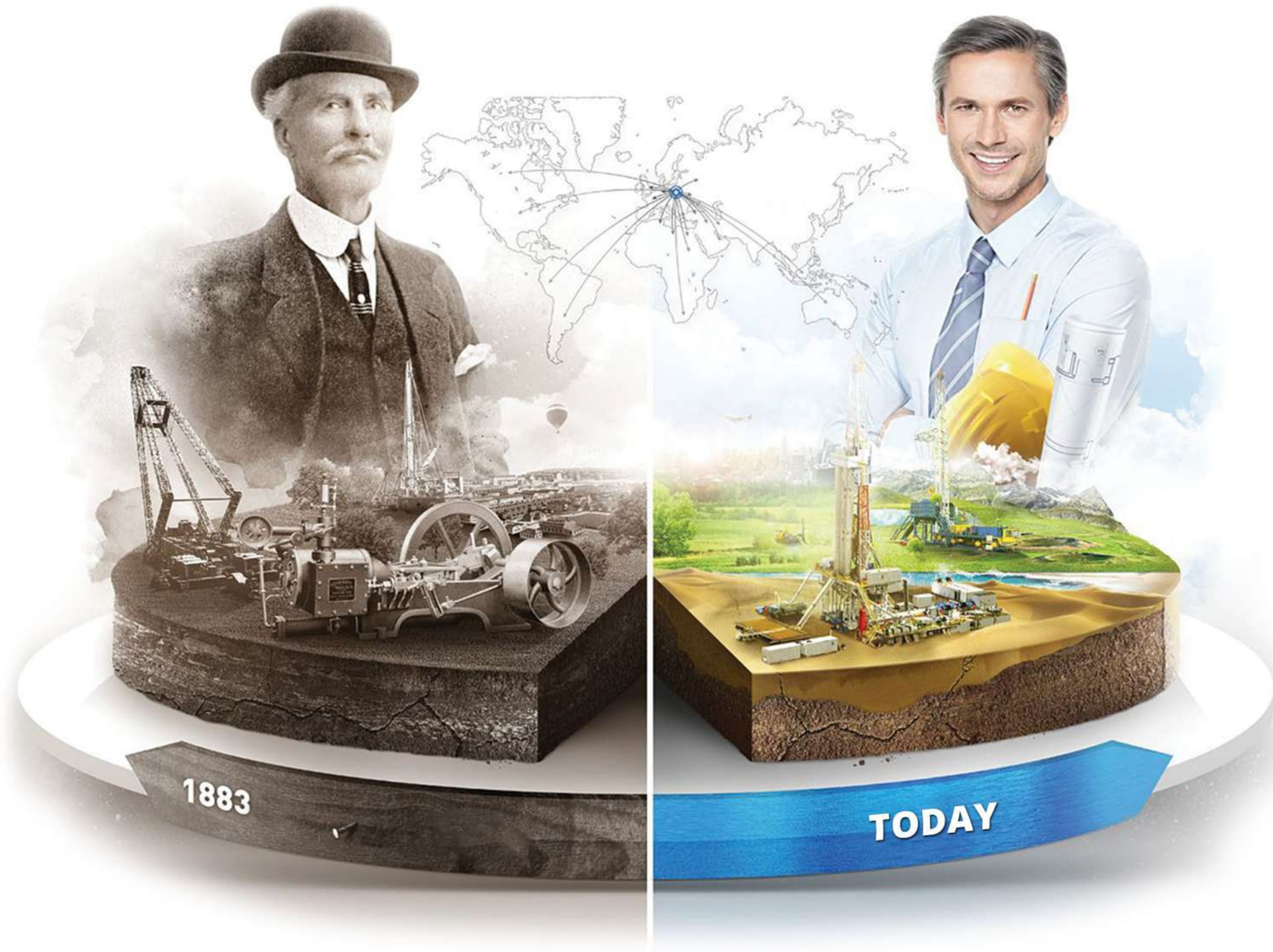
GLINIK
DRILLING TOOLS

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....

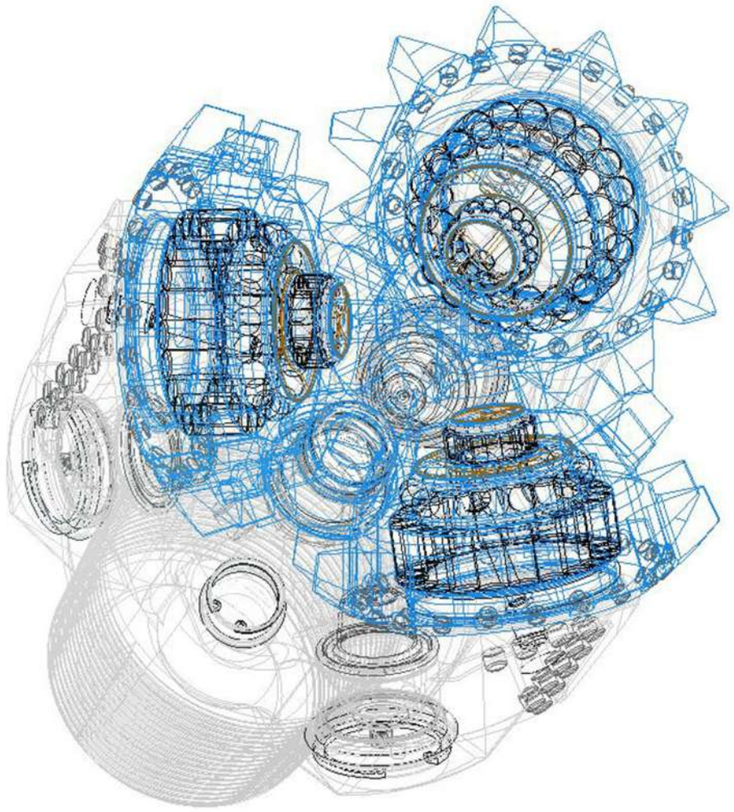
Determining the future.

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



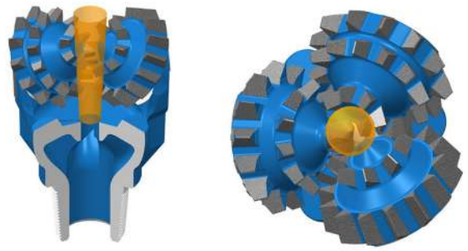
GLINIK
DRILLING TOOLS

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

Center flushing

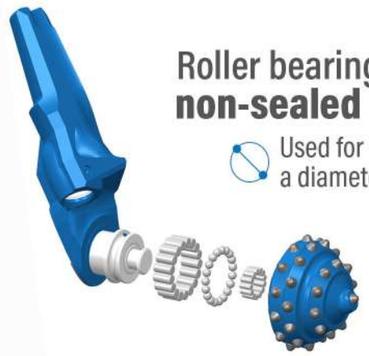
Used for bits with a diameter of **2-3/8" - 42"**



Central flushing is used for bits designed for hydrogeological and geoengineering 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.

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"**

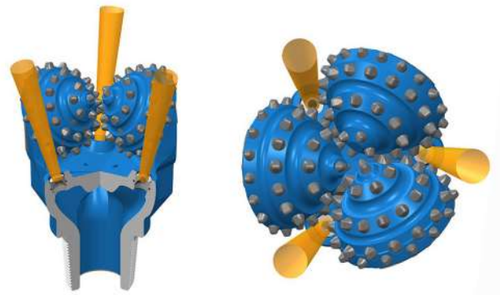
Characterized by high durability and wear resistance, thanks to the use of innovative components minimizing friction in the bearing. Sealed drills are earmarked to working in the most demanding conditions. The bearing is sealed and supported by a lubrication system using a compensation system.

Journal bearing **sealed**

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

3-jet flushing

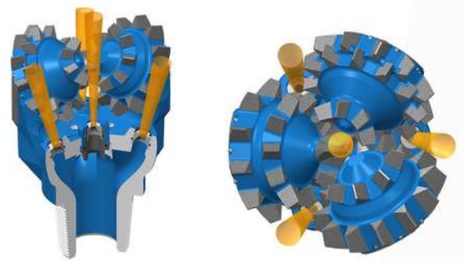
Used for bits with a diameter of **3-7/8" - 36"**



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"**

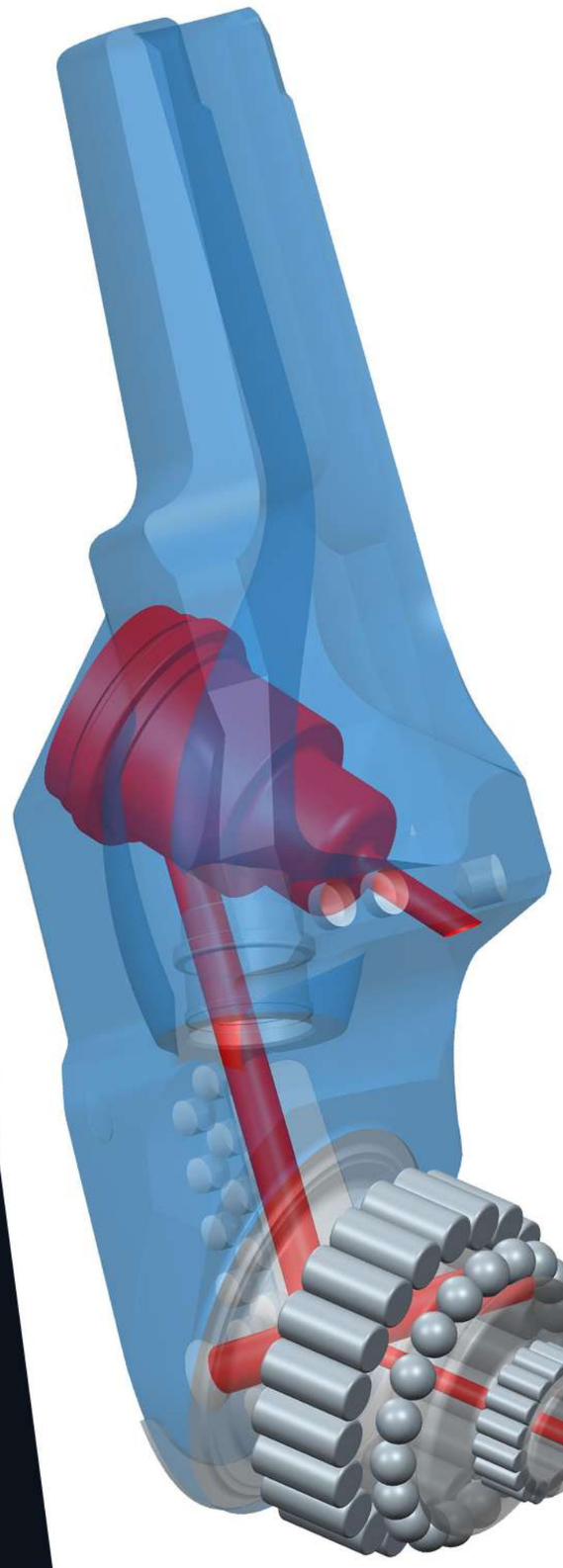


The advanced flushing system extended by additional nozzles in relation to the 3-jet flushing system system allows for more effective cleaning of the cutting structure and the bottom of the hole, and thus maintaining high drilling progress.

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

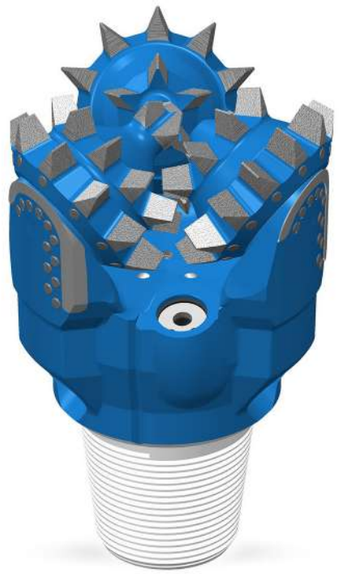
SELECTION OF THE DRILL BITS

FOR VARYING ROCK FORMATIONS

Rock strength [psi]	[Mpa]	Type of drill BM	M	S	T	Type of formation
below						
8000	55					clayey, muddy
10000	69					soft slate, sandstone
12000	83					consolidated sandstone
14000	97					medium-hard slate
16000	110					tufa, shale
18000	124					andeosite, rhyolite
20000	138					quartz (sandstone)
22000	152					limestone, marble
24000	165					granite
26000	179					gneiss
28000	193					diorite, diabase,
30000	207					hard slate
32000	221					limestone, dolomite
34000	234					basalt
36000	248					tactite
38000	262					granodiorite
40000	276					taconite
42000	290					quartzite
44000	303					syenite
46000	317					gabbro
48000	331					iron ore
50000	345					taconite
52000	359					cornering
54000	372					quartzite
56000	386					amphibiolite
58000	400					hematite ore
60000	414					
above						

SOFT FORMATION
DRILL BITS

8-1/2"
IADC 117



Diameter inch — 8-1/2"
Diameter mm — 215,9mm
Drill bit type — BM1HSX
IADC code — 1-1-7

CUTTING STRUCTURE:

Tall teeth with a small sharpening angle.

The placement as well as the geometry of the teeth are designed using 3D simulation. The teeth are reinforced with a tungsten carbide hardface coating, preventing tooth wear during the drilling process. In addition, the bit surf row is reinforced with carbide inserts which protect the drill bit 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).

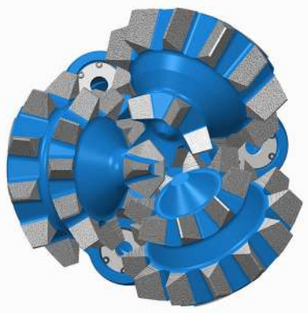
TYPES OF ROCK:

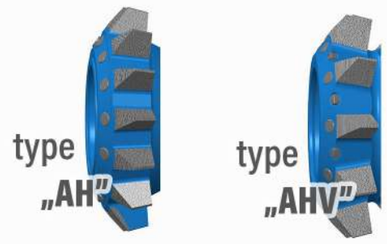
Designed for very soft, unstratified and poorly concise rocks with a high degree of water permeability, such as: shale, clay, poorly concise slate and sandstone marl limestone, salts, gypsum, coal, earthy iron ores.

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

4" (101,6mm) to **42"** (1066,8mm).

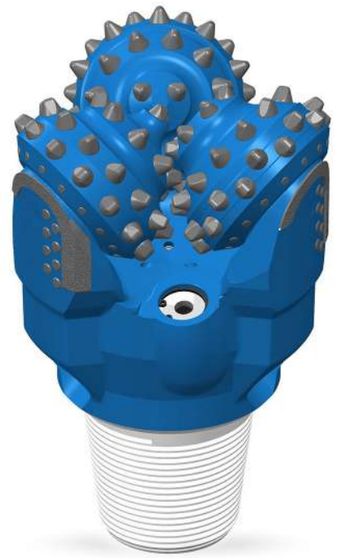
We offer the possibility of customized product designs for individual client needs.





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

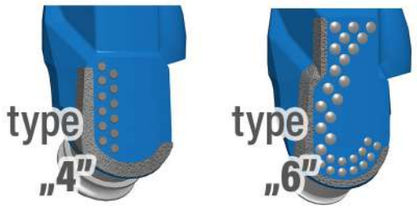
8-1/2"
IADC 537



LEG BACK PROTECTION TYPES:

As a standard, we offer **TYPE "4"** reinforcement with hardfacing on the outer surface of the segment and with tungsten carbide inserts on the entire attack surface.

For more demanding applications we offer the **TYPE "6"** reinforcement with tungsten carbide inserts spread over the entire wear surface.

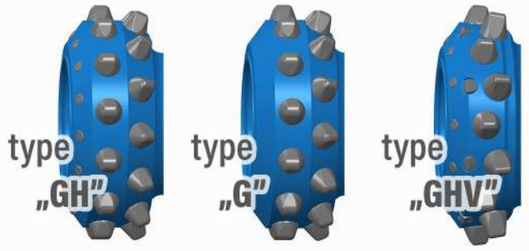


CUTTING STRUCTURE:

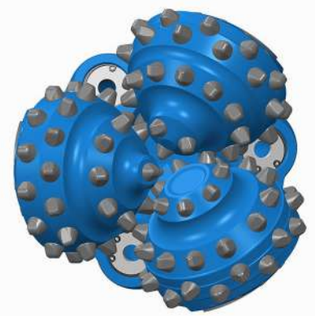
High prismatic posts. The proper placement of the inserts as well as the positioning cones enable the drill able to drill large intervals in a relatively short time.

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

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

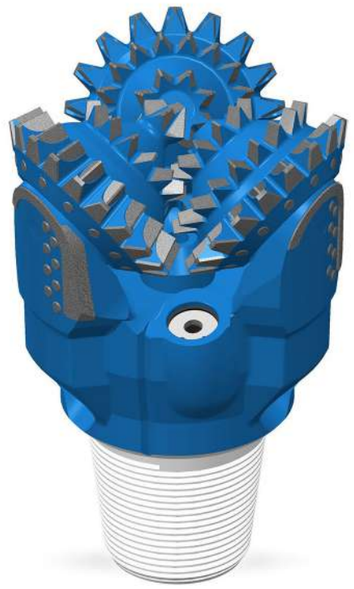


Our knowledgeable engineering team can provide consulting to select the best possible drilling solutions.



MEDIUM FORMATION
DRILL BITS

8-1/2"
IADC 237



Diameter inch — 8-1/2"
Diameter mm — 215,9mm
Drill bit type — S2THSX
IADC code — 2-3-7

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 surf row is strengthened with carbide inserts protecting the bit 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 rate of penetration (ROP)

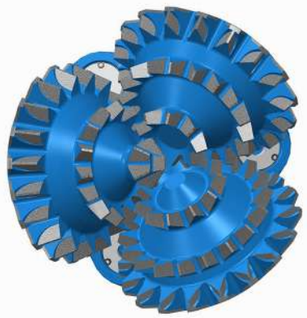
TYPES OF ROCK:

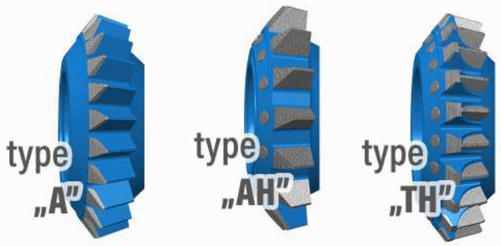
Hard and medium abrasive rocks such as: sandstones with quartz veins, hard limestone or keratinized conglomerates with iron or silica binder, crystalline dolomites, haematite ores, siderites, limonite, hard slates.

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

4" (101,6mm) to **28"** (711,2mm).

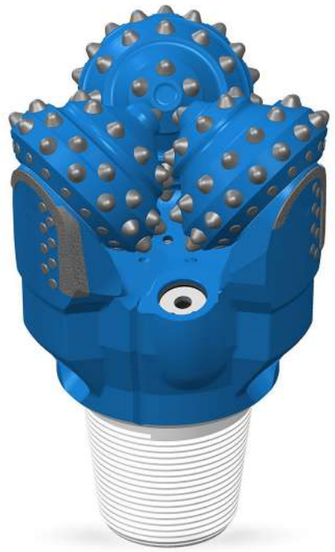
We offer the possibility of customized product designs for individual client needs.





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

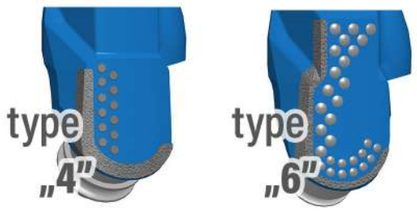
8-1/2"
IADC 637



LEG BACK PROTECTION TYPES:

As a standard, we offer **TYPE "4"** reinforcement with hardfacing on the outer surface of the segment and with tungsten carbide inserts on the entire attack surface.

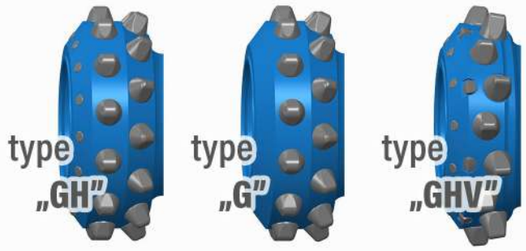
For more demanding applications we offer the **TYPE "6"** reinforcement with tungsten carbide inserts spread over the entire wear surface.



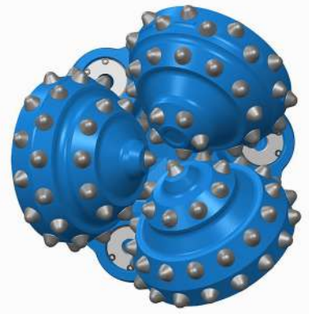
CUTTING STRUCTURE:

The prismatic inserts of high height and diameter and the relatively large offset of the bite axis in relation to the axis of the drill 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 drill bit



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



HARD FORMATION
DRILL BITS

9-7/8"
IADC 315

Diameter inch — 9-7/8"
Diameter mm — 250,8mm
Drill bit type — T1THX
IADC code — 3-1-5

CUTTING STRUCTURE:

Shorter teeth with a large sharpening angle and small spacing.

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

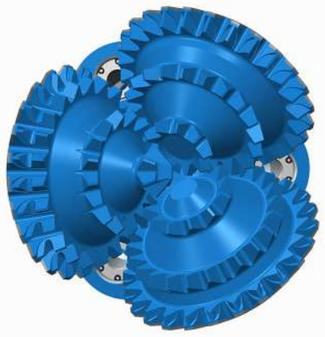
TYPES OF ROCK:

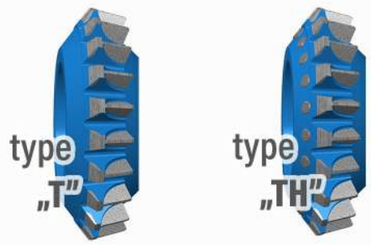
Hard abrasive rocks such as: quartzite binder sandstones, hard sandstones with corn inserts, hard quartzite slates, magma and metamorphic rocks.

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

4" (101,6mm) to **28"** (711,2mm).

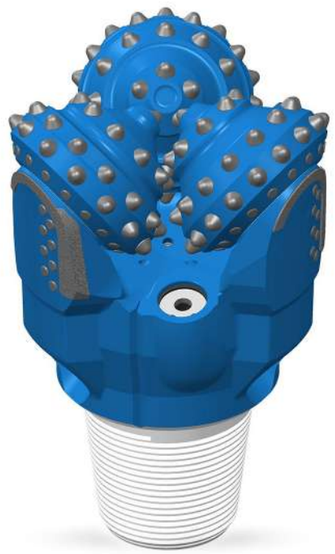
We offer the possibility of customized product designs for individual client needs.





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

8-1/2"
IADC 737



LEG BACK PROTECTION TYPES:

As a standard, we offer **TYPE "4"** reinforcement with hardfacing on the outer surface of the segment and with tungsten carbide inserts on the entire attack surface.

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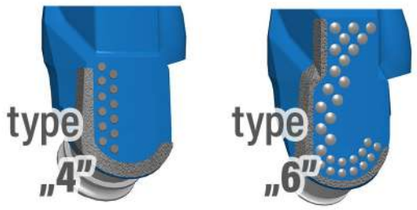
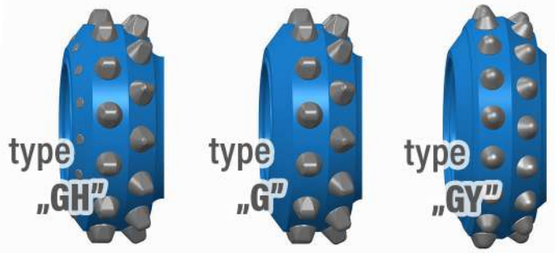


CUTTING STRUCTURE:

A large number of posts with low bowl height and very wide sharpening angle as well as shorter distances between the inserts ensure optimal conditions for hard rock mining. The minimum displacement of the bit axis in relation to the drill axis protects the inserts from breakage. The reinforcement of the bit surf row with numerous carbide inserts ensures that the diameter of the drill bit is maintained throughout the entire lifetime of the bit



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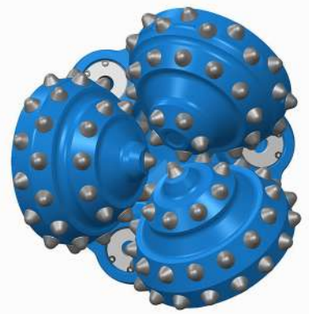
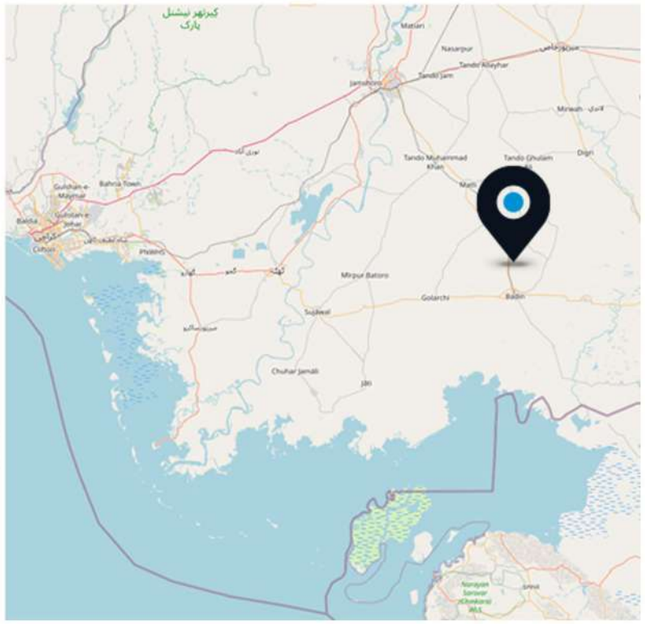


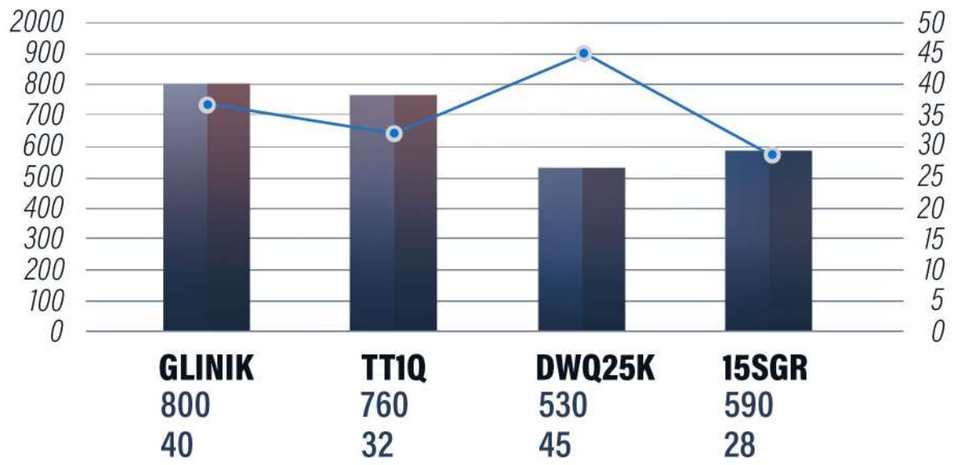
CASE HISTORY
PAKISTAN



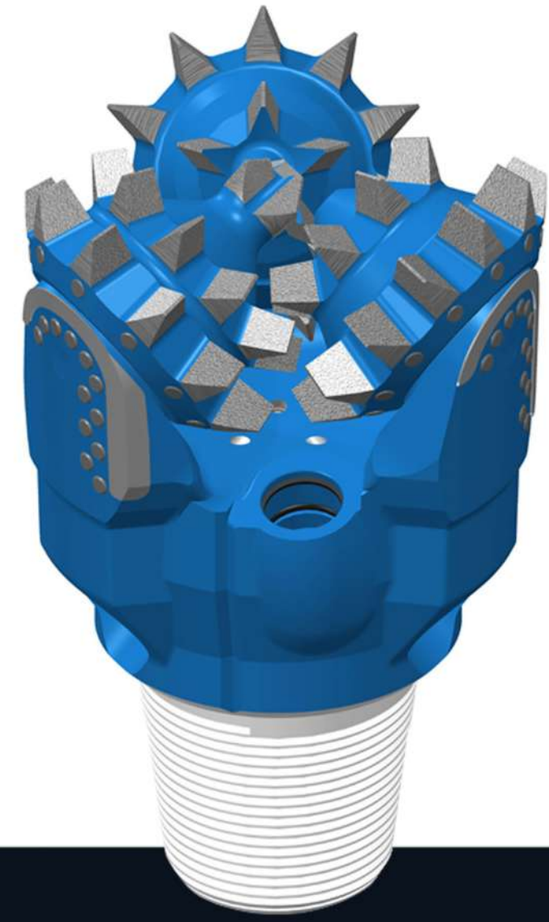
40 m/h **ROP**

132 **kRevs**

Bit Dull Grating **1-1-WT-A-EEE-IN-NO-TD**



17-1/2"
IADC 115 BM1HVXC



Customer Comments:

Due to formation bit came out with bit balling. Same ituation was with competitor bit.
Because of very high ROP and low Dull Grating we decided to re-run with Glinik bit.

Customer challenge: Drill interval shoe to shoe in one run

Formations: Clay and sand

Interval: ~800m

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.

GLINIK
DRILLING TOOLS

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.


QMS REGISTERED

Certificate of Registration

APIQR® REGISTRATION NUMBER
0195

This certifies that the quality management system of
NARZEDZIA I URZADZENIA WIERTNICZE GLINIK SP. Z O.O.
1 Michalusa Street
Gorlice
Republic of Poland

has been assessed by the American Petroleum Institute Quality Registrar (APIQR®) and found it to be in conformance with the following standard:

ISO 9001:2015

The scope of this registration and the approved quality management system applies to the
Design, Manufacture, Repair and Remanufacture of
Rotary Drilling Equipment; Service of Drill Rigs

APIQR® approves the organization's justification for exclusio
No Exclusions Identified as Applicable

Effective Date: NOVEMBER 6, 2020
Expiration Date: SEPTEMBER 8, 2023
Registered Since: NOVEMBER 6, 2020

Vice Presiden
Industry S


REGISTRATION NO. Q1-1436

Certificate of Registration

The American Petroleum Institute certifies that the quality management system of
NARZEDZIA I URZADZENIA WIERTNICZE GLINIK SP. Z O.O.
1 Michalusa Street
Gorlice
Republic of Poland

has been assessed by the American Petroleum Institute and found to be in conformance with the following:

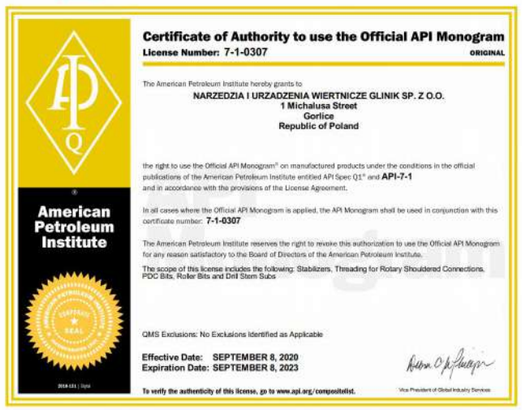
API Specification Q1

The scope of this registration and the approved quality management system applies to the:
Design, Manufacture, Repair and Remanufacture of
Rotary Drilling Equipment; Service of Drill Rigs

API approves the organization's justification for excluding:
No Exclusions Identified as Applicable

Effective Date: SEPTEMBER 8, 2020
Expiration Date: SEPTEMBER 8, 2023
Registered Since: AUGUST 20, 2011

Vice President of Global Industry Services


Certificate of Authority to use the Official API Monogram

License Number: 7-1-0307 ORIGINAL

The American Petroleum Institute hereby grants to
NARZEDZIA I URZADZENIA WIERTNICZE GLINIK SP. Z O.O.
1 Michalusa Street
Gorlice
Republic of Poland

the right to use the Official API Monogram® on manufactured products under the conditions in the official publications of the American Petroleum Institute entitled API Spec Q1® and API-7-1 and in accordance with the provisions of the License Agreement.

In all cases where the Official API Monogram is applied, the API Monogram shall be used in conjunction with this certificate number: 7-1-0307

The American Petroleum Institute reserves the right to revoke this authorization to use the Official API Monogram for any reason satisfactory to the Board of Directors of the American Petroleum Institute.

The scope of this license includes the following: Stabilizers, Threading for Rotary Shouldered Connections, PDC Bits, Roller Bits and Drill Stem Subs

American Petroleum Institute

QMS Exclusions: No Exclusions Identified as Applicable

Effective Date: SEPTEMBER 8, 2020
Expiration Date: SEPTEMBER 8, 2023

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Vice President of Global Industry Services

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