

History of the brand

1883

In 1883 a Canadian engineer William Henry McGarvey and an Austrian financier John Simeon Bergheim founded an oil refinery and opened a tool-repair facility. The refinery soon became one of the most successful in the area, and the tool-repair facility became the Machinery and Drilling Equipment Factory (Fabryka Maszyn i Urządzeń Wiertniczych), being the best of its kind in Europe until the outbreak of the First World War.

The company was one of the first in the world to begin producing drilling tools and equipment. It expanded its product range very intensively, producing among other things complete drilling rigs, pumps, steam-powered lifts, impact drills, and tools and equipment for shaft drilling.

1945

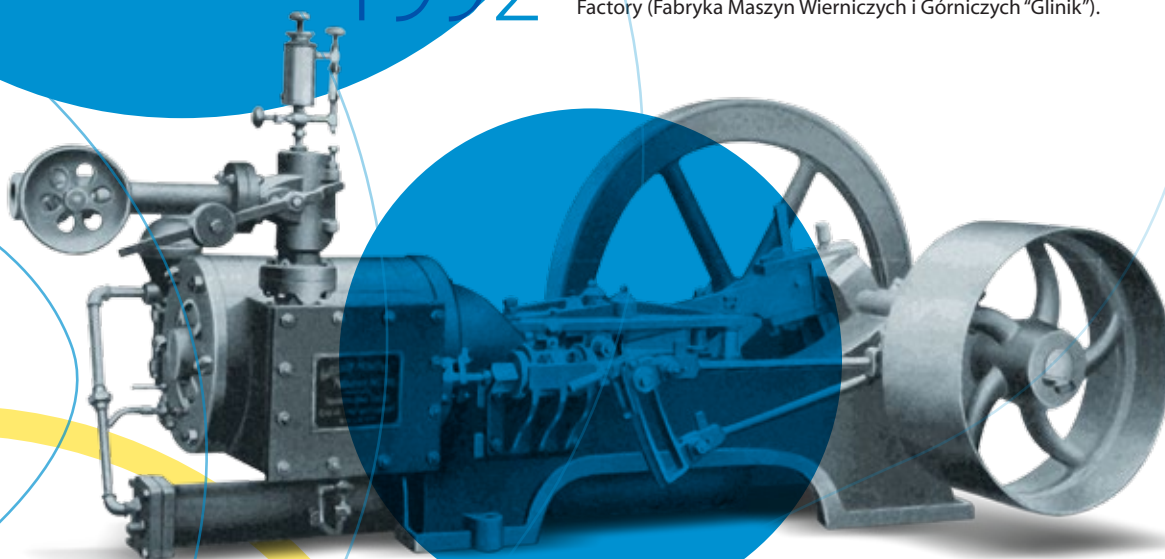
In addition to the internal market, the company exported its products to almost every country with oil fields, including Romania, the USSR, Austria, India, Syria, Argentina and Peru.

1968

In 1962 Glinik Machine and Drilling Equipment Factory (Fabryka Maszyn i Sprzętu Wiertniczego "Glinik") was established. It produced machinery and equipment for the mechanization of coal mining. The production of hydraulic cylinders and roof supports commenced. A new plant was formed which included a forging department, a die shop and a heat and power generating plant.

1992

In 1973 the name was changed to "Glinik" Drilling and Mining Machinery Factory (Fabryka Maszyn Wiertniczych i Górniczych "Glinik").



2001

NiUW became Glinik Machine Factory S.A. (Fabryka Maszyn Glinik S.A.), a company wholly owned by the State Treasury.

The company structure changed gradually into that of a holding company. Manufacturing plants and services were separated, including Glinik Forgings Sp. z o.o. (Kuznia Glinik Sp. z o.o.), Glinik Tools and Drilling Equipment Sp. z o.o. (Narzędzia i Urządzenia Wiertnicze Glinik Sp. z o.o.) and Glinik Mining Equipment Company Sp. z o.o. (Zakład Maszyn Górniczych Glinik Sp. z o.o.).

In 2001 the company Invest "Glinik" Sp. z o.o. was formed as a result of a management-employee buyout of the majority shareholding in the "Glinik" Machine Factory S.A. (Fabryka Maszyn "Glinik" S.A.) from the National Investment Fund and the State Treasury.

2014

In 2011 Drilling Tools & Equipment "Glinik" Sp. z o.o. (Narzędzia i Urządzenia Wiertnicze "Glinik" Sp. z o.o.) was acquired by TDJ S.A. This gave rise to a change in the company's image both internationally and locally. A new logo and corporate strategy were created and there was an intensive push of products into previously untapped world markets.

Nowadays, NiUW is a modern enterprise whose specialist products meet the standards of the global market, as evidenced by certificates:

API Spec. 7-1 relating to marking the Company's products, drill stem subs, roller bits, PDC bits, threading for rotary shouldered connections, stabilizers;

API Spec. Q1 relating to the conformity of the quality management system of the Company, in accordance with the requirements of API Spec. Q1 for the design, manufacture, repair and remanufacture of drilling equipment and service of drill rigs;

ISO Certificate relating to the conformity of the quality management system of the Company, in accordance with the requirements of ISO 9001 for the design, manufacture, repair and remanufacture of drilling equipment and service of drill rigs;

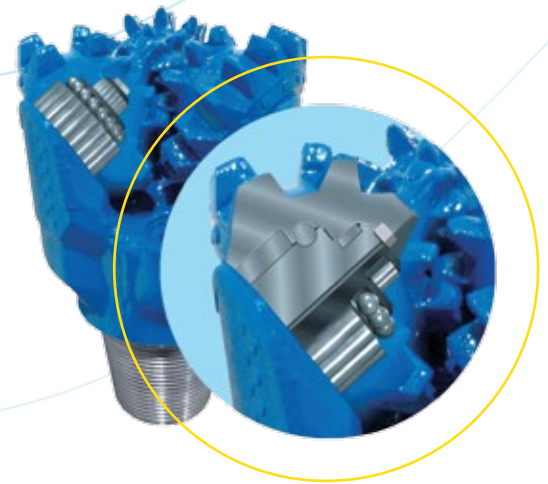
The hardbanding certificate relating to hardbanding drill pipes according to the guidelines laid down by Castolin Eutectic.



Bearings

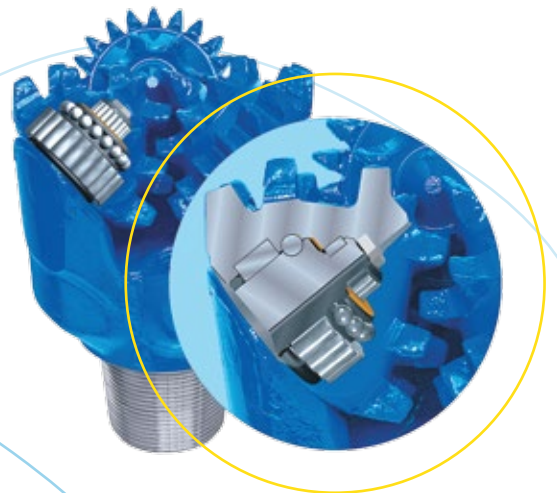
NON-SEALED ROLLER

- high durability of the bearing is ensured by ball bearing and two roller raceways
- dimensions of rollers ensure optimal transmission of the load from the cone during the operation
- optimal axial load capacity is attained by means of TCI thrust plug and two hard-faced thrust surfaces.



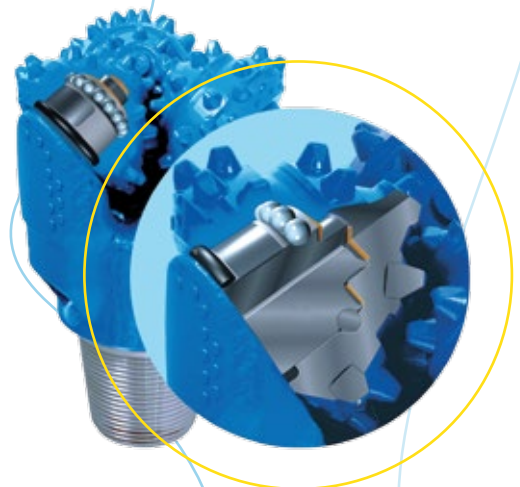
SEALED ROLLER

- improved lifetime by means of seals
- the grade of the seal of O-Ring type ensures that the proper characteristics are maintained throughout rock bit operation,
- the bearing unit pressure prevents the bearings from being penetrated with drilling fluid and the output and it prevents the washing out of the lubricant
- besides the thrust plug, the bearing has got an alloy copper thrust washer placed on the bigger thrust surface in order to improve its load capacity and durability.



JOURNAL

- very good durability and wear resistance of the journal bearing
- the main surfaces of the journal pin are hard-faced to improve wear resistance.
- both thrust surfaces of the pin have got an alloy copper washers improving load capacity and durability of the bearing
- the bearing has got „O-Ring“ seal which together with lubrication and compensation system ensure proper lubrication of slide raceways and protect the bearing from the drilling fluid and the output
- both „O-Ring“ and compensator membrane are made of chemically and heat resistant materials to protect them from chemical agents and high temperature
- the bearing has got a ball raceway



Flushing

CENTRAL FLUSHING

APPLICATION:

Central flushing is used for rock bits designed for waterwell drilling, where large values of the flowing stream of mud are required not high speed of mud outflow.

There is right or left mud circulation:

- the right mud circulation guarantees circulation through the central hole in the bit body to clean both the bottom of a bore-hole and the cutting structure. Central flushing can be done through one full hole or three directional holes.
- rock bits designed for reverse circulation are manufactured with the biggest possible central hole and, at a customer's request, with additional steel plates for drills with a diameter of more than 12 1/4", which are to improve cleaning of the both cutting structure and the bottom of a bore-hole.



3-JET FLUSHING

APPLICATION:

The 3-jet flushing is used for rock bits designed for drilling where high speed of mud outflow is desired

- is used for all rock bits sizes ranging from 5 7/8".

ADVANTAGES:

- higher speed of mud outflow
- effective cleaning of the both cutting structure and the bottom of a bore-hole.

ADVANTAGES OF STRUCTURAL SOLUTION:

- replaceable ceramic nozzles
- selecting the most appropriate nozzle diameters depending on the hydraulic parameters of the drilling process
- replaceable ceramic nozzles are mounted in the seats sealed with „O-Ring“
- securing the nozzle retaining ring allows quick replacement of nozzles.



4-JET FLUSHING

APPLICATION:

- it is used for bits designed for very soft and soft formation, which prevents bites from being covered with the output
- the additional fourth non-removeable central jet nozzle is used for bits sizes ranging from 7 1/2"
- the additional fourth fixed central jet nozzle is used for bits sizes ranging from 11 5/8".

ADVANTAGES

- preventing bits from the output sticking to them and so avoiding drilling speed reduction
- higher speed of mud outflow
- effective cleaning of the both the cutting structure and the bottom of a bore-hole.

ADVANTAGES OF STRUCTURAL SOLUTION:

- replaceable peripheral ceramic nozzles
- selecting the most appropriate nozzle diameters depending on the hydraulic parameters of the drilling process
- replaceable ceramic nozzles are mounted in the seats sealed with „O-Ring“
- securing the nozzle retaining ring allows quick replacement of nozzles.



Spiral stabilizers

„GLINIK“ manufacture spiral stabilizers of integral type with diameters of 130 mm – 445 mm.

The body of the stabilizer is made of alloy steel, heat-treated to 277 - 352 HB hardness and impact strength 54 J/cm2 according to API Spec. 7-1.

The stabilizers are supplied in two types:

- **STRING STABILIZERS** with box-pin connection
- **NEAR-BIT STABILIZERS** with box-box connection

Depending on the blade-shape the following stabilizers are available:

- with open design (small blade angle)
- with tight design (big blade angle)

The threaded connections are made according to API Spec 7-1.

Upon customer's request we can make a stress relief features on the threaded pin and on the treaded box. Also float valve recess can be made on the near-bit box.

The blades of the stabilizers are reinforced in the following ways:

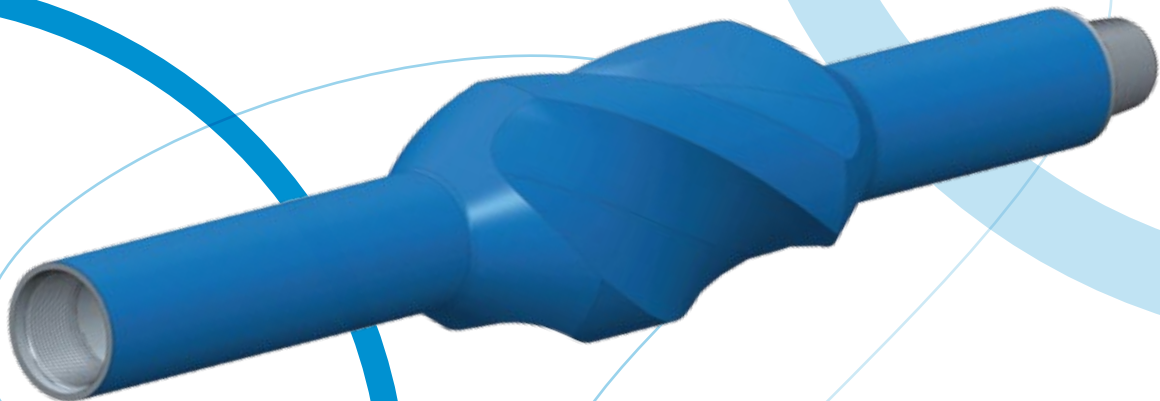
- hard - facing with tungsten carbide protecting from wear and enabling recondition of stabilizers many times
- tungsten carbide inserts pressed into blade surface ensuring increased resistance of stabilizers against diameter loss.

The blade diameters are under the sizes of the holes:

- for hole sizes 130 – 311 mm 0,8 mm under size
- for hole sizes 311- 445 – 1,6 mm under size

The parameters of the mass - produced stabilizers are shown in the table.

STABILIZERS IN OTHER SIZES CAN ALSO BE PRODUCED AT A CUSTOMER'S REQUEST.



Spiral stabilizers dimensions

Diameter			Length				Connections			
blades	body	holes	upper body	drill collar	lower body		string		near bit	
					string	near bit				
D [mm]	D1 [mm]	D2 [mm]	L1 [mm]	L2 [mm]	L3 [mm]		box	pin	box	box
130 ÷ 187	121	51	760	305	600	450	NC38		3 1⁄2" REG	
191 ÷ 200	165	71		406			NC46		4 1⁄2" REG	
203 ÷ 244	171			NC50			6 5⁄8" REG			
241 ÷ 394	203			457						
397 ÷ 445	241	76		508			7 5⁄8" REG			
311 ÷ 445				457/508						
397 ÷ 445				508						

OPERATING INSTRUCTION

of Drill Bits NIUW Glinik

1 Transportation

Drill bits should be transported on a stable surface, such as a wooden pallet in position that ensures minimal risk of mechanical damage resulting from vibration during the transport. Normally, drill bits are transported in position with pin up with a twisted thread protector. During loading and unloading of drill bits it is required to use specially designed transport equipment. Drill bits should be protected against sudden uncontrolled shifting by proper attachment to the pallet in order to avoid damage, it is forbidden to roll and throw drills.

2 Storage

Drill bits should be stored in a dry place where they are protected from rain and long-term damaging effects of the sun. In the case of drill bits with sealed bearings, it is required to ensure their proper storage during downtime on the job site in order to limit the negative impact of low temperatures

3 Operating Conditions

- a) for the safe conduct of work, it is required to rinse the bottom of the hole before drilling and ensure continuous circulation to assure constant cooling of the drill bit running on the bottom of the hole.
- b) it is required to start drilling gently and avoid sudden changes in load pressure on drill bit
- c) drilling parameters such as pressure and speed should be chosen with respect to geological conditions of the hole. This parameters shall not exceed drilling parameters recommended by the manufacturer for this type of drill bit.

4 Parameters of drilling

Proper adjustment of drilling parameters is ultimately dependent on the depth of drilling and geological conditions in the hole, such as the anticipated reservoir pressure and fracturing. The principle of selection of drilling parameters:

- low load > high speed/ rpm
- high load > low speed/ rpm

Note: The recommended drilling parameters for each type of drill bit are given in the Product Data Sheet.

5 Bit protection for reuse

In the case of intermittent time for work, it is required to secure the drill by keeping it really clean.

Drill bits with unsealed bearings are required to be protected against drying up of ore in bearings and drill bits with sealed bearings are required to be protected against drying up of excavated material in the vicinity of the seal. Therefore, drill bits need to be put in water after having them rinsed with water under high pressure. Then it is required to refill drill bits with lubricant according to the instruction.

6 Assembly and disassembly of drill bits

The operation of tightening or loosening a drill bit must be carried out according to all the procedures and safety instructions - it is recommended to use special bit breaker for particular bits diameters.

Before tightening of a bit, it is required to apply a lubricant agent on the thread in accordance with API spec.7 Appendix F requirements (lubricants with 40 ÷ 50% zinc and no more than 0.3% sulfur).

Note: Any changes or reworks on the bits may result in rejecting claims

Any comments concerning our products should be sent to the representatives of our company.

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Selection of IADC code

The code for milled cutter and pillar bits consists of 3 digits and 1 letter.

THE FIRST index

from 1 to 8 specifies the type of tools and corresponding increase in the hardness of the rock:
1 - 3 cutter bits with steel, milled teeth
4 - 8 cutter bits of the hard sintered bars

THE SECOND index

of 1- 4 describes the type of the bit depending on the hardness of rock:
1 - soft
2 - medium
3 - hard
4 - very hard

THE THIRD index

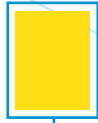
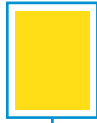
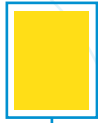
of 1 - 7 sets design features: the type of bearings bites and indicate the presence or absence of surface hardening outer part of bites fittings of hard sinter:
1 - not sealed bearings and lack of cure of the outer portion bites
2 - not sealed bearings and lack of cure of the outer portion bites, the drill bit for drilling an air scrubber
3 - not sealed bearings and harden the outer part of the reinforcement stress bites wreaths
4 - sealed bearings and lack of cure of the outer portion bites
5 - sealed bearings and curing of the outer portion bites
6 - sealed bearings without outer part of the cure bites
7 - sealed bearings and harden the outer part of bites

THE FOURTH index

a letter determines the properties of the tool
A - bits designed for drilling with air scrubber
B - special bearing seal
C - bits with a central irrigation
D - bits for special directional drilling
E - borers jet nozzle with replaceable caps
F - jet drills with reinforced cured outer part of the bites
H - augers for drilling horizontal wells
J - borers nozzle with nozzle caps directed at an angle relative to the bottom of the hole
M - designed for the drilling of motor plunge
S - drills with standard steel, milled teeth
T - borers two cutter
X - bits with the posts of sintered hard alloy with a wedge ending
Z - bits with posts of the sintered hard alloy with endings other than wedge or cone endings

TYPE OF TOOTH	IADC CODE	TYPES OF ROCKS
STEEL MILLED TOOTH	1-1-1 1-2-1 1-1-3 1-2-3 1-1-4 1-2-4 1-1-5 1-2-5 1-1-6 1-2-6 1-1-7 1-2-7	very soft, and slightly succinct non stratified, high drillability such as shale clays, shale, and poorly concise sandstone limestone marl, salt, gypsum, coals, earthy iron ore
STEEL MILLED TOOTH	1-3-1 1-4-1 1-3-3 1-4-3 1-3-4 1-4-5 1-3-5 1-4-5 1-3-6 1-4-6 1-3-7 1-4-7 2-1-1 2-3-1 2-1-1 2-3-1 2-1-3 2-3-3 2-1-5 2-3-5 2-1-6 2-3-6 2-1-7 2-3-7	layered soft and medium concise rocks as calcareous schist, shale, sandy, sandstones of lime binder, conglomerates, porous gypsum, anhydrite soft marbles of clay binder- silica, dolomite marl, clayey siderite, limonite. Hard and medium abrasive rocks like sandstone with veins of quartz, limestone or chert, conglomerates of ferruginous , calcium or silica binder, dolomite crystalline hematite ore, siderite, limestone, hard shale.
	3-1-1 3-3-3 3-1-3 3-3-5 3-1-5 3-3-6 3-1-6 3-3-7 3-1-7 3-4-3	hard abrasive rocks as sandstones of binder quartzite, hard sandstones of chert inserts, hard slate quartzite ore, pyrite, magnetite, chromium, phosphate rock, granite, igneous and metamorphic rock
TEETH pillars carbide	4-2-5 4-3-5 4-2-7 4-3-7	long intervals of very soft poorly concise slate, sandstone, clays, salt, and soft limestone
	5-1-3 5-3-3 5-1-5 5-3-5 5-1-7 5-3-7	layered soft rocks as calcareous schist, sandstone, sandy shale with a binder limestone, conglomerates, porous gypsum, anhydrite soft. Layered, soft and medium concise rocks as medium-shale, anhydrite, marbles, sandstones with clayey binder - silica, hard marl, sandy strongly with inserts of limestone, dolomite marl, siderite clayey limonite. Medium-concise rocks as hard crystalline limestone, silica shale; siliceous sandstones of the binder ferruginous, sandy limestone, Hard anhydrite, limestone compact, dolomite, medium-, concise rock as above, layered with hard inserts
	6-2-3 6-3-3 6-2-5 6-3-5 6-2-7 6-3-7	medium hard and abrasive rocks like sandstone with veins of quartz, limestone or chert, conglomerates of limestone, ferruginous or silica binder; dolomites. Crystalline; hematite ore, siderite, limonite, hard shale. Hard, very concise abrasive rocks as sandstones of binder quartzite, hard limestone with veins of chert, hard sandy limestone, dolomites quartzite conglomerates, quartz schist, igneous and metamorphic rock
	7-3-3 7-3-7 7-3-5	hard, very concise rocks as hard limestone flint vein quartz, petrified ore hematite, pyrite, magnetite; chromium, phosphate rock, granite

IADC code number designation



A LETTER DETERMINES THE PROPERTIES OF THE TOOL

A - bits designed for drilling with air scrubber
B - special bearing seal
C - bits with a central irrigation
D - bits for special directional drilling
E - borers jet nozzle with replaceable caps
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T - borers two cutter
X - bits with the posts of sintered hard alloy with a wedge ending
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DESIGN FEATURES

1 - not sealed bearings and lack of cure of the outer portion bites
2 - not sealed bearings and lack of cure of the outer portion bites, the drill bit for drilling an air scrubber
3 - not sealed bearings and harden the outer part of the reinforcement stress bites wreaths
4 - sealed bearings and lack of cure of the outer portion bites
5 - sealed bearings and curing of the outer portion bites
6 - sealed bearings without outer part of the cure bites
7 - sealed bearings and harden the outer part of bites

FORMATION SUB-CATEGORY

from softest **1**
to hardest **4**

HARDNESS OF FORMATIONS

1-2-3 steel tooth bits (from softest to hardest)
4-5-6-7-8 tungsten carbide inserts bits (from softest to hardest)

Heat treatment

WE OFFER THE FOLLOWING SERVICES

I Thermo-chemical treatment

- **GAS CARBURIZING** with adjustable carbon potential in the field of deep layers of $0.5 \div 2.5$ mm
- **CARBONITRIDING** with adjustable high-potential carbon layers in depth from 0.1 to 0.6 mm

II Heat treatment in protective atmospheres

- improvement of structural steel
- hardening of tool steels
- hardening of special steels

III Heat treatment in air

Chamber furnaces: 1500x900x500 mm

IV Annealing

- normalizing
- softening
- recrystallization
- relaxing

V Surface Hardening

- high frequency currents - hardening depth of 0.5 to 1.5 mm
- the outer surfaces of the rollers and flat surfaces
- straight and oblique teeth of shafts and gears with module $5 \div 10$
- medium frequency currents - hardening depth of $2.0 \div 6$ mm
- the outer surfaces of the rollers and flat surfaces
- straight and oblique teeth of shafts and gears with a module over 12

The maximum length of hardening to 1500 mm.

VI Cleaning the surface

- corundum sandblasting
- grit spherical blasting



Furnace description

Operation	Furnace	Charge Weight [kg]	Dimension basket [mm]
carburizing carbonitriding	twin-chamber furnaces TQFR-11-EM	550kg	1100 x 800 x 300 mm
improvement in protective atmosphere	chamber furnaces RTPFQ-11EM, PEKAT, DLR	550kg	1100 x 800 x 300 mm
soft annealing in a protective atmosphere	chamber furnaces PEKAT, DLR	550kg	1100 x 800 x 300 mm
stress relief annealing	soaking pits PEH-3b	500kg	φ 800 x 11000 mm
hardening without protective atmosphere	chamber furnaces PEK- 4	chamber dimension 1450 x 870mm	
annealing normalizing			
induction surface hardening FDF	medium-low frequency (layer thickness $2.0 \div$ hardened 6.0 mm)	- oblique and straight teeth of gear wheels and shafts of the module above 5 m and the diameter of max. 900 mm - cylindrical outer surfaces of rollers, rod etc. attaching length of 1800 mm and hardening length of 1500 mm - the outer surface of wheels, discs, etc., of a diameter 400 to 1000 mm	
	high frequency the thickness of the hardening $0.5 \div 1.5$ mm)	cylindrical outer surfaces of rollers	



Heat treatment

Control and process repeatability are guaranteed by:

- having the processes designed by the company technology department with the use of software facilitating the performance of the technology engineers
- numerical process control using the Eurotherm Eycon
- data collection and data logging with the use of Dream Report software
- the implemented and functioning quality management systems and ISO 9001:2008 API.

We guarantee:

- professional service
- short deadlines
- possibility to negotiate prices
- technical assistance in the selection of steel grade and the optimal technology.

We cooperate with a metallurgical laboratory, a subcontractor certified by Technical Inspection Office, in which tests are performed after heat treatment, confirming the established requirements.

For the services we issue a certificate of quality.

Contact:

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diameters		diameters	
IADC		IADC	
111	2-1/2" (60,3) mm	111	2-1/2" (60,3) mm
112	2-1/2" (63,5) mm	112	2-1/2" (63,5) mm
113	2-1/2" (66,7) mm	113	2-1/2" (66,7) mm
114	2-3/4" (73,0) mm	114	2-3/4" (73,0) mm
115	2-13/16" (74,6) mm	115	2-13/16" (74,6) mm
116	3" (76,2) mm	116	3" (76,2) mm
117	3-1/8" (79,4) mm	117	3-1/8" (79,4) mm
118	3-1/4" (82,6) mm	118	3-1/4" (82,6) mm
119	3-3/8" (85,7) mm	119	3-3/8" (85,7) mm
120	3-1/2" (88,9) mm	120	3-1/2" (88,9) mm
121	3-5/8" (92,1) mm	121	3-5/8" (92,1) mm
122	3-3/4" (95,2) mm	122	3-3/4" (95,2) mm
123	3-5/8" (98,4) mm	123	3-5/8" (98,4) mm
124	4" (101,6) mm	124	4" (101,6) mm
125	4-1/8" (104,8) mm	125	4-1/8" (104,8) mm
126	4-1/4" (107,9) mm	126	4-1/4" (107,9) mm
127	4-7/16" (112,7) mm	127	4-7/16" (112,7) mm
128	4-1/2" (114,3) mm	128	4-1/2" (114,3) mm
129	4-5/8" (117,5) mm	129	4-5/8" (117,5) mm
130	4-3/4" (120,6) mm	130	4-3/4" (120,6) mm
131	4-7/8" (123,8) mm	131	4-7/8" (123,8) mm
132	5" (127,0) mm	132	5" (127,0) mm
133	5-1/8" (130,2) mm	133	5-1/8" (130,2) mm
134	5-3/16" (131,8) mm	134	5-3/16" (131,8) mm
135	5-1/4" (133,4) mm	135	5-1/4" (133,4) mm
136	5-1/2" (139,7) mm	136	5-1/2" (139,7) mm
137	5-5/8" (142,9) mm	137	5-5/8" (142,9) mm
138	5-3/4" (146,0) mm	138	5-3/4" (146,0) mm
139	5-7/8" (149,2) mm	139	5-7/8" (149,2) mm
140	5-13/16" (150,8) mm	140	5-13/16" (150,8) mm
141	6" (152,4) mm	141	6" (152,4) mm
142	6-1/8" (155,6) mm	142	6-1/8" (155,6) mm
143	6-1/4" (158,7) mm	143	6-1/4" (158,7) mm
144	6-1/2" (165,1) mm	144	6-1/2" (165,1) mm
145	6-5/8" (168,3) mm	145	6-5/8" (168,3) mm
146	6-3/4" (171,4) mm	146	6-3/4" (171,4) mm
147	7-1/8" (187,3) mm	147	7-1/8" (187,3) mm
148	7-1/2" (190,5) mm	148	7-1/2" (190,5) mm
149	7-5/8" (193,7) mm	149	7-5/8" (193,7) mm
150	7-3/4" (200,0) mm	150	7-3/4" (200,0) mm
151	8" (203,2) mm	151	8" (203,2) mm
152	8-1/8" (212,7) mm	152	8-1/8" (212,7) mm
153	8-1/2" (215,9) mm	153	8-1/2" (215,9) mm
154	8-3/4" (219,1) mm	154	8-3/4" (219,1) mm
155	8-1/4" (222,2) mm	155	8-1/4" (222,2) mm
156	9" (228,6) mm	156	9" (228,6) mm
157	9-1/2" (241,3) mm	157	9-1/2" (241,3) mm
158	9-3/4" (244,5) mm	158	9-3/4" (244,5) mm
159	9-5/8" (250,8) mm	159	9-5/8" (250,8) mm
160	10" (254,0) mm	160	10" (254,0) mm
161	10-1/4" (260,3) mm	161	10-1/4" (260,3) mm
162	10-3/8" (269,9) mm	162	10-3/8" (269,9) mm
163	10-1/2" (276,2) mm	163	10-1/2" (276,2) mm
164	11" (279,4) mm	164	11" (279,4) mm
165	11-1/8" (295,3) mm	165	11-1/8" (295,3) mm
166	11-1/2" (301,6) mm	166	11-1/2" (301,6) mm
167	12" (304,8) mm	167	12" (304,8) mm
168	12-1/4" (311,1) mm	168	12-1/4" (311,1) mm
169	13" (330,2) mm	169	13" (330,2) mm
170	13-1/8" (342,9) mm	170	13-1/8" (342,9) mm
171	13-3/4" (349,2) mm	171	13-3/4" (349,2) mm
172	14" (355,6) mm	172	14" (355,6) mm
173	14-1/4" (361,9) mm	173	14-1/4" (361,9) mm
174	14-1/2" (368,3) mm	174	14-1/2" (368,3) mm
175	14-3/4" (374,6) mm	175	14-3/4" (374,6) mm
176	15" (381,0) mm	176	15" (381,0) mm
177	15-1/2" (393,7) mm	177	15-1/2" (393,7) mm
178	16" (406,4) mm	178	16" (406,4) mm
179	16-3/4" (425,4) mm	179	16-3/4" (425,4) mm
180	17-1/4" (438,1) mm	180	17-1/4" (438,1) mm
181	17-1/2" (444,5) mm	181	17-1/2" (444,5) mm
182	18-1/2" (469,9) mm	182	18-1/2" (469,9) mm
183	20" (508,0) mm	183	20" (508,0) mm
184	20-1/2" (520,7) mm	184	20-1/2" (520,7) mm
185	22" (558,8) mm	185	22" (558,8) mm
186	23" (584,2) mm	186	23" (584,2) mm
187	24" (609,6) mm	187	24" (609,6) mm
188	26" (660,4) mm	188	26" (660,4) mm

Hole openers

The hole - openers are designed for reaming of the following bore- holes:

WATERWELLS with diameter from 8 ½" to 48". Hole-openers designed for waterwell drilling can be equipped with a 3-cone roller bit as a pilot. Typical threaded connections are shown in the tab.1.

LARGE DIAMETER interbed bore- holes with diameter 5 5/8" to 56" tab.2.

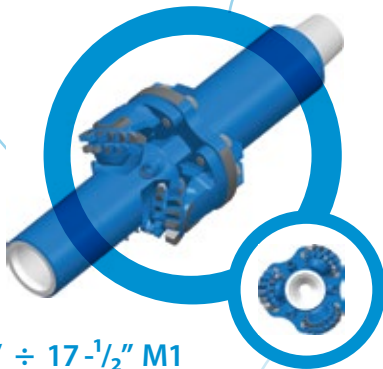
Holes can be reamed with a single hole-opener or with a set of hole-openers connected as so called "christmas tree". The end of hole-opener body has threaded connection which fits another hole-opener or the drilling string.

At a customer's request, other connections can be supplied as well.

HORIZONTAL BORE holes, e.g. under riverbeds or roads, within diameter range from 5 5/8 to 16" tab.3.

Hole-openers for horizontal drilling have replaceable nozzles, which to use optimum hydraulic parameters for a proper mining and drawing drillings out of a bore-hole.

The surface of a hole-opener body is reinforced with hard metal and tungsten carbide inserts to secure from excessive wear caused by friction against a bore-hole. In order to assure a stable and proper work of a drill string, upon customer's request, the hole openers can be equipped with special cylinders guiding hole-openers through a pilot bore-hole.



12 -1/4" ÷ 17 -1/2" M1

Kod IADC: 131

Designed for drilling layered silt and medium concise rocks such as: limy claystone; slate; sandstone of limy binder; conglomerates; porous gypsum; soft anhydrite; marble of clayey and silica binder; clayey siderite; limonite.



12 -1/4" ÷ 13" M1ZX

Kod IADC: 135

Designed for drilling layered silt and medium concise rocks such as: limy claystone; slate; sandstone of limy binder; conglomerates; porous gypsum; soft anhydrite; marble of clayey and silica binder; clayey siderite; limonite.



610 ÷ 813 M-S

Designed for drilling layered, silt and medium concise rock formations.



1422 ÷ 1633 M-S

Designed for drilling layered, silt and medium concise rock formations.

Hole openers

BENEFITS OF THE HOLE- OPENERS

- cutter sets can be easily replaced in the field, when worn out
- cutting structure of cones with milled tooth is designed for soft (M type), medium (S type), or hard formation (T type)
- upon customer's request we manufacture TCI insert hole-openers designed for very hard formation (BT type)
- the hole- openers have got jet nozzle circulation, which provides efficient cleaning of cutters and a bore- hole bottom simultaneously.

"Glinik" also manufactures replaceable cutter sets for all types and sizes of the hole-openers.



131.8 ÷ 250.8 S2TZ
Kod IADC: 233

Designed for drilling medium hard and abrasive rocks such as: sandstone with veins of quartz, hard limestone or chert; conglomerates of limy ferruginous or silica binder; crystalline dolomites; hematite ores; siderites; limonite; hard shale.



8-¹/₂" ÷ 12-¹/₄" BM3GVSX
Kod IADC: 437

Designed for drilling layered soft and medium concise rocks such as: limy claystone; slate; sandstone of limy binder; conglomerates; porous gypsum; soft anhydrite; marble of clayey and silica binder; clayey siderite; limonite.



12-¹/₄" ÷ 17-¹/₂" M1ZSX
Kod IADC: 137

Designed for drilling layered soft and medium concise rocks such as: limy claystone; slate; sandstone of limy binder; conglomerates; porous gypsum; soft anhydrite; marble of clayey and silica binder; clayey siderite; limonite.



168 ÷ 311 BM3GVSX
Kod IADC: 437

Designed for drilling layered soft and medium concise rocks such as: limy claystone; slate; sandstone of limy binder; conglomerates; porous gypsum; soft anhydrite; marble of clayey and silica binder; clayey siderite; limonite.



Hole openers

16" ÷ 24 S

Kod IADC: 211

Designed for drilling medium hard and abrasive rocks such as: sandstone with veins of quartz, hard limestone or chert; conglomerates of limy ferruginous or silica binder; crystalline dolomites; hematite ores; siderites; limonite; hard shale.

Tab. 1 Cutting hole openers for hole enlarging in water-well drilling.

Normal size		Threaded connection		Number of cutters	Length
[mm]	[inch]	Up	Down		
215.9/311.1	8 1/2 / 12 1/4	6 5/8 Reg box	4 1/2 Reg pin	3	1000
215.9/370	8 1/2 / 14 5/8	6 5/8 Reg box	4 1/2 Reg pin	3	1000
250.8/431.8	9 7/8 / 17	6 5/8 Reg	6 5/8 Reg	5	1300
311.1/444.5	12 1/4 / 17 1/2	7 5/8 Reg	6 5/8 Reg	3	1330
311.1/470	12 1/4 / 18 1/2	6 5/8 Reg	6 5/8 Reg	3	1330
444.5/558.8	17 1/2 / 22	7 5/8 Reg	7 5/8 Reg	4	1380
444.5/609.6	17 1/2 / 24	7 5/8 Reg	7 5/8 Reg	5	1400
444.5/660.4	17 1/2 / 26	7 5/8 Reg	7 5/8 Reg	5	1430
444.5/770	17 1/2 / 30	7 5/8 Reg	7 5/8 Reg or flange	5	1500
444.5/870	17 1/2 / 34	7 5/8 Reg	7 5/8 Reg	5	1500
444.5/960	17 1/2 / 38	7 5/8 Reg	7 5/8 Reg	5	1500
444.5/1050	17 1/2 / 42	7 5/8 Reg	7 5/8 Reg	5	1500
444.5/1219	17 1/2 / 48	7 5/8 Reg	7 5/8 Reg	9	1750

Tab. 2 Cutting hole openers for enlarging inter-level boreholes.

Normal size		Threaded connection		Numbers of cutters	Length	Weight
[mm]	[cale]	Wymiar	Rodzaj			
143/270	5 5/8 / 10 5/8	3 1/2 WP(Reg)	mufa x pin	3	420	58
193/305	7 5/8 / 12	4 1/2 WP(Reg)	czop x pin	3	510	65
270/406	10 5/8 / 16	4 1/2 WP(Reg)	mufa x pin	3	480	101
406/610	16/24	4 1/2 WP(Reg)	mufa x pin	3	480	228
406/610	16/24	6 5/8 WP(Reg)	mufa x box	3	590	255
610/813	24/32	6 5/8 WP(Reg)	mufa x box	5	530	417
813/1016	32/40	6 5/8 WP(Reg)	mufa x box	5	530	456
1016/1219	40/48	6 5/8 WP(Reg)	mufa x box	5	530	521
1219/1422	48/56	6 5/8 WP(Reg)	mufa x box	5	530	579

Tab. 3 Cutting hole openers for hole enlarging in horizontal directional drilling.

Normal size		Threaded connection		Number of cutters	Length	Weight
[mm]	[inch]	size	type			
143/270	5 5/8 / 10 5/8	NC38 (3 1/2 IF)	czop x box	3	700	65
193/311	7 5/8 / 12 1/4	NC38 (3 1/2 IF)	czop x box	3	780	76
270/406	10 5/8 / 16	NC50 (4 1/2 IF)	czop x box	3	900	190

Drill stem subs

NiUW "Glinik" Sp. z o.o. is also manufacturer of drill stem subs used in rotary drilling rigs. They are used to connect elements of the drill string and drilling tools. Manufacturing process of these tools is carried out in accordance with the requirements of API Spec. 7-1.

The dimensions of the external and internal diameters of drill stem subs are adjusted to the sizes of the connected elements of the drill string.

The drill stem subs are made of stainless steel for quenching and tempering. The pins of these tools are coated with zinc. Thread connections are protected against mechanical damage with polyethylene protectors.

At the customer's request, NiUW "Glinik" Sp. z o.o. also produces drill stem subs with dimensions in accordance with PN-82/G-74015 and protective subs.



DRILL STEM SUB
CXC NC61L



DRILL STEM SUB
CXC NC61L



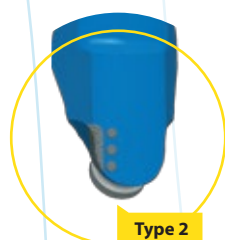
DRILL STEM SUB
CXC NC61L

Leg back protection

Designed for drills with diameters
2 - $\frac{3}{8}$ " do 3 - $\frac{1}{2}$ "



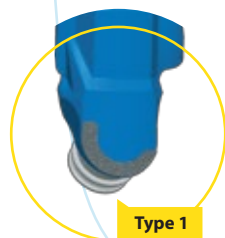
Type 1



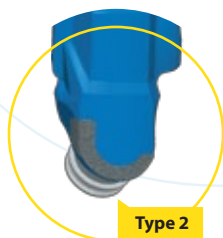
Type 2

Type of leg back protection	Design features
1	leg back hard- facing
2	leg back hard- facing side hard-facing at attack side
3	leg back hard- facing flat T.C. inserts
4	leg back hard- facing side hard-facing at attack side flat T.C. inserts on full length of attack edge
5	leg back hard- facing side hard-facing at attack side ball shaped T.C. inserts
6	leg back hard- facing spherical T.C. inserts on full length of attack edge side hard-facing at attack side
7	leg back hard- facing spherical T.C. inserts on full length of attack edge stabilizing pad side hard-facing at attack side

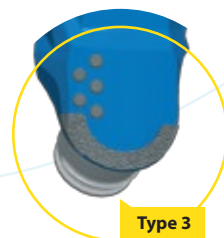
Designed for drills with diameters 3 - $\frac{3}{4}$ " do 5 - $\frac{7}{8}$ "



Type 1



Type 2

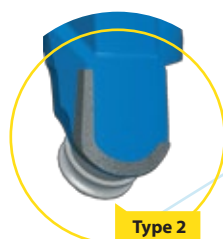


Type 3

Designed for drills with diameters more than 5 - $\frac{7}{8}$ "



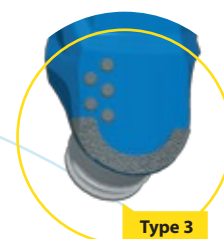
Type 1



Type 2



Type 2 strengthen

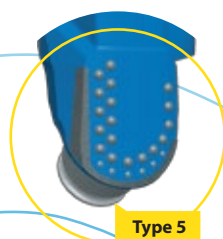


Type 3

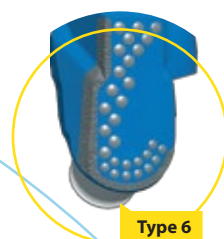
Used for directional drilling



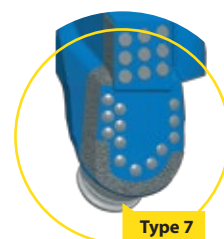
Type 4



Type 5



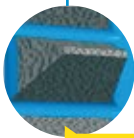
Type 6



Type 7

Leg back protection

STEEL MILLED TOOTH BITS –
GAUGE TOOTH SHAPE



Feature A



Feature T



Feature TT

TUNGSTEN CARBIDE INSERT BITS –
GAUGE T.C.I. SHAPE



Feature G



Feature GY

Hell row protection



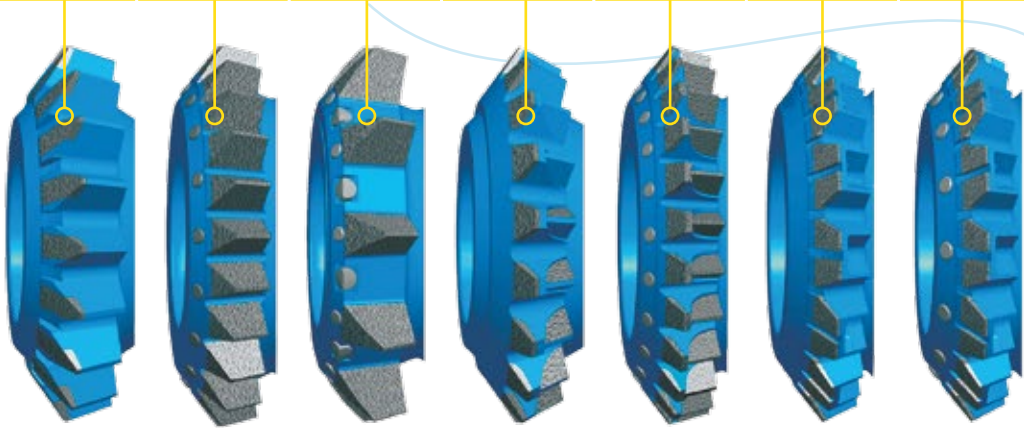
Feature H



Feature V

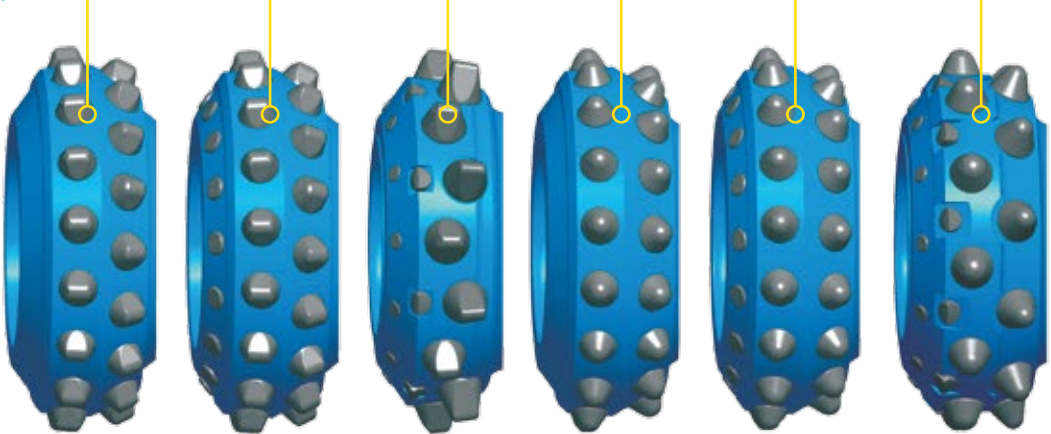
Steel milled tooth bits – gauge tooth shape

Rock formation types	Feature A	Feature AH	Feature AHV	Feature T	Feature TH	Feature TT	Feature TTH
very soft formation							
soft formation							
medium formation							
hard							
	all diameters	4" and more	5 - 7/8" and more	3 - 3/4" and more	4" and more	5 - 7/8" and more	5 - 7/8" and more



Tungsten carbide insert bits – gauge t.c.i. shape

Rock formation types	Feature G	Feature GH	Feature GHV	Feature GY	Feature GYH	Feature GYHV
very soft formation						
soft formation						
medium formation						
hard						
very hard						
	all diameters	4" and more	5 - 7/8" and more	all diameters	4" and more	5 - 7/8" and more





Narzędzia i Urządzenia Wiertnicze "GLINIK" Sp. z o.o. offers services in:

- turning of complex shapes (max. diameter 1150mm; max. length 2000mm), e.g. injection moulds and dies on NC lathes
- milling on numerically controlled machines in 3,4 and 5 axis (non-standard chain wheels, gear wheels) and 3,4 and 5 axis machining of complex shape objects
- grinding holes (max. diameter: 500mm max. length: 400mm) on universal grinders
- grinding shafts (max. diameter: 70mm max. length: 300mm) on centerless grinders
- drilling holes with NC drillers
- gas and electric hard facing with stellite alloys
- plasma hard facing of bearings
- regeneration of worn out shafts surfaces and guides by spraying them with hard and abrasion resistant powders
- stamping on crank press machines up to 160 Mg

NC machine tools. Machined elements permissible dimensions.

Machine Type	Machined elements permissible dimensions
NC lathes	
PORĘBA	external turning length in centres – 2100mm turning diameter in centres – 700mm turning diameter using jaw chuck up – 1100mm spindle swing ø 100mm
PORĘBA	external turning length in centres – 4000mm turning diameter in centres – 700mm turning diameter using jaw chuck up – 1100mm spindle swing ø 216mm
BNC	turning diameter – 400mm
USC	turning diameter – 550mm
FAT	turning length in centres – 1300mm turning diameter – 700mm spindle swing ø 108mm
SBL700	turning length in centres – 1800mm turning diameter in centres – 500mm turning diameter – 700mm spindle swing ø 108mm
SBL500	external turning length in centres – 700mm turning diameter in centres – 350mm turning diameter – 400mm spindle swing ø 69mm
FISZER	external turning length in centres – 900mm turning diameter – 400mm
MDW	external turning length in centres – 1000mm turning diameter – 600mm
NC planner mills	
KLOPP	milling length – 1000mm milling height – 400mm milling width – 400mm
MAZAK Variaxis 630-5X centrum obróbcze	component height – 500mm diameter of the machined component – 630mm max weight – 500 kg
MAZAK Variaxis 505-5X centrum obróbcze	diameter of the machined component – 510mm component height – 405mm max weight – 300 kg
NC drillers	
WEBO	length of the machined component – 600mm component width – 400mm
REWOMAT	length of the machined component – 700mm component width – 400mm
SABRE	component length – 400mm component width – 400mm

Cutting machine Jantar 2

- oxygen cutting up to 100mm
- plasma cutting up to 8mm

Plasma hardfacing machine: Eutronic GAP 150

Welding machines: ESAB, LORCH, etc.

MC 50 grinder– diameter: ø 4-35mm

SASL centreless grinder –
grinding diameter ø 5-100mm

Saw for cutting at an angle
of 45° - ø 400mm

Jotes surface grinder – 300 x 900mm

Hydraulic press – 100T

Aberlink Axion measuring machine

