

**Manufacture and repair of the Drilling Equipment and
the Tools for Horizontal Di-rectional Drilling (HDD)**



TEHNOPROK
Manufacture of drilling equipment





Vladimir Kalinin - Chief Executive Officer of Limited Liability Company

The «Tehnoprok» company was founded in 2004. Since that time the small production sector turned into the modern hi-tech enterprise for release and repair of drilling equipment and the tool for HDD, capable successfully to compete with the leading global manufacturers.

Kalinin Vladimir, before the foundation the company, was the manager of the laboratory of the boring tools and equipment in the Southern Russian State Technical university. Perfectly understanding branch problems, he often participated in scientific conferences and business trips all over the country. And in the concrete direction of development, namely, horizontal directional drilling, Vladimir Vadimovich together with colleagues on scientific work was engaged already at the request of the Rostov experts from the Don Aluminium and Soyuzdonstroy companies. And the things started to whirl around...

“Tehnoprok” also distinguishes presence of the highly skilled engineering and working personnel and solid production base - machines with numerical program control, press, the equipment for plasma protection of the tool against abrasive wear (on the Pancir technology), etc. Having technical capabilities for cutting of all types of a carving, specialists of the company can make the tool practically for any installations of HDD. At consumers such types of production as Cutting-Sealing Compact Reamers (diameter of 160-1800 mm), Kodiak, “Carrot”, “Rino” and “Barrel”, bladed and rocky reamers, the built-in and hinged swivels, pilot bars with lateral loading of a probe, the boring heads and shovels, installations on mixing of bentonite from 3 to 15 cubes, starting bars and of course boring bars enjoy the greatest popularity. Thus in the company safely undertake production of non-standard production.

In general, «Tehnoprok» casts itself as the design and production company.

Our industrial engineers are true professionals. They make a top-class work. All the projects are created solely in «Kompas» and «AutoCAD» programs, and the calculations are justified with the assistance of research staff from Department Resistance of Materials of the Southern Russia State Technical University. The working staff is well prepared. They are able to accurately implement all design ideas. Even a single millimeter cannot escape from their attention!



Cutting reamer



Carrot reamer



Mixer reamer



Mill reamer



Kodiak reamer



Rino's reamer



Rolling cutter



Kompakt reamer



Swivels



Boring shovels



PDC Bit



The body of the probe



Drill rods



Pump and Mixing Knot (PMK)



Starting bars, quick-detachable connections



Wrench for promotion of boring bars for HDD



Transition adapters (spindles) for boring bars



Drilling head



Defence «Pancir»



Saver sub

Cutting-sealing Reamer «Compact»



Cutting-sealing reamers for horizontal directional drilling type (Kompakt) intended for the expansion of a pilot hole drilled bore. This type of spreader is widely used in drilling operations, as appropriate for most rigs, in particular Ditch Witch, Vermeer, XCMG - XZ et al.

Specifications and features

Diameter of a reamer for HDD «Compact» can be from 200 mm to 1800 mm. Depending on model, also length varies. It is considered the most wide-spread a reamer about 586 mm long.

Thus length of a forward shaft makes 100 mm. Taking into account the sizes the mass of the equipment changes can some tens, or hundreds of kilograms.

For the manufacture of Compact reamer is used high quality raw materials, which not only provides a high resistance to breakages of tools, but also prevents abrasion.

Specifications	Dimension
Diameter \varnothing	from 200 to 1800 mm *
Application area	loams, sandy loams, sand, slates
Protection against abrasive wear	Pancir
Feature	Has additional hollows on soil carrying out, the swivel built-in or hinged

* possibility of production of a product in this range on request of the customer.



On the Mohs scale

№9

On a scale of HRS

90 units



Cutting-sealing Reamer «Kodiak»



The design of the cutting-sealing reamer is created so that to provide high efficiency of drilling operations at the minimum prices of the equipment. The main component of the equipment is the set of steel rings 40 mm wide. Special-ly designed evolvent form of dredging promotes pressing and sliding on well walls. For this purpose, slime at first passes on larger hollows. Further the form of a tail component provides consolidation and smoothing down

of walls of a trunk. Works as a soil presser. If necessary, it is completed with the built-in swivels from 20 to 250 tons.

«Kodiak» (KODIAK) works in difficult soil, such as a gravel, limestone, sandstone, soapstone, sandy loams, slates and provides reliable dragging of a pipe towards the drilling rig.

In efficiency of works the teeth located on a reamer have special value. But even at loss of all cutters, the equipment allows to receive a working well.

Hardness of an alloy of the strengthening Pancir elements

Tool is protected against abrasive wear by innovative technology «Pan-cir».

The non-standard product «KODIAK» includes (should be discussed separately): the return cone, flat calling from a reverse side of the body of a reamer, an additional number of cutters, the increased calibrating part of the body of a reamer, a seat for the damping valve.



On the Mohs scale

№9

On a scale of HRS

90 points



Milling reamer «Rocky»

The milling reamer with replaceable tangential (rotary) teeth is intended for drilling of breeds to 6 categories on a scale of prof. Protodyakonov with in-clusions of stronger breeds. It is especially effective when drilling non-uniform jointed fragile breeds, gravel and pebble breeds. There is



a possibility of delivery both an integral reamer «Mill», and a combined-folding reamer from sections which easily join with each other by means of conic carvings. The national team-folding the reamer is completed with a special key for connection of sections, the attached elements of the re-turn cone and replaceable rotary cutters.





Rolling Cutter Reamer rocky Assembly-folding "Transformer"

The Rolling Cutter reamer with removable disks is intended for drilling of rocky breeds with a strength up to 12 units across Protodyakonov..

Are included in the package of a reamer:

- shaft (axis);
- Rolling Cutter disks with a diameter of 300, 400, 500 mm. etc.;
- two plugs nuts with the left carving;
- two strut plugs, special key.





Advantage of this design:

- 1 reamer instead of the whole set of reamers gives the chance to save decent quantity of money, thereby to increase profitability of a well;
- Maintainability. It is enough to replace the worn-out « Rolling Cutter roller» or «a Rolling Cutter disk»;

Possibility of production of a reamer from 0 300 to 0 1000 mm. on one shaft.



I stage of drilling: on a shaft set a Rolling Cutter disk of Ø 300 mm.



II stage of drilling: on a shaft set a Rolling Cutter disk of Ø 300 mm. and Ø 400 mm.



III stage of drilling: on a shaft set a Rolling Cutter disk of Ø 400 mm. and Ø 500 mm



IV stage of drilling: on a shaft set a Rolling Cutter disk of Ø 500 mm. and Ø 600 mm.

Cutting-sealing reamers from bent sheet steel

«Carrot»

This type of reamer used in clay soils, loam, debris, gravel, bulk land, quicksand, swampy ground. «Carrot» reamer has light weight and it is suitable for all types of horizontally directed drilling rigs. It is designed in two modifications: filled and not filled with bentonite. The wall thickness is 12 mm.



Cutting-sealing reamers from bent sheet steel

«Burrell-Calibrator»

This type of reamer is designed to increase density of the wellbore walls .

Soils: marshy, light sandy clay, peat, light loam, loose sand. It is designed in two modifications: filled and not filled with bentonite. «Burrell» reamer has light weight. The wall thickness is 12 mm.





Cutting-sealing reamers «Rino-Burrell»

This type of reamer is designed to increase density of the wellbore walls.

Soils: marshy, light sandy clay, peat, light loam, loose sand. It is de-signed in two modifications: filled and not filled with bentonite. «Burrell» reamer has light weight. The wall thickness is 12 mm.

NEUTRAL BUOYANCY = $F_b = V_s \times D \times g$

where, F_b - buoyancy force;

V_s - the volume of the part of a body shipped in liquid, m^3

D - density of liquid. in which immerse a body, kg/m^3

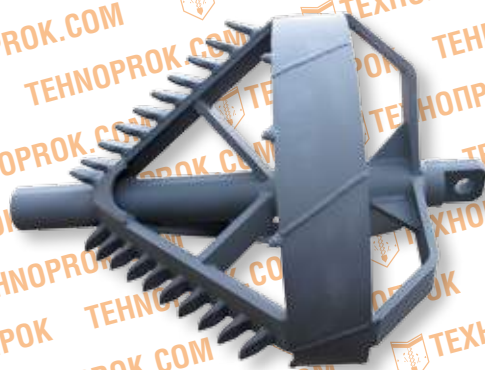
g - gravity, N/kg



The Cutting Reamers

The main application of this type of reamer - expansion of boreholes in loose and unstable soil. The design of the equipment is created so that to re-duce resistance to turn. The open structure allows for processing soil to over-come freely all obstacles. Depending on a design, the main components is the aligning ring, three and more blades which quantity depends on diameter of reamer. Reliable teeth "spark fins" are executed from a qualitative alloy. And replaceable nozzles of injectors allow to wash away effectively soil and to re-duce load of the equipment.

Protection against abrasion provides a plasma hardfacing BK8 technolo-gy, hardness which is 80 HRA.





Cutting reamer «Mixer»

The reamer «Mixer» is effectively used for loose (sand) types of soil. The design of this reamer allows to wash away most effectively developed soil from a well. Works with dense bentonite.



The cutting reamer with the centering segments

The cutting reamers with the centering segments on peripheral part provide the stable movement, without creating additional loadings.



The standard boring pilot with lateral loading of a probe transmitter



Diameter \varnothing , mm	70	76	82	92	106	116
House- probe L, mm	380	380	380	480	480	480

The universal boring pilot with lateral loading of a probe-transmitter



Primedrilling 100 тонн.



It is used as with a nozzle with a bevel under a boring shovel (for light soil) and with rocky nozzles (for difficult soil).

Nozzles join the probe case by means of a conic carving.

Diameter \varnothing , mm	70	76	82	92	106	116
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Rocky nozzle

Комплектуется сменными скальными тангенциальными (поворотными) резцами.

Diameter \varnothing , mm	110	130	150	180	230
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Rocky nozzle ТК АП

The Boring Nozzle (BN) with diamond and hard-alloy elements is intended for the drilling of wells with a diameter of 110 - 160 mm operated in the direction in rocky breeds with fortress coefficient to 14 on Protodyakonov's scale.

Diameter \varnothing , mm	120	150
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BN consists of the case with connecting carving part for a pilot or boring bar protected from wear by hard-alloy elements, and the hard-alloy and cutting diamond and hard-alloy elements attached by means of welding damping. In the case there are flushing channels for working liquid.

Work

Drilling is carried out by means of rotation of BN clockwise and smooth giving in the axial direction (is more detailed on the scheme). Boring slime from cutting by rock cutting elements, and also from the core destroyed by a special design of the case is removed from a well by the flushing liquid passing across canals of the case.

1. The Drilling Process
2. Management in rocky breeds
 - 2.1. Pressing, turn on sector
 - 2.2. Branch on 1-3 cm; the return turn on sector
 - 2.3. Repetition of points 2.1. and 2.2. 4-10 times depending on properties of breed.
 - Drilling (point 1) on ~ 0,5 bars
 - Check of a deviation on a location
3. Repetition of management (point 2) or continuation of drilling (point 1)
4. Control in soil is exercised similar to management of a boring shovel.

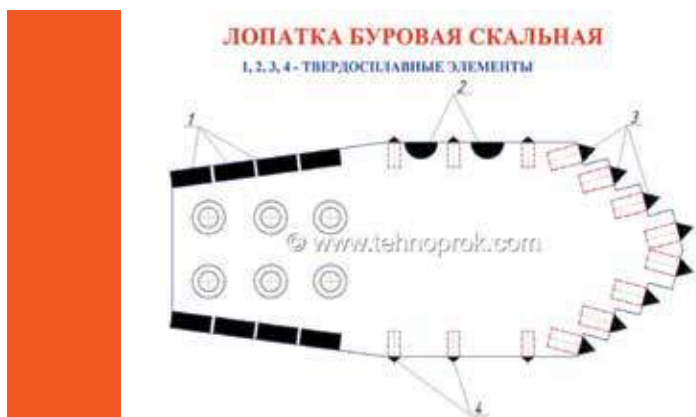




Boring shovels



Rock Series



Sketch of Boring shovels the Rock Series



Rock Series



Marl Series



Sand Series

Width 90 mm	Width 110 mm	Width 130 mm	Width 150 mm

We make boring shovels for: Vermeer, Ditch Witch, UNIVER-SAL, Hanlyma, ZT, GOODENG, JOVE, XZ, FDP, DDW, FORWARD, ROBBINS, GRUNDODRILL, HANJIN.



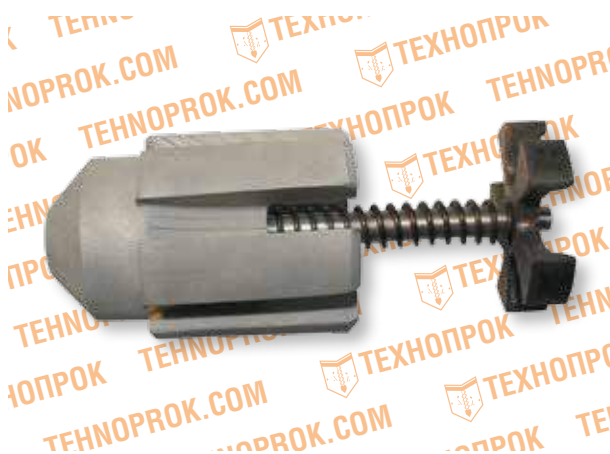
Starting bars

We produce starting bars, couplings for all installations of HDD. At production of this type of the tool the certified metal conforming to the HDD standards that provides reliability and long term of operation of products is used. The tool after production is exposed to heat treatment to 45 points on HRC scale by current of high frequency.



Damper valve (valve of return pressure)

The damper valve is intended for prevention of change of the direction of a flow of a washer fluid (bentonite) in the reamer body that excludes suction of slime to flushing canals of the body of a reamer via monitors. It is mounted on the shaft of reamer.



Subsaver, transitions, spindles, earrings, anchor

We manufacture this production with a various connecting carving for the installations Vermeer, Ditch Witch, XZ, DDW, FORWARD, UNIVERSAL, ZT, Hanlyma, GOODENG, JOVE JVD, FDP, TRACTOTEHNIK (GRUNDO-DRILL), HANJIN, etc. All products after manufacturing are exposed to heat treatment 40 points HRC.



subsaver Vermeer 36x50 FS2



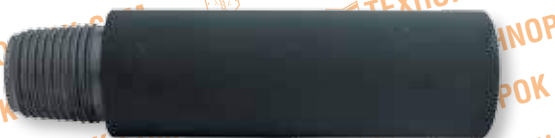
box NC23 - pin NC26



subsaver vermeer 80x100 FS1



box NC26 - pin NC23



subsaver Vermeer 100x120 3,5 FS1



Verm 36x50 под стартовую Verm 16x20-36x50



grundodrill 7x plus



388 - Vermeer 24x40



Ditch Witch



pin DW 2720 _ pin 2,375 fs1



Vermeer D 24x40



Vermeer D 100x120 fs2



Drill rods

We have our own production of boring bars. Bend = 9%, group of S-135 steel. Bars are made by a special method of connection of locks to a bar body with application of arc welding.



Ø (inch)	Rod Ø (mm) Boring lock Ø (mm)	Length (m)
1.66	42 48	2.00
1.90	48 54	3.05
2.06	52 57.5	3.05
2.06	52 63.5	3.05
2.06	60 67	3.05
2.375	60 70	3.05
2.375	60 70	4.57
2.875	73 82	4.57



Pumping and Mixing Knot (PMK)

The mixing unit is made with a capacity from 2m³ до 15m³ with ICE from 13 p/a to 50 p/a.

The mixing unit consists of:

- steel welded capacity volume;
- hatch;
- the removable filter of the arriving water,
- installed in the hatch;
- the accepting branch pipe with the fire connector of at. 80 mm, es-tablished on the hatch;
- the bunker for bentonite falling asleep;
- the transparent pipeline – a fluid level indicator;
- steel pipelines;
- spherical cranes;
- latches at. 65 mm;
- latches at. 80 mm;
- drain crane 3/4»;
- ladders;
- fuel tank of 25 l;
- mounting frame;
- output branch pipe with the fire connector of at. 80 mm;
- removable centrifugal pump.

The centrifugal pump consists of centrifugal pump CM80-50-200a-2; ICE; the mechanism of the belt tension consisting from: tension roller; the lever of a roller, a bolt axis with a nut.

Special distinctive features of the mixing units made by JSC TEKHNOПРОК are:

- The CM pump installed on them intended especially for viscous liquids
- Rotation from the engine on the pump is carried out through a belt drive which lowers pump turns that is important for transportation of viscous liquids, and also compensates vibration of the engine.
- On a jellied branch pipe of PMK the removable filter of water with a cell 3mm is installed
- Heating of a bottom of capacity of the mixing unit exhaust gases of the engine.





Swivels



От: 01.09.2016г.

Отзыв

11.05.2016 г. нами у предприятия ТЕХНОПРОК был приобретен наливной вертлюг ГНБ с тяговым усилием 200 тонн, согласно нашего технического задания.

Вертлюг использовался на установке ГНБ HANJIN D&B 250 HDO в городе Алматы Республика Казахстан. Целью первого этапа работ было строительство стального магистрального газопровода «Алматы - Талдыкорган» Ø 530 мм, протяженностью 455 метров.

Работа производилась в грунтах насыщенных фракциями песка и суглинков, на глубине 20 м. Нареканий к работе вертлюга не имеем. Изделие было выполнено качественно и поставлено в установленный срок. Техническими характеристиками и качеством изделия остались довольны.

ООО «Подзембурстрой» планирует и дальше сотрудничать с предприятием ТЕХНОПРОК.

С уважением
Ген. Директор ООО «Подзембурстрой»



Г.А. Селезнев

We make swivels as built in a reamer and cap with any connecting openings from 5 to 250 tons.

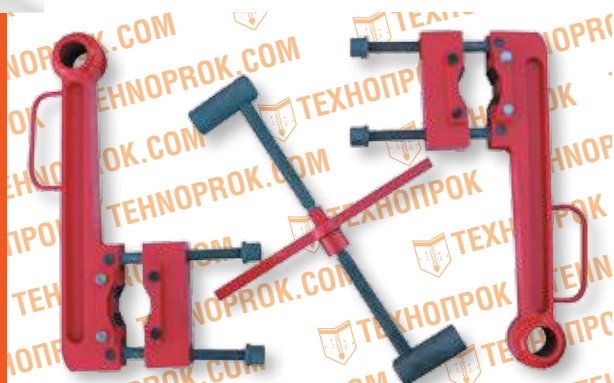




The mechanical wrench Terminator

Have a wrench for untwisting of bars is an obligation of each crew of HDD. Our marketing service has carried out the analysis of the market of the wrenches not only provided on sale by business concerns but also have re-ceived the return comments from our clients, directly operators HDD. The key provided by us meets all requirements of clients possessing such Specification as:

1. the small weight of-16 kg, allows to use mobile a wrench without attraction of specifics;
2. Difference of this wrench from other analogs is that «fingers» of a wrench are made of stainless steel that interferes with emergence of corrosion on mobile parts.
3. work as a wrench is carried out by one person, ease and compre-hension of an operation principle of a wrench, unlike the wrenches having a chain clip;
4. untwisting of bars diameter in the theory to 146 mm, in practice to 102 mm;
5. replaceable, high-quality account elements (sponges of a wrench are made of the low-alloyed steel with a hardness of 55-60 HRC);
6. reliable, adjustable capture of a pipe, this wrench you can turn off with guarantee any pipe in the range from 60 to 102 mm;
7. the plant can separately put maintainability of all design, each part of a wrench;
8. it is made of an integral leaf, by milling of a contour of a wrench, unlike cast import keys, after all in them the micro pores leading further to formation of the centers of tension are anyway formed;
9. the strengthened plugs of the screw lever, prevent formation of cracks at heavy loads and natural breakdowns of a wrench;
10. the mechanical drive of untwisting, creates sufficient effort for fail-ure of strongly tightened threaded connections.





The pipe captures

We produce both the single, and combined pipe captures (head holder).

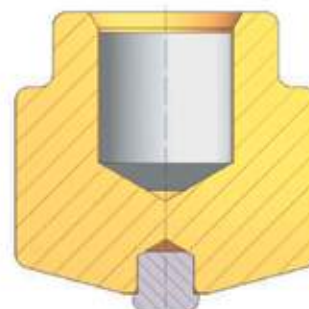
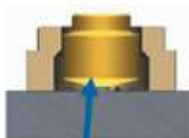




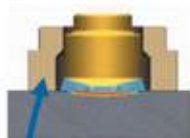
TV-jack



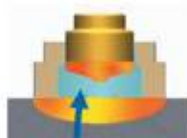
Bush

Contact
element
(aluminum)**Welding process:**

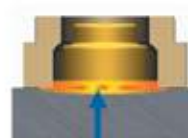
Pancir element



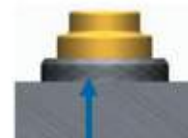
Ceramic ring



Electric arc



Fusion



Welded seam

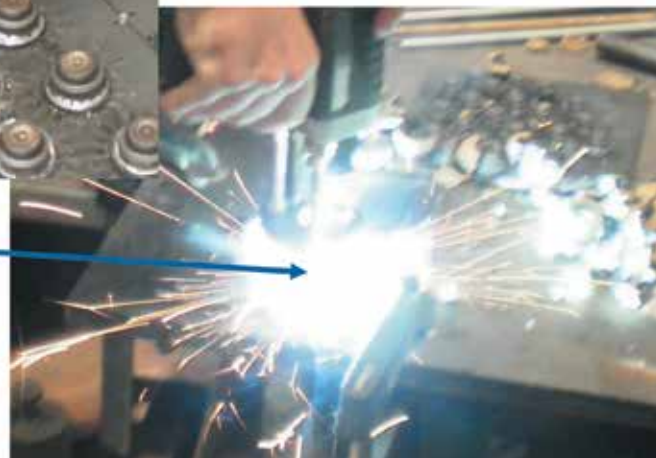


Welding gun

Ceramic ring

Electric arc

Welded seam

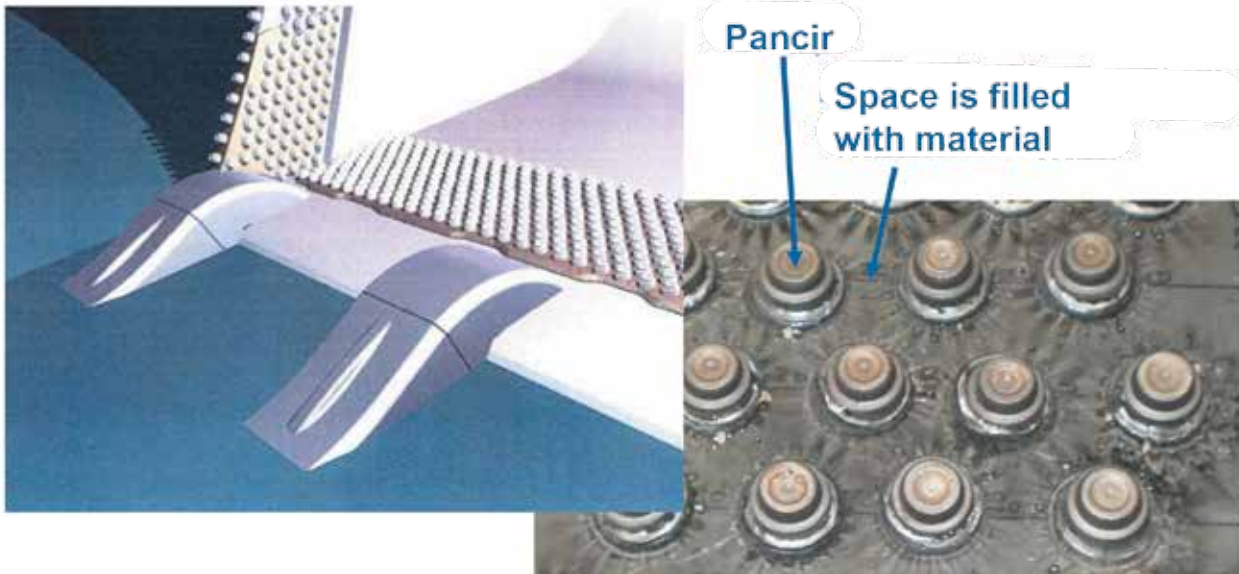




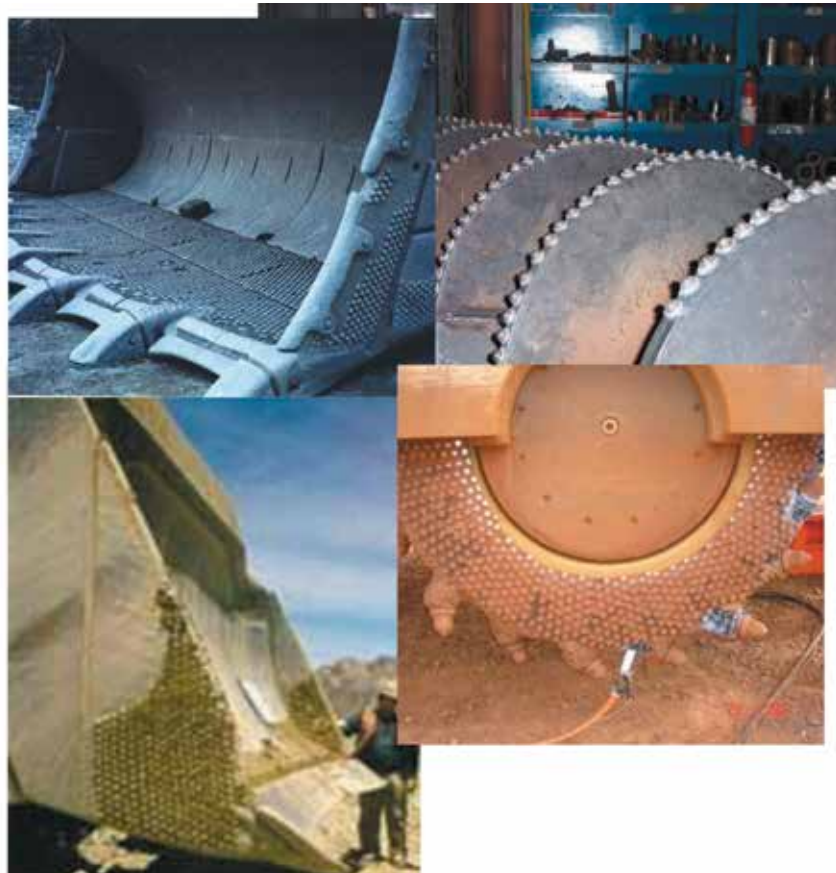
- Welding on a surface
- The space between the Armour elements is filled with material (Rock Box-Effect)



Protection against wear on a plane surface



- Ladles
- Shovels
- HDD reamers
- Boring screws
- Boring screw;
- Cutting loading machines
- Cutting harvester
- Blade shields
- Cutter drums



Think, what do you try to save on?



It is well known fact, that in Russia there are a lot of manufacturers of drilling tools for HDD installations, most of them are in the small production sector. Their staff knows how it should look, but they are not familiar with the technology, and they have only simple equipment, such as turn benches, milling machines and welding machines.

BUT!!! These people do not have basic... They have no experience of use of their products, there is no feedback from the HDD installation operator, from the workers. They have not enough science and technology in their projects. At the «TEHNOPROK» plant there is frequent updating of the tools. For example, only our company produces all the range of the back taper reamers ("Carrot" reamers are made from bent sheet steel, "Kodiak" and "Compact" are sleeved reamers, Damper valve, six-involute constriction and other advanced technologies. Our production is flexible enough for customers. There is an individual approach to each technical task. Our experienced experts will help you to choose the right tool which other manufacturers cannot offer. We use high-quality components and raw materials in our manufacture that ensures reliable operation over a long period compared with the original American / European instrument.

Nothing to say about of manufacturers from China. Look through the photo on the right. We do not think, that you will be surprised. Our clients brought this reamer for repair from installation, produced in China. After the 150 meters drilling the soil 300 mm in diameter, welding seams were scraped, there were cracks in the area of welding, cutting teeth were scraped and fallen off. Blowouts from fluid pressure of these reamers are not uncommon.

On the following photos are presented



cutting teeth of different manufacturers. There are low-grade items of the Chinese manufacturer that are used for standard reamer, in comparison with good rock cutting tools.

Chinese manufacturers often use tricks to lower the cost of the product, having the same physical form. In that case, you will have a low-price fake, which you try to drill with. If you are lucky enough, you will make sure that the quality is low. Much worse variant is the brake of the drill rod, disruption of dead-lines, unproductive time of the team. And if you work at the federal highway or at the rail track, an unproductive day costs twice as much as the reamer, or even more... You understand this better, than we do. It is important to be sure, that the work will be done in time, and you can get it only with the high quality equipment.

We choose the best protection against abrasive wear for you, and it is tested by our customers. Our cooperation with Russian manufacturer KZTS, our technology «BK8» (plasma facing of the hard alloy granulate) and scientifically-based technologies provide the balance of all the parts of our tools, whether it is connecting thread (hardness factors, strength factors of the material) or wear index, cutting power and ability of the tool to penetrate.

The following picture shows the elements of hard alloy tools for which we use PANCIR protection.

The accurate technical approach has allowed us to update our product and increase the usage of our tools in Russia and the CIS.

Even those, who were old skeptical and sure that there could not be created a manufacture and a product in Russia better, than their analogues in Europe/USA after full change for TEHNOPROK products, have changed their opinion. Since what time there could not be a good product in Russia??? Have we forgotten about it when lots of people were chasing the easy pickings and cheap product in China? We are always there for you and you just need to order our tools to join the technical progress in Russia.

What differs an ordinary reamer and drilling assembly made by Tehnoprok plant?

could not be a good product in Russia??? Have we





forgotten about it when lots of people were chasing the easy pickings and cheap product in Chi-na? We are always there for you and you just need to order our tools to join the technical progress in Russia.

What differs an ordinary reamer and drilling assembly made by Tehnoprok plant?

Tradition to manufacture only quality products requires, in this case, in-novations:

Tehnoprok equipment can drill the well, where it did not work with the other manufacturer's tools! Step by step, land mark by land mark... Thus the first drill body was created, the first abrasive protection technology developed, the first float coupling system and much more tools were designed... We are happy to remember the past, but most of all we love to go forward!

Tehnoprok plant tools are our way of accident free drilling! We develop and apply technologies that actively support and unload a drill team.

Today, the tool has many valuable advantages. These systems allow to be sure in each new kilometer!

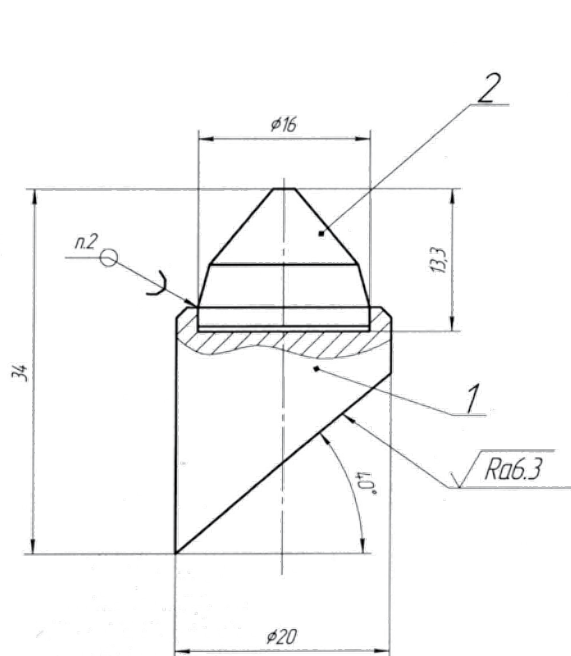
KZTZ's hard-alloy technology is the way how we see the high protection of the reamer body and maximum resistance against abrasion. Built-in and mounted swivels are our way of secure connection, a smooth rotation and burst margin. We made the coupling bearing assembly work untiringly!

All systems are integrated for the better cooperation. That allows to identify potentially danger and pre-emergency situations in time, and prevent them.

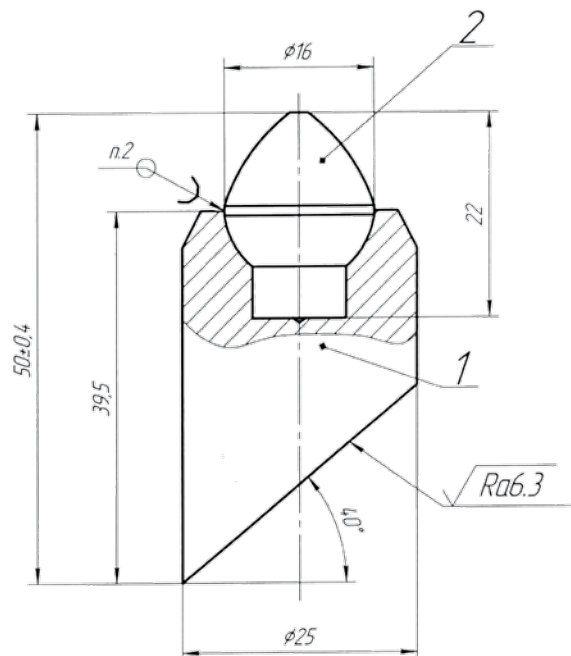
We are aimed to make the work of people easier and drilling teams more advanced and effective. Today we are still looking to the future, and constantly improving our products. And what could be better than to enter the future with a quality tool!?



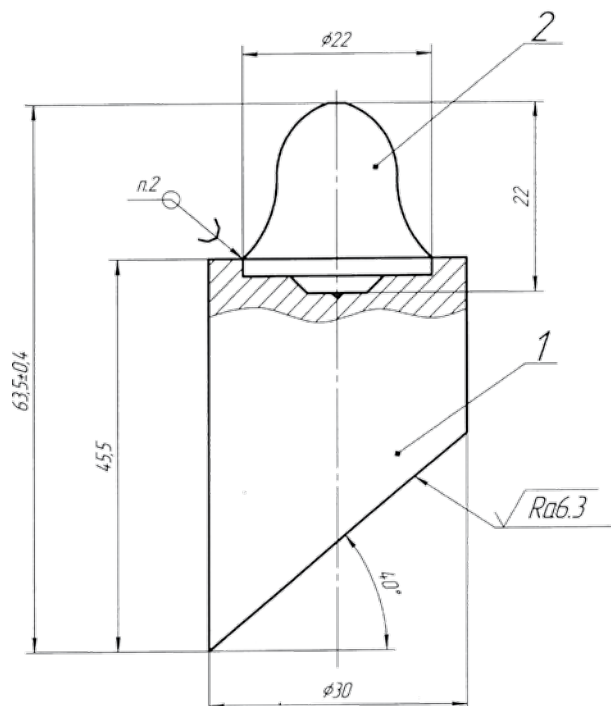
Cutters HDD. HRC 87



P3 - 20



P3 - 30



P3 - 50















tehnoprok

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