

CASING SECTION MILLING TOOLS

Expandable mill FKR is designed for continuous casing section milling throughout the diameter in any interval of wellbore. Expansion of blades, reinforced with high quality composite material, into operating position is provided by the effect of differential pressure in mill body. FKR delivery set includes back valve, which prevents tool from sludging

Wear pads preventing loss of diameter during round-trip operations.



FEATURES

- Hydraulic activation.
- Changeable blades.
- Capability of using both for cutting-off and for full milling of casing.
- Changeable sleeves for different flow rates.



STRING CUTTING TOOLS

Internal hydromechanical pipe cutters “**TGMV**” are designed for cutting part of casing or tubing string in well for further retrieving to surface during repair-and renewal operations.

Expansion of blades, reinforced with high quality composite material, into operating position is provided by the effect of differential pressure in pipe cutter body.



Delivery set includes interchangeable blades easily replaceable in rig conditions.

MILLS

Special junk mill **FZ2 SP** is the most effective and multi-purpose tool for drilling out cement and sand plugs, casing equipment, milling metal objects on the bottomhole Effective cutting at high ROP is achieved due to tungsten carbide plates and self-sharpening effect.

Combined cutting structure considerably increases mill operating characteristics and expands area of application: besides milling light alloy pipes, tubings, drilling out cement plugs at favorable conditions **FZ2 SP** successfully recommended itself in milling casing equipment and drill pipes.



BOTTOM-HOLE JUNK MILLS

Junk mill **FZ2** is effective tool for milling metal objects on the bottomhole. Cutting surface is reinforced with composite material made up of granulated hard alloy and binder material that allows mill to easily operate in difficult milling conditions where high durability of tool is required.



Concave junk mill **FZV2** is modification of **FZ2** with concave working surface that allows centralizing unfixed milling objects relative to mill.

At customer request **FZ2** and **FZV2** mills can be produced with increased cover of granulated hard alloy that is designated by “**Y**” letter in the end of tool series name.

Spiral junk mill **FZS2** is designed for drilling out cement and sand plugs, casing equipment, milling metal objects on the bottomhole.

Special feature of this tool is cutting face and spiral gauging blades reinforced with granulated hard alloy.



Pilot mill **FP2** is designed for milling components of tubings, liners, packers, joints and sleeves during repair-and-renewal operations.

Capable of operating in heavy milling conditions where high durability of tool is required. Main design feature is cutting surface reinforced with composite material made up of granulated hard alloy and binding material.



Bit-mill **DTF** is designed for drilling out cement and sand plugs, casing equipment in favorable conditions with small impact loads.

Junk mills **FZZZ** are effective tool for milling cement plugs, sand plugs, casing mountings, metal objects on the bottomhole as well as milling in horizontal well with liner assemblies for multistage hydraulic fracturing.



Washover mill **FK2 SP** is reinforced with granulated hard alloy and tungsten carbide teeth. Designed for milling stuck drill pipes, tubings and sucker rods. All washover mills are produced with welding bevel.

Washover mill **FK2** has massive cutting edge reinforced with granulated hard alloy and designed for milling big metal objects in heavy conditions.



Magnetic mill **FM** is multi-purpose tool designed for retrieving metal objects with ferromagnetic properties from well. Cutting mill crown allows milling metal object before retrieving.

TAPER STRING MILLS

Taper string mills are designed for reaming elliptical pipes (restoring internal diameter), milling out a collapsed section of pipes, removing an internal surface roughness and cleaning a casing window.

Main feature of this tool is a tapered working surface reinforced with crushed carbide. Mill RK2 has apical angle 10°, string mill **FKK2** has angle 20°, window mill **FRK2** has angle 60°.

At customer option all mills of **FKK2** and **RK2** types can be produced with central flushing hole, thus marking will include index "C".



RK2

FKK2

FRK2



Reamer bits **KRp-2ST** is designed for calibrating and reaming well sections represented by medium, hard and abrasive formations. Reamer bits allow reaming horizontal and high dogleg severity wells preventing accidental sidetracking and sizing wellbore to nominal diameter both moving down and up.

Reamer bits are produced with two tapered surfaces. Tapered surfaces, reinforced with tungsten carbide inserts with cutting edge, comprise reaming part of a tool.