



CUTTING FLUIDS



GAZPROMNEFT
LUBRICANTS

gazpromneft-sm.ru

CONTENT

CUTTING FLUIDS	4
GAZPROMNEFT CUTFLUID	
WATER-MISCIBLE CUTTING FLUIDS	7
GAZPROMNEFT CUTOIL	
OIL-BASED CUTTING FLUIDS	17
GAZPROMNEFT FORMSYNTH	
FAST EVAPORATING CUTTING FLUIDS	25
APPENDIX	28

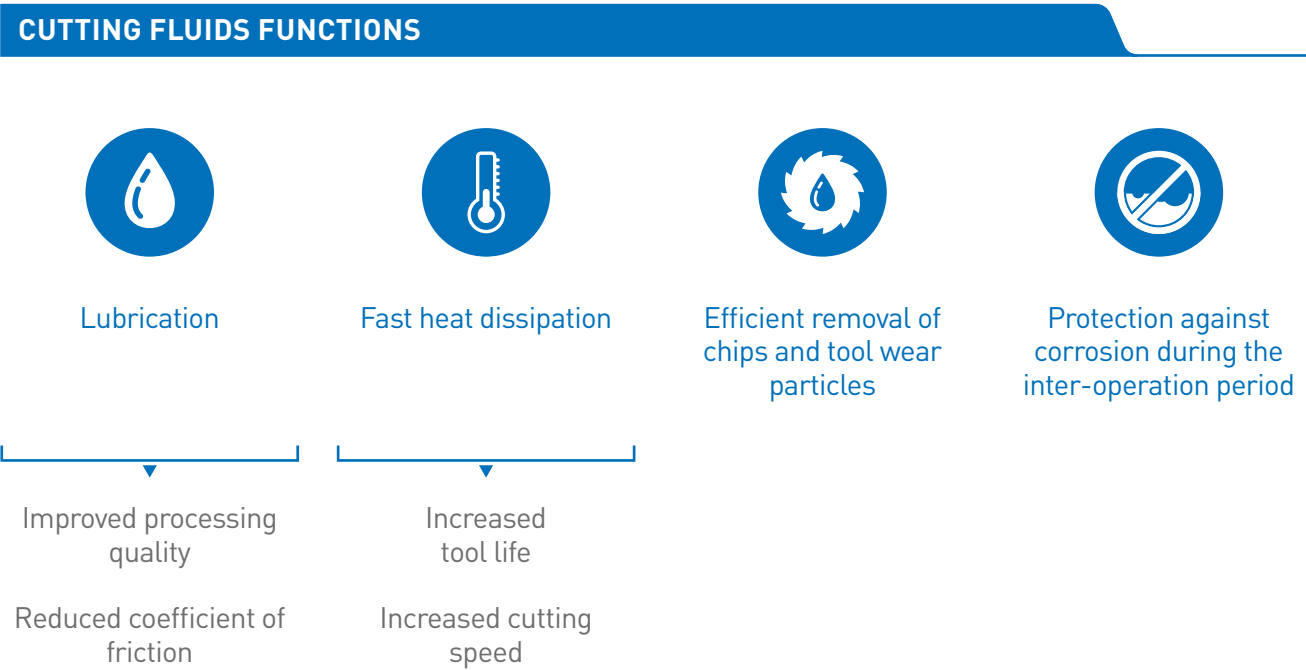
CUTTING FLUIDS

There is a huge variety of methods for machining metals. In most cases, metalworking cannot take place without the use of cutting fluids.

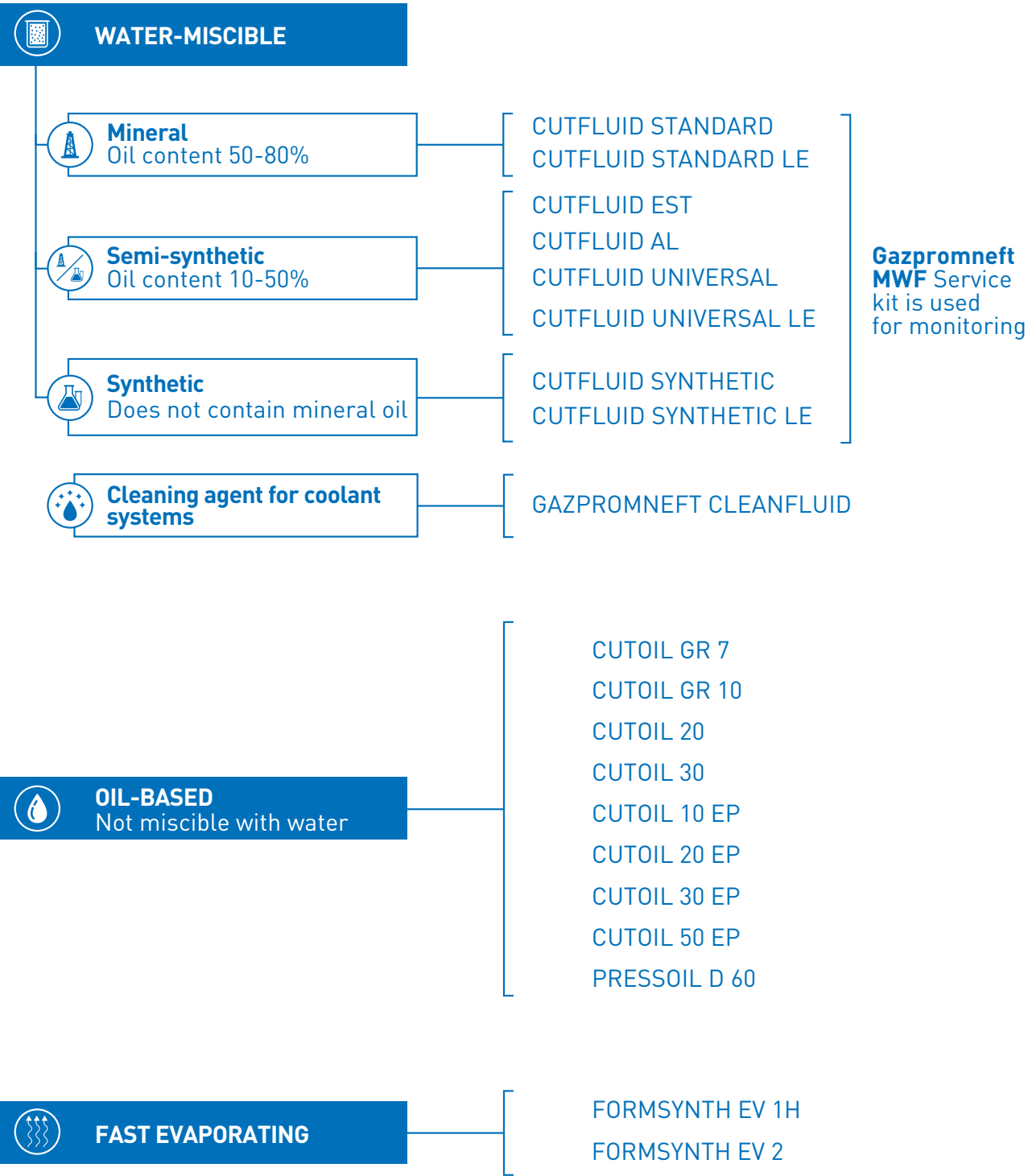
One or another type of cutting fluid is used depending on the processing operation, processed metals and alloys and hardness of water used for preparation of water-miscible fluid. Often the choice of cutting fluid requires an individual approach, taking into account all the peculiarities and requirements of the technological process of a particular production.



Cutting fluids are designed to improve the efficiency of metalworking by performing the following functions.



GAZPROMNEFT CUTTING FLUIDS

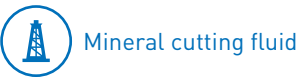




**GAZPROMNEFT
CUTFLUID**

**WATER-MISCIBLE
CUTTING FLUIDS**

GAZPROMNEFT CUTFLUID STANDARD



Gazpromneft Cutfluid Standard — a high quality water-miscible fluid with a high content of mineral oil and a highly effective additive package that provides multifunctionality and emulsion stability.

Processed materials:

- all types of steel;
- cast iron;
- non-ferrous metals;
- aluminum.

The recommended concentration:

- drilling, turning, milling - 5-7%;
- screw cutting, reaming - 6-8%.

ADVANTAGES AND BENEFITS OF USE



Excellent lubricating properties



High anti-corrosion protection



Easily mixed with water



Cost-effective use



Low foaming



Long emulsion service life



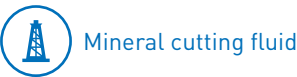
Good emulsion stability



Use with water of a wide range of hardness

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutfluid Standard
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	31,2
Density at 20 °C, kg/m³	GOST 3900	889
Hydrogen index, 5% of emulsion, pH	GOST 6243 P.4	9,0
Refraction factor	Manufacturer's information	1,0

GAZPROMNEFT CUTFLUID STANDARD LE



Gazpromneft Cutfluid Standard LE — water-miscible cutting fluid with a high content of mineral oil. Gazpromneft Cutfluid Standard LE coolant is developed on the basis of domestic components, including those of its own design, which ensure multifunctionality, stability and long service life of the working emulsion.

Processed materials:

- all types of steel;
- cast iron;
- non-ferrous metals;
- aluminum.

The recommended concentration:

- drilling, turning, milling - 5-7%;
- screw cutting, reaming - 6-8%.

ADVANTAGES AND BENEFITS OF USE



High level of import substitution industrialization



Excellent lubricating properties



High anti-corrosion protection



Easily mixed with water



Cost-effective use



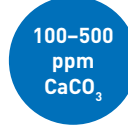
Low foaming



Long emulsion service life



Good emulsion stability



Use with water of a wide range of hardness

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutfluid Standard LE
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	63,9
Density at 20 °C, kg/m³	GOST 3900	920
Hydrogen index, 5% of emulsion, pH	GOST 6243 P.4	9,6
Refraction factor	Manufacturer's information	1,0

GAZPROMNEFT CUTFLUID EST

 Semi-synthetic cutting fluid



Gazpromneft Cutfluid EST — biostable semi-synthetic water-miscible cutting fluid based on mineral oil and esters. It is used for medium and heavy operations: turning, rifling, drilling, milling, deep drilling with gun drills, gear cutting, tapping, broaching, reaming and countersinking.

- Processed materials:
- all types of steels;
 - non-ferrous metals;
 - aluminum;
 - titanium;
 - nickel;
 - aircraft alloys.
- The recommended concentration:
- grinding - 3-5%;
 - drilling, turning, milling - 5-7%;
 - screw cutting, reaming, broaching - 6-8%.

ADVANTAGES AND BENEFITS OF USE



For the harshest processing conditions



High anti-corrosion protection



Versatile for most types of metals



Cost-effective use



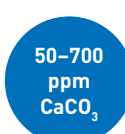
Low foaming



High stability



Separation of oils entering the cutting fluid



50-700 ppm CaCO₃ Use with water of a wide range of hardness



Excellent cooling properties

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutfluid EST
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	62,4
Density at 20 °C, kg/m³	GOST 3900	964
Hydrogen index, 5% of emulsion, pH	GOST 6243 P.4	9,0
Refraction factor	Manufacturer's information	1,1

GAZPROMNEFT CUTFLUID AL

 Semi-synthetic cutting fluid



Gazpromneft Cutfluid AL — semi-synthetic water-miscible cutting fluid for a wide range of applications with mineral oil content. The concentrate provides multifunctionality and emulsion stability even under extreme metalworking conditions. Especially recommended for aluminum, aluminum alloys, aircraft alloys.

- Processed materials:
- aircraft alloys;
 - aluminum;
 - steels and alloys;
 - non-ferrous metals.
- The recommended concentration:
- grinding - 3-5%;
 - drilling, turning, milling - 5-7%;
 - screw cutting, reaming, broaching - 6-8%.

ADVANTAGES AND BENEFITS OF USE



Use for aerospace materials



Efficient washing out of metal chips



Effective anti-corrosion protection



Long emulsion service life



Cost-effective use



Low foaming



Excellent stability of the finely dispersed emulsion structure



Excellent cooling properties



Easily mixed with water

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutfluid AL
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	60,6
Density at 20 °C, kg/m³	GOST 3900	966
Hydrogen index, 5% of emulsion, pH	GOST 6243 P.4	9,2
Refraction factor	Manufacturer's information	1,2

GAZPROMNEFT CUTFLUID UNIVERSAL

 Semi-synthetic cutting fluid



Gazpromneft Cutfluid Universal — a semi-synthetic water-miscible cutting fluid for a wide range of applications with mineral oil content. The concentrate provides multifunctionality and emulsion stability even under extreme metalworking conditions. The product is designed for most metalworking operations: grinding, turning, cutting, drilling and milling.

Processed materials:

- cast iron;
- steels and alloys;
- non-ferrous metals;
- aluminum;
- aircraft alloys;
- titanium.

The recommended concentration:

- grinding - 3-5%;
- drilling, turning, milling - 5-7%;
- screw cutting, reaming - 6-8%.

ADVANTAGES AND BENEFITS OF USE

 Efficient washing out of metal chips

 Effective anti-corrosion protection

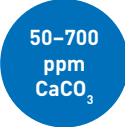
 Excellent cooling properties

 Cost-effective use

 Long emulsion service life

 Low foaming

 Easily mixed with water

 50-700 ppm CaCO₃ Use with water of a wide range of hardness

 Excellent stability of the finely dispersed emulsion structure

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutfluid Universal
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	41,5
Density at 20 °C, kg/m³	GOST 3900	1 081
Hydrogen index, 5% of emulsion, pH	GOST 6243 p.4	9,4
Refraction factor	Manufacturer's information	1,2

GAZPROMNEFT CUTFLUID UNIVERSAL LE

 Semi-synthetic cutting fluid



Gazpromneft Cutfluid Universal LE — a modern universal semi-synthetic water-miscible cutting fluid. Gazpromneft Cutfluid Universal LE was developed in accordance with the requirements of the Russian metalworking market on the basis of carefully selected domestic components, including internal production of Gazpromneft-Lubricants, using a balanced complex of emulsifiers and corrosion inhibitors of own development, effective detergents and biocidal additives.

Processed materials:

- cast iron;
- steels and alloys;
- non-ferrous metals;
- aircraft alloys;
- titanium.

The recommended concentration:

- grinding - 3-5%;
- drilling, turning, milling - 5-7%;
- screw cutting, reaming - 6-8%.

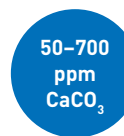
ADVANTAGES AND BENEFITS OF USE

 High level of import substitution industrialization

 High emulsification rate

 Biological stability

 Does not contain chlorine, phenol, secondary amines

 50-700 ppm CaCO₃ Stable in water of a wide range of hardnesses

 Low foaming when operating on water of different quality

 Excellent cleaning properties for removal of chips, sludge from the processing zone

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutfluid Universal LE
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	77,0
Density at 20 °C, kg/m³	GOST 3900	974
Hydrogen index, 5% of emulsion, pH	GOST 6243 p.4	9,8
Refraction factor	Manufacturer's information	1,0

GAZPROMNEFT CUTFLUID SYNTHETIC



Gazpromneft Cutfluid Synthetic — a synthetic water-miscible fluid based on a modern imported additive package that forms a transparent emulsion. The product provides excellent anti-corrosion protection and heat dissipation from the contact zone between tool and workpiece.
Application: grinding, honing, turning.

- Processed materials:
- ferrous metals (including steel, cast iron);
 - non-ferrous metals.
- The recommended concentration:
- grinding - 3-5%.

ADVANTAGES AND BENEFITS OF USE

Easy removal of small metal chips

High anti-corrosion protection

Excellent cooling properties

Cost-effective use

Low foaming

Does not harm the operator's health if the operating requirements are met

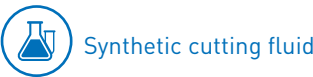
Separation of oils entering the cutting fluid

Guaranteed emulsion stability

Use with water of any type of hardness

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutfluid Synthetic
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	6,4
Density at 20 °C, kg/m³	GOST 3900	1 081
Hydrogen index, 5% of emulsion, pH	GOST 6243 p.4	9,4
Refraction factor	Manufacturer's information	2,3

GAZPROMNEFT CUTFLUID SYNTHETIC LE



Gazpromneft Cutfluid Synthetic LE — a modern universal synthetic water-miscible cutting fluid. Gazpromneft Cutfluid Synthetic LE has been developed in accordance with the requirements of the Russian metalworking market based on carefully selected domestic components, including those produced in-house by Gazpromneft-Lubricants.

- Processed materials:
- ferrous metals (including steel, cast iron);
 - non-ferrous metals.
- The recommended concentration:
- grinding - 3-5%.

ADVANTAGES AND BENEFITS OF USE

High level of import substitution industrialization

Excellent cleaning properties for removing chips and sludge from the machining zone

Does not contain chlorine, phenol, secondary amines

Cost-effective use

Effectively separates the oil from the cutting fluid

Low foaming when operating on water of different quality

High anti-corrosion protection

Stable in water of a wide range of hardnesses

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutfluid Synthetic LE
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	6
Density at 20 °C, kg/m³	GOST 3900	1015
Hydrogen index, 5% of emulsion, pH	GOST 6243 p.4	9,5
Refraction factor	Manufacturer's information	1,7

GAZPROMNEFT CLEANFLUID

CLEANING AGENT



Gazpromneft Cleanfluid — a biocide-free, highly effective cleaner for cooling systems, production machines, circulation systems and other equipment. Gazpromneft Cleanfluid breaks down biofilms that can accumulate in machine tool systems and cleans the system.

Application:

- cleaning of the machine coolant system before changing the emulsion;
- stabilization of the emulsion used in order to prolong its service life.

The recommended concentration: 1–3%.

CUTTING FLUID REPLACEMENT

- After the equipment systems have been completely cleaned of cutting fluid, it is recommended to circulate the aqueous solution of the cleaner for at least two hours.
- If it is preferable to flush without stopping production, it is recommended to pour Gazpromneft Cleanfluid solution into the used cutting fluid and work with this emulsion for 3-5 days.
- After the cleaning procedure, drain the cleaner/cleaner/mixture with the coolant and flush the system with water before refilling with fresh cutting fluid.
- Carefully monitor filters, machine ducts and tank level due to the destruction of deposits and biofilms.

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS

Indicators	Gazpromneft Cleanfluid
Appearance	Clear liquid
Density at 20 °C, kg/m³, max	1 075
pH value of 1% in demineralized water	9,9

GAZPROMNEFT CUTOIL

OIL-BASED CUTTING FLUIDS



GAZPROMNEFT CUTOIL GR 7



Gazpromneft Cutoil GR 7 — low-viscosity oil-based cutting fluid on a synthetic base with the addition of a specially developed additive complex. It has high tribological characteristics, increased resistance to oxidation and long service life. Provides the highest quality of the processed surface.

Application

Honing, grinding with diamond and ceramic (boron nitride) wheels, superfinishing, blading. The product is recommended for machining various ferrous and non-ferrous alloys.

ADVANTAGES AND BENEFITS OF USE

High level of import substitution industrialization

No negative impact on human health if the operating requirements are met

Suitable for machining most metals and alloys

High tribological characteristics

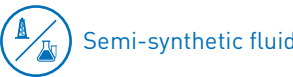
Low oil mist formation

Stable machining on highly loaded and high-temperature operations

Increased durability of the cutting tool and quality of the machined surface

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutoil GR 7
Appearance	Visually	Homogeneous transparent liquid without visible impurities
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	6,5
Density at 20 °C, kg/m³	GOST 3900	824
Flash point, COC, °C	GOST 4333	158
Pour point, °C	GOST 20287 method B	-58

GAZPROMNEFT CUTOIL GR 10



Gazpromneft Cutoil GR 10 — multifunctional oil-based cutting fluid on high purity oil bases with excellent performance characteristics, low tendency to foaming and evaporation.

Application

General light to medium duty metalworking operations: milling, drilling, automatic and profile turning, screw cutting, reaming and sawing. Suitable for honing, grinding, including diamond and ceramic (boron nitride) wheels. Suitable for all steel grades and their alloys, non-ferrous metals (except magnesium and magnesium alloys).

ADVANTAGES AND BENEFITS OF USE

High level of import substitution industrialization

No negative impact on human health if the operating requirements are met

Suitable for machining most metals and alloys

High tribological characteristics

Low oil mist formation

Stable machining on highly loaded and high-temperature operations

Increased durability of the cutting tool and quality of the machined surface

Excellent cooling and flushing capacity

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutoil GR 10
Appearance	Visually	Homogeneous transparent liquid without visible impurities
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	10,0
Density at 20 °C, kg/m³, max	GOST 3900	857,0
Flash point, COC, °C	GOST 4333	179
Pour point, °C	GOST 20287 method B	-46

GAZPROMNEFT CUTOIL 20, GAZPROMNEFT CUTOIL 30

 Semi-synthetic fluid



Gazpromneft Cutoil 20, Gazpromneft Cutoil 30 — multifunctional oil-based cutting fluids based on high-quality high-index base oils. The composition includes complexes of anti-seize, anti-wear additives with friction modifiers and antioxidant additives of the latest generation.

Application

Light to medium duty general metalworking operations. The products are suitable for milling, drilling, automatic and profile turning, screw cutting, reaming and sawing of structural and alloy steels, aluminum and copper alloys.

ADVANTAGES AND BENEFITS OF USE

 High level of import substitution industrialization

 Excellent cooling and flushing capacity

 Low tendency to oxidation and oil mist formation

 Increased durability of the cutting tool and quality of the machined surface

 No negative impact on human health if the operating requirements are met

 Suitable for machining most metals and alloys

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS			
Indicators	Method	Gazpromneft Cutoil 20	Gazpromneft Cutoil 30
Appearance	Visually	Homogeneous transparent liquid without visible impurities	
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	19,0	30,0
Density at 20 °C, kg/m³, max	GOST 3900	847	865
Flash point, COC, °C	GOST 4333	198	210
Pour point, °C	GOST 20287 method B	-46	-46

GAZPROMNEFT CUTOIL 10 EP, GAZPROMNEFT CUTOIL 20 EP, GAZPROMNEFT CUTOIL 30 EP

 Semi-synthetic fluid



Gazpromneft Cutoil 10 EP, Gazpromneft Cutoil 20 EP, Gazpromneft Cutoil 30 EP — multifunctional oil-based cutting fluids based on high purity base oils with the addition of a modern additive complex for heavy-duty machining operations on a wide range of steel and alloy grades.

Application

Highly loaded general metalworking operations. Products can be used for grinding, turning, milling, screw cutting, roll threading, reaming of structural, alloyed, corrosion-resistant, heat-resistant steels and alloys. The products are of limited suitability for machining non-ferrous metal-based alloys. Gazpromneft Cutoil 10 EP is specially formulated for deep drilling operations on high-alloy steels. Gazpromneft Cutoil 20 EP is a specialized product for the hobbing segment, planing and hobbing operations on modern machining centers.

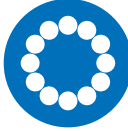
ADVANTAGES AND BENEFITS OF USE

 High level of import substitution industrialization

 Low level of evaporation and oil mist formation

 Efficient flushing of generated chips out of the machining zone

 Does not contain chlorine or heavy metals

 Modern tribological additive complex

 Increased durability of the cutting tool and quality of the machined surface

 Increased oxidative stability of the product for long service life

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS				
Indicators	Method	Gazpromneft Cutoil 10 EP	Gazpromneft Cutoil 20 EP	Gazpromneft Cutoil 30 EP
Appearance	Visually	Homogeneous transparent liquid with no visible impurities. Opalescence is allowed		
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	10,0	21,0	30,0
Density at 20 °C, kg/m³, max	GOST 3900	848	860	865
Flash point, COC, °C	GOST 4333	178	190	200
Pour point, °C	GOST 20287 method B	-56	-40	-40
Test of corrosive effect on the plate made of copper grade M1 or M2 according to GOST 859	GOST 2917	4C	4C	4C

GAZPROMNEFT CUTOIL 50 EP

-  Semi-synthetic fluid
-  EP Extreme loads



Gazpromneft Cutoil 50 EP — oil-based cutting fluid developed for medium- and heavy-duty general metalworking operations: reaming, broaching, deep drilling, gear cutting and stamping. Contains sulfur compounds that provide anti-seize properties.

Processed materials:

- high-strength and stainless steels;
- titanium.

Not recommended for processing non-ferrous metals and alloys!

ADVANTAGES AND BENEFITS OF USE

 High level of import substitution industrialization

 No negative impact on human health if the rules of industrial hygiene are observed

 Excellent lubricating properties

 Long cutting tool life

 Suitable for extreme loads

 Low oil mist formation

 Does not contain chlorine

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Cutoil 50 EP
Appearance	Visually	Homogeneous liquid of yellow color
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	51,0
Density at 20 °C, kg/m³, max	GOST 3900	892
Flash point, COC, °C	GOST 4333	192
Pour point, °C	GOST 20287	-23

GAZPROMNEFT PRESSOIL D 60

-  Semi-synthetic fluid



Gazpromneft Pressoil D 60 — oil-based cutting fluid developed for medium and heavy metalworking operations such as drawing, stamping, rolling, torsion and thread rolling.

Processed materials:

- steel;
- stainless steel;
- steel alloy.

ADVANTAGES AND BENEFITS OF USE

 High level of import substitution industrialization

 Suitable for machining most metals and alloys

 Excellent lubricating properties

 Tool cost savings

 Low oil mist formation

 Does not contain chlorine

 No negative impact on human health if the operating requirements are met

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Pressoil D 60
Appearance	Visually	Transparent liquid of brown color
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	58,0
Density at 20 °C, kg/m³, max	GOST 3900	900
Flash point, COC, °C	GOST 4333	192

A blurred background image of a large industrial machine, likely a CNC lathe or mill, with various mechanical components and a yellow safety light visible.

GAZPROMNEFT FORMSYNTH

**FAST EVAPORATING
CUTTING FLUIDS**

GAZPROMNEFT FORMSYNTH EV 1H

 Semi-synthetic fluid



Gazpromneft Formsynth EV 1H — fast evaporating oil. The product dries in a short period of time, significantly facilitating further painting and welding processes. Does not contain silicone.

Application:

- for punching, stamping, piercing and light drawing of aluminum and thin steel sheets.

ADVANTAGES AND BENEFITS OF USE

 Protects tools from wear (matrixes, punches)

 Does not contain chlorine

 Fast evaporation

 Does not contain heavy metals, including zinc

 Does not contain silicone

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Formsynth EV 1H
Appearance	Visually	Homogeneous colorless liquid without sediment or suspended matter
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	1,2
Density at 20 °C, kg/m³, max	GOST 3900	759
Water content	GOST 1547	None

GAZPROMNEFT FORMSYNTH EV 2

 Semi-synthetic fluid



Gazpromneft Formsynth EV 2 — a fast evaporating, highly purified oil providing high lubricating properties. The oil film dries in a short period of time, which makes it possible to quickly perform further processes of painting, welding of parts. Recommended for punching, stamping, piercing and light drawing operations.

Processed materials:

- thin sheet steels;
- aluminum.

ADVANTAGES AND BENEFITS OF USE

 High level of import substitution industrialization

 Does not contain chlorine

 Does not contain silicone

 Protects tools from wear (matrixes, punches)

 Does not contain heavy metals, including zinc

 Characterized by complete evaporation from the product surface

TYPICAL PHYSICOCHEMICAL CHARACTERISTICS		
Indicators	Method	Gazpromneft Formsynth EV 2
Appearance	Visually	Homogeneous liquid of yellow color
Kinematic viscosity at 40 °C, mm²/sec	GOST 33	2,6
Density at 20 °C, kg/m³, max	GOST 3900	803
Flash Point, PMCC, °C	GOST 6356	90
Test of corrosive effect on the plate made of copper grade M1 or M2 according to GOST 859, points	GOST 2917	1b

While in service it is necessary to systematically check the cutting fluid condition. Obtaining reliable information on the current state of cutting fluid will allow by means of minor adjustments to return the fluid parameters to the required values, prevent serious deviations of these parameters, which can lead to failure of the cutting fluid, and thereby significantly extend its service life, as well as protect the equipment from corrosive effects.

METALWORKING FLUIDS SERVICE is a service that aims to promote water-miscible cutting fluids by evaluating physical and chemical characteristics using mobile diagnostic equipment

KIT FOR MONITORING THE CONDITION OF THE OPERATING EMULSION OF CUTTING FLUID



- 1. Water hardness test strips
- 2. Refractometer
- 3. pH test strips
- 4. Sampling containers
- 5. Pasteur pipette
- 6. Test strips for determination of Nitrite
- 7. Thermometer

WATER HARDNESS TEST STRIPS



Determination of hardness salt content

REFRACTOMETER



Determination of emulsion concentration

PH TEST STRIPS



Determination of acidity index (degree of oxidation of cutting fluid)

SAMPLING CONTAINER



Collecting and storing cutting fluid samples

PASTEUR PIPETTE



Sampling of small volumes of coolant

TEST STRIPS FOR DETERMINATION OF NITRITE



Determination of nitrite content in cutting fluids

THERMOMETER



Water and cutting fluid temperature measurement

STANDARD OPERATING PROCEDURE

WATER HARDNESS TEST STRIPS

Procedure for conducting a water or solution hardness test



- 1. Dip the test strip into the water solution. Lightly stir with the test strip.
- 2. Hold the test strip in the water solution for 30 seconds to stabilize the reading.
- 3. Remove the test strip from the water solution and refer to the color coding chart on the package.
- 4. Read the water solution hardness level that corresponds to the color of the test strip.
- 5. Record the water solution hardness in a log or monitoring sheet.

PH TEST STRIPS

Procedure for conducting a pH test



- 1. Dip the test strip into the water solution. Lightly stir with the test strip.
- 2. Hold the test strip in the water solution for 30 seconds to stabilize the reading.
- 3. Remove the test strip from the water solution and refer to the color coding chart on the package.
- 4. Read the water solution pH level that corresponds to the color of the test strip.
- 5. Record the water solution pH level reading in a log or monitoring sheet.

REFRACTOMETER

Procedure for conducting the test to determine the concentration of working emulsion of coolants



- 1. Take a sample of the operating cutting fluid emulsion from the fluid supply circuit to the cutting zone. Make sure that the cutting fluid is pre-mixed in volume. (It is better to take a sample while the machine is running.)
- 2. Clean the prism surface with distilled water and wipe with a soft, lint-free cloth.
- 3. Check the accuracy of the instrument with distilled water. Apply 2-3 drops of water to the prism glass with a pipette and close the lid.
- 4. If the scale shows a value other than 0% (Brix), turn the calibration screw until 0% (Brix) is set.
- 5. Do not measure unless the lens is completely covered with liquid.
- 6. Drop one drop of cutting fluid on the slide and look through the eyepiece, observing the following conditions. Stand facing a natural or artificial light source to maximize the illumination of the field of view and the appearance of the light-shadow boundary. Record the digital value at the boundary of the separation.
- 7. Multiply the obtained result by the refraction factor (fixed in the description of each product) and record it in the table.

TEST STRIPS FOR DETERMINATION OF NITRITE

Procedure for conducting the nitrite test



- 1. Dip the test strip into the water solution. Lightly stir with the test strip.
- 2. Hold the test strip in the water solution for 30 seconds to stabilize the reading.
- 3. Remove the test strip from the water solution and refer to the color coding chart on the package.
- 4. Read the nitrite value that corresponds to the color of the test strip.
- 5. Record the nitrite value in the logbook or monitoring sheet.

GAZPROMNEFT CUTTING FLUIDS													
Cutting fluid type	Name	Base	Lubricity	Cooling	Emulsion stability	Protection against corrosion	Chip removal	Emulsion service life	Oil separation	Safety	Low oil mist level	Evaporation rate	
Water-miscible	Cutfluid Standard												
	Cutfluid Standard LE												
	Cutfluid EST												
	Cutfluid AL												
	Cutfluid Universal												
	Cutfluid Universal LE												
	Cutfluid Synthetic												
	Cutfluid Synthetic LE												
Oil-based	Cutoil GR 7												
	Cutoil GR 10												
	Cutoil 20												
	Cutoil 30												
	Cutoil 10 EP												
	Cutoil 20 EP												
	Cutoil 30 EP												
	Cutoil 50 EP												
	Pressoil D 60												
	Fast evaporating	Formsynth EV 1H											
Formsynth EV 2													
		Synthetic base			Mineral base			Semi-synthetic base					

In order to ensure proper operation and to maximize the efficiency of water-miscible cutting fluids Gazpromneft Cutfluid , please observe the following recommendations.

GAZPROMNEFT CUTFLUID APPLICATION RECOMMENDATIONS	
Product type and its application	Before use, carefully read the cutting fluid documentation. Technical Data Sheet (TDS) – general product description, recommended concentration ranges, allowable water hardness, metal compatibility restrictions. Safety Data Sheet (SDS) – A summary of the characteristics, rules, regulations, safety requirements and necessary anti-pollution measures.
Machine cleaning	The machine must be properly cleaned before refilling. The use of Gazpromneft Cleanfluid system cleaner is mandatory for this purpose. Deposits in the machine must be removed. Note: The system cleaner has good detergent properties to help remove deposits, including in machine tool nozzles. However, the machine walls require subsequent mechanical cleaning.
Preparation of emulsion	Mixing with blenders: in order to prepare a homogeneous emulsion and to achieve a stable concentration, we recommend the use of special blenders (Venturi-type dispensers). Mixing by hand: the emulsion can be prepared by hand in the absence of a mixer. Always add water first, then slowly add the concentrate while mixing gently.
Water requirements	Before preparing the emulsion, make sure that water hardness meets the requirements specified in the TDS. In case of deviations, consult the Engineering and Technical Department (ETD) of Gazpromneft-Lubricants Ltd. .
Concentration	The required concentration depends on the material and application/treatment. The recommended concentration is specified in the TDS. For central systems, we strongly recommend a buffer concentration of 1-2% over the minimum recommended value. Note: Pay attention to the refractive factor. It can be found in the TDS for the product. Top-ups and emulsion adjustments should be made with a slightly concentrated (minimum 1%) emulsion or a highly concentrated (15% maximum) emulsion, if necessary contact ETD of Gazpromneft-Lubricants for details. Never refill pure concentrate or pure water into the machine tank, this may destabilize the emulsion.
pH	For long-term operation of the emulsion, the pH value of the emulsion must be monitored. The permissible pH range is specified in the TDS of the product. In case of pH drop: temporary increase of concentration is possible. In case of increased pH: contact the ETD of Gazpromneft-Lubricants.
Control	Daily checking of the concentration and entering the information into the cutting fluid monitoring log. It is recommended to monitor the pH on a weekly basis.
Residual oils	It is strongly recommended to remove any extraneous oil from the surface of the tank in order to maintain the emulsion in the machine system for a long period of time.
Product Safety Information	Information on sanitary and epidemiologic rules and regulations is contained in the safety data sheet for the product.

Depending on the metal to be machined, the requirements for the composition and characteristics of the cutting fluid are determined. These requirements often determine the choice of cutting fluid. Metals differ in hardness, brittleness, and corrosiveness, so the level of difficulty of machining different metals differs. It should be taken into account that cutting fluids of different types can often be used for one and the same operation of processing the same metal. Therefore, the choice of cutting fluids requires an individual approach.

GAZPROMNEFT CUTTING FLUID APPLICATION RECOMMENDATIONS				
Operations	Grinding	Honing	Turning	Milling
Cast iron	Cutfluid EST Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10	Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid GR 7 Cutfluid GR 10	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 20 EP Cutoil 30 Cutoil 30 EP	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 20 EP Cutoil 30 Cutoil 30 EP
Low and medium alloy steels	Cutfluid EST Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10	Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid GR 7 Cutfluid GR 10	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 20 EP Cutoil 30 Cutoil 30 EP	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 20 EP Cutoil 30 Cutoil 30 EP
High alloyed/ stainless steels	Cutfluid EST Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10	Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid GR 7 Cutfluid GR 10	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 20 EP Cutoil 30 Cutoil 30 EP	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 20 EP Cutoil 30 Cutoil 30 EP
Aluminum/ aluminum alloys	Cutfluid EST Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10	Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid GR 7 Cutfluid GR 10	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 30	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 30
Non-ferrous metals	Cutfluid EST Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10	Cutfluid Synthetic Cutfluid Synthetic LE Cutfluid GR 7 Cutfluid GR 10	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 30	Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutfluid GR 7 Cutfluid GR 10 Cutoil 20 Cutoil 30
Titanium/ titanium alloys	Cutfluid EST Cutfluid Synthetic Cutfluid Universal Cutfluid AL Cutfluid GR 7	Cutfluid GR 7	Cutfluid EST Cutfluid Universal Cutfluid AL Cutoil 20 Cutoil 20 EP Cutoil 30 Cutoil 30 EP	Cutfluid EST Cutfluid Universal Cutfluid AL Cutoil 20 Cutoil 20 EP Cutoil 30 Cutoil 30 EP

GAZPROMNEFT CUTTING FLUID APPLICATION RECOMMENDATIONS				
Drilling	Threading	Reaming	Drawing/ gear cutting	Stamping
Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutoil 10 EP	Cutfluid EST Cutoil 20 EP Cutoil 30 EP	Cutfluid EST Cutoil 20 EP Cutoil 30 EP	—	—
Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutoil 10 EP	Cutfluid EST Cutfluid Universal Cutfluid AL Cutoil 20 EP Cutoil 30 EP Cutoil 50 EP	Cutfluid EST Cutfluid Universal Cutfluid AL Cutoil 20 EP Cutoil 30 EP Cutoil 50 EP	Cutfluid EST Cutoil 20 EP Cutoil 30 EP Cutoil 50 EP Pressoil D 60	Formsynth EV 1H Formsynth EV 2 Pressoil D 60
Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutoil 10 EP	Cutfluid EST Cutfluid Universal Cutfluid AL Cutoil 20 EP Cutoil 30 EP Cutoil 50 E	Cutfluid EST Cutfluid Universal Cutfluid AL Cutoil 20 EP Cutoil 30 EP Cutoil 50 EP	Cutfluid EST Cutoil 20 EP Cutoil 30 EP Cutoil 50 EP Pressoil D 60	Formsynth EV 1H Formsynth EV 2 Pressoil D 60
Cutfluid EST Cutfluid Universal Cutfluid AL	Cutfluid EST	Cutfluid EST	Cutfluid EST Cutfluid AL	Formsynth EV 1H Formsynth EV 2
Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL	Cutfluid EST Cutfluid Universal Cutfluid AL	Cutfluid EST Cutfluid Universal Cutfluid AL	Cutfluid EST Cutfluid AL	Formsynth EV 1H Formsynth EV 2
Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL	Cutfluid EST Cutfluid Universal Cutfluid AL	Cutfluid EST Cutfluid Universal Cutfluid AL	Cutfluid EST Cutfluid AL	Formsynth EV 1H Formsynth EV 2
Cutfluid EST Cutfluid Universal Cutfluid Universal LE Cutfluid AL Cutoil 10 EP	Cutfluid EST Cutfluid Universal Cutfluid AL Cutoil 20 EP Cutoil 30 EP Cutoil 50 EP	Cutfluid EST Cutfluid Universal Cutfluid AL Cutoil 20 EP Cutoil 30 EP Cutoil 50 EP	Cutfluid EST Cutoil 20 EP Cutoil 30 EP Cutoil 50 EP Pressoil D 60	—

RECOMMENDATIONS FOR ADJUSTING THE CONCENTRATION OF THE WORKING EMULSION

FORMULAS FOR CALCULATING THE CONCENTRATION ADJUSTMENT

W — concentrations in percent
V — volumes in liters



Increased
concentration
required

$$V_{\text{emulsion added}} = \frac{V_{\text{emulsion poured}} (W_{\text{required}} - W_{\text{current}})}{W_{\text{emulsion added}} - W_{\text{required}}}$$



Decreased
concentration
required

$$V_{\text{emulsion added}} = \frac{V_{\text{emulsion poured}} (W_{\text{current}} - W_{\text{required}})}{W_{\text{required}} - W_{\text{emulsion added}}}$$

Gazpromneft-Lubricants Ltd. recommends to use emulsions with 12% concentration to increase the concentration of working emulsion, and to decrease the concentration of working emulsion we recommend to use 1% emulsion. In this case, the formulas for calculating the refill volume are as follows:



Increased
concentration
required

$$V_{\text{emulsion added}} = \frac{V_{\text{emulsion poured}} (W_{\text{required}} - W_{\text{current}})}{12\% - W_{\text{required}}}$$



Decreased
concentration
required

$$V_{\text{emulsion added}} = \frac{V_{\text{emulsion poured}} (W_{\text{current}} - W_{\text{required}})}{W_{\text{required}} - 1\%}$$



In case if it is possible to add only water to the operating emulsion to reduce the concentration, the formula for calculation will look as follows:

$$V_{\text{emulsion added}} = \frac{V_{\text{emulsion poured}} (W_{\text{current}} - W_{\text{required}})}{W_{\text{required}}}$$



Gazpromneft-Lubricants Ltd. does not recommend adding net water to reduce the concentration of the operating emulsion, as in this case problems with the stability of the operating emulsion may appear, which will adversely affect the processing of parts and equipment.

GAZPROMNEFT CUTFLUID STORAGE RECOMMENDATIONS

Concentrates of water-miscible cutting fluids are systems of complex components. It is recommended to store these compositions not more than 1 year. This is due to the fact that concentrates of water-miscible cutting fluids are colloidal systems in which the concentration of many additives may decrease over time due to sedimentation and adsorption processes. This is particularly relevant for defoamers, biocides and some anti-wear and anti-seize additives.

In addition to physicochemical changes, many active ingredients can change their structure over time, which can lead to a decrease in their chemical activity. These phenomena lead to the fact that if the storage time is exceeded, water-mixed cutting fluids may lose some of their original properties and may not work optimally in the equipment. In order to be sure of preservation of all technological characteristics of our products, we recommend to observe not only the terms, but also the conditions of product storage.



In case the temperature in the storage room drops below 0 °C, Gazpromneft-Lubricants recommends mixing the concentrate before use by rolling the drum on the floor for 15-20 minutes.

Gazpromneft-Lubricants does not recommend to overfreeze water-miscible products. If the concentrate has been subjected to freezing, mixing the container with it before pouring it into the equipment is mandatory.

If after opening the cutting fluid container it has not been used up completely, we recommend to close it tightly with a lid to ensure maximum tightness to prevent moisture and contamination. It is also inadmissible to pour cutting fluid concentrate into galvanized containers, as zinc may react with active components of the product to form zinc soap, which will have an extremely negative effect on cutting fluid properties and emulsion separation will occur.

QUESTIONNAIRE

<<>>20y.

Machine (model, serial number)

System volume, m³

Cutting fluid mark

Permissible concentration

pH range

Refractive index

Responsible

Date

Concentration

pH

Appearance

Hardness

Odor (yes/no)

Bio-degradation (yes/no)

Foaming (yes/no)

Responsible person from the workshop (signature)

Responsible person from Gazpromneft-Lubricants Ltd. (signature)

Refilling of concentrate

Date

Liter

Date

Liter

Date

Liter

Date

Liter

Date

Liter

Date

Liter

Date

Liter

Date

Liter

Date

Liter

Date

Liter

Date

Liter

Date

Liter

FOR NOTES

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