

DearSirs!

The limited liability company “Giprokhim” Plant”, which is a part of the Investment and Industrial Group “Giprokhim” is a modern enterprise with a strong technological and industrial base, high-tech industrial chemicals, petrochemicals and chemicals for the road construction manufacturer.

There are more than 30 types of different brands of reagents in our portfolio, including:

- **high-performance corrosion inhibitors**, which are providing a protection from the sulfurated-hydrogen and acid corrosion, sulfide cracking corrosion, a hydrogen-charging and development of brittleness;
- **salting inhibitors**;
- **inhibitors of asphaltene-resin-paraffin deposits (ARPD)**;
- **hydrate inhibitors**;
- **bactericides**;
- **demulsification agents**;
- **cooling lubricants**;
- **adhesive additives**;
- **polymeric additives for an asphaltic bitumen modifying**.

The limited liability company “Giprokhim” Plant” specialists constantly carry out research and development works on an integrated service development with a pipeline transport and services on overall chemicalization of the deposits, as well as modern polymer compositions production technology and functional additives for the road construction.

Chemicals industrial production, including active basics synthesis and production of the commodity forms with the given technological properties, is placed at the production facilities in Belgorod, Russia.

Currently the Investment and Industrial Group “Giprokhim” is actively expanding its borders and capabilities. The Group enters new markets and diversifying its activities by developing new departures for the more complete satisfaction of needs of existing and potential customers.

Our advantages:

- our own production of key components, which allows us to combine high-quality performance and low price;
- a wide range of high performance chemicals;
- our own research and development center;
- quality control directly at customer sites;
- qualified technical expertise.

I. Corrosion inhibitors:

1. The corrosion inhibitor “Defence”.

The corrosion inhibitor “**Defence**” is designed to protect the oil and gas field equipment from corrosion in environments, containing the **carbon dioxide (CO₂)**.

In the stream of highly mineralized water a level of protection against corrosion damage exceeds 90%.

Parameters:

Outer appearance - liquid from light brown to dark brown color.

Density at 20 °C in the range of 0.925 g / cm³.

Viscosity by Angler at 20 °C, Angler degrees - 5.0.

Solidification temperature is not higher - minus 15 °C.

Acid number, mg KOH per 1 g of the product, not less than - 9.4.

pH value (1% aqueous solution) - 6.3.

Aftereffect - more than 90 days.

Protective action.

Determination results of the “Defence” corrosion inhibitor protective action are shown in table 1.

Table 1

No	Aggressive substance	Inhibitor concentration, % vol.	Inhibitor protective action, %
1.	NaCl 3% aqueous solution, acidified with acetic acid to pH 3,5 + r / c field in 4: 1 ratio	25	93,7

The “Defence” corrosion inhibitor is totally soluble in hydrocarbon condensates of paraffinic and paraffin-aromatic type, is not soluble in water, does not produce a stable emulsion in a two-phase system “hydrocarbon condensate - mineralized water” in a ratio of 1: 4.

According to the degree of impact on the human body it relates to 4-class low-hazard substance. It is supplied in drums and railway tanks.

The “Defence” corrosion inhibitor is most suitable for use on well bores of deposits with carbon dioxide aggressiveness of environment and low gas condensate factor.

Taking into account the inhibitor low cost and its excellent operational characteristics, the given proposal is the most profitable in today's market of corrosion inhibitors.

2. The corrosion inhibitor “Unicor-3”.

The corrosion inhibitor “Unicor-3” is the limited liability company "Giprokhim" Plant" innovative product, which is designed to protect the oil and gas field equipment from corrosion in environments containing **carbon dioxide (CO₂)**.

In the stream of highly mineralized water a level of protection against corrosion damage exceeds 90%. In such a case, effect is achieved with minimum rates of the inhibitor during use.

Parameters:

Outer appearance - liquid of dark brown color.

Density at 20° C in the range of 0.925 g / cm³.

Viscosity by Angler at 20° C, Angler degrees - 5.0.

Solidification temperature is not higher - minus 19° C.

Acid number, mg KOH per 1 g of the product, not less than – 9,4.

pH value (1% aqueous solution) – 6, 3.

Aftereffect - more than 90 days.

Protective action.

Determination results of the “Unicor-3” corrosion inhibitor protective action are shown in table 2.

Таблица 2.

No	Aggressive substance	Inhibitor concentration, % vol.	Inhibitor protective action, % vol.
1.	NaCl 3% aqueous solution, acidified with acetic acid to pH 3,5 + r / c field in 4: 1 ratio	10	96,4

The “Unicor-3” corrosion inhibitor is soluble in alcohols, aromatic hydrocarbons, insoluble in water, does not produce a stable emulsion in a two-phase system “hydrocarbon condensate - mineralized water”.

It has a long aftereffect.

High-performance protection of tube steel P-105 is achieved as late as using a 10% solution of the inhibitor in the condensate (Z = 96, 4%).

According to the degree of impact on the human body it relates to 4-class (a low-hazard substance). It is supplied in drums and railway tanks.

The “Unicor-3” corrosion inhibitor is most suitable for use on well of deposits with carbon dioxide aggressiveness of environment and low gas condensate factor. This product is characterized by its high efficiency at low consumption rate during use.

3. The corrosion inhibitor “Unicor-3S”.

The corrosion inhibitor “Unicor-3S” is designed for gas and gas condensate fields conditions with a high content of **hydrogen sulphide (H₂S)**. Physical and chemical as well as technological properties of the given inhibitor provide protection against general corrosion and specific types of corrosion (hydrogen charging, development of brittleness) without process flow disruption of natural gas output and preparation of gas to transport and gas conversion process.

“Unicor-3S” is a polyaminoamides, imidazolines and solvents composition.

In the stream of highly mineralized water a level of protection against corrosion damage exceeds 90% and provides aftereffect more than 90 days.

In such case high-performance protection of tube steel is achieved as late as using a 5% solution of the inhibitor in the gas condensate ($Z = 95,7\%$).

Parameters:

Outer appearance - liquid from light yellow to dark brown colour.

Density at 20 °C in the range of 20 °C в пределах 820-900 g/cm³.

Solidification temperature is not higher - minus 35 °C.

Amine number, g HCl with a mass fraction of 100% for 100 inhibitor, at least - 1.5.

Foaming properties - low.

Protective action.

The inhibitor “Unicor-3S” efficacy in the presence of hydrogen sulfide H₂S and carbon dioxide CO₂ is shown in table 3.

Table 3.

No	Aggressive substance	Inhibitor concentration, % vol.	Inhibitor protective action, % vol.
1.	NaCl 23 g / l in the presence of hydrogen sulfide H ₂ S (2,5%) and CO ₂	5	95,7

The “Unicor-3S” investigation of the effect on the foamability of absorbents is performed by using the aqueous solution of diethanolamine model (DEA and 20% vol.) and methyldiethanolamine (MDEA, about 10%). These studies are summarized in table 4.

Table 4.

Inhibitor solution		$\omega_{ing} = 5\%$
Foam height h, mm	DEA	0
	MDEA	0

According to the degree of impact on the human body it relates to the 3rd class, subclass 3.3, categories 3.3.1. It is supplied in drums and railway tanks.

II. Salting inhibitors.

The wide range of salting inhibitors of series “Unicor-5” allows to choose reagents for certain unique requests of a customer.

This series of inhibitors is designed to protect the down hole and surface oil-field equipment from calcium sulfate, calcium carbonate, sulphides and iron oxides, barium sulfate depositions. Inhibitors have high antiscale activity in heat transfer apparatus of oil thermochemical dehydration and desalting, as well as heat and power systems, industrial cooling systems and in water purification systems.

Parameters

Outer appearance	Liquid of light yellow colour
Hydrogen ion exponent, pH	5,5 -10
Solidification temperature, °C	-30 - 55
Density at 20°C	970-1080 g / cm ³
Viscosity/density ratio at 20°C	3 - 8,7 mm ² /s
Viscosity/density ratio at -30°C	280 mm ² / s
The corrosion rate of steel grade St 3 at 20°C - no more than 0.04 mm / year	

The inhibitors specific consumption rate depends on mineralizing of environ and is equal to 10-70 g per ton of produced tailwind water. At the same time, these products have low corrosivity, preventing corrosive wear of the metering, borehole and heat exchange equipment.

Products of this series are not combustible, not explosive. Hazard Class 3 (moderately hazardous). Storage is provided in the covered warehouses, under a shelter or in a storage area in a transport container. With regard to the use, transportation and storage of the product specific requirements for the environment protection are not demanded. Recycling is not required.

III. Inhibitors of asphaltene-resin-paraffin deposits (ARPD);

Paraffin inhibitors of complex action series “Unicor-6” are designed to prevent asphaltene-resin-paraffin deposits in oilfield equipment. Reagents have demulsifying properties and reduce the viscosity of petroleum crude oils and corrosion processes in the oil-producing equipment. Reagents have high detergency and dispersant properties.

Principal characteristics of the reagents series “Unicor-6”:

Physical form	liquid from light yellow to light brown color
Density at 20°C, kg / m ³ , within	890-940
Weight percent of actual basics, %, within	48 - 68
Solidification temperature, °C, within	- 40 - 15

Reagents series “Unicor-6” are represented by three kinds:

- inhibitors of the adhesion action (wetting);
- inhibitors-modifying agents and depressants;
- detergency inhibitors (detergents) and dispersing agents.

The “Unicor-6” series contains reagents of following actions:

- ARPD dissolving agents;
- ARPD water-soluble dispersing agents for highly watered wells treatment;
- chemical reagents for stable emulsions treatment;
- chemical reagents for commercial crude oil treatment;
- chemical reagents for highly resinous oil;
- chemical reagents for preventing of paraffinic hydrocarbons deposits on equipment and during crude-oil production.

Selection of ARPD inhibitors and their dosing rate is calculated individually depending on the operating conditions, the amount of reagent required modes and the customer wishes. Selection of particular chemical method for crackdown on the ARPD is based on a thorough study of the produced product properties, its behavior in reservoir conditions, wells and surface equipment. Selection of specific chemicals is based on the ARPD precise knowledge, the mechanism of its formation and study of selected chemical reagent (reagent composition) under laboratory conditions on applicability to the specific composition of deposits.

The inhibitors of “Unicor-6” series relate to moderately hazardous substances of Hazard Class 3 according to the degree of impact on the human body.

IV. Bactericides.

Bactericides of series “**Unicor-7**” are intended to suppress the activity of sulfate-reducing bacteria (SRB), causing an oilfield equipment microbiologically-influenced corrosion for the bacterial treatment of well-killing fluid, to prevent bacterial decomposition of drilling fluids organic components, as well as carrying out a set of oil recovery improvement measures.

Principal characteristics of the reagents series “**Unicor-7**”:

Physical form	liquid from light yellow to dark brown colour
Pour point of reagents, ° C, not exceeding	-40
Density at 20 ° C, kg / m ³ , within	0,900-1000
Effective dosage, g / m ³	10-300
Temperature of product storage, ° C, not exceeding	50

A dosing rate, frequency and treatment effectiveness will depend on the degree of contamination of oil field waters by sulfate-reducing and other types of bacteria, the reagent contact time with the bacteria, the composition of the oil field water.

This series of bactericides:

- is effective against planktonic and adhesive forms of SRB;
- has inhibitory properties for oilfield equipment protection against corrosion;
- is soluble in fresh u soluble in fresh and mineralized water;
- acts to enhance oil recovery;
- is effective in neutralizing hydrogen sulfide and methyl-, ethylmercaptans in the commercial crude oil, gas condensate, in oil gathering and processing systems, transport pipelines;
- can be used for periodic and continuous injection.

Inhibitors of the series “**Unicor-7**” can be used:

- in a formation pressure maintenance system;
- in gathering and water treatment systems;
- in development wells (a casing string-borehole annulus treatment);
- as a drilling mud fluid stabilizing element.

Recommended a product storage and transportation in plastic and metal tanks.

V. Demulsification agents.

Series “**Unicor-8**” demulsifiers are high-performance reagents, resolving wide range of oil trade emulsions destruction problems in the process of commercial crude oil preparation. They are intended for use in oil collecting systems and initial water separation systems (IWSU), a commercial crude oil treatment plants (CCOTP), as well as a crude oil preparation on electrical oil dehydrators and desalinating plants (EODDP) and mechanical impurities decontamination.

The demulsification agents, produced by the LLC “Giprokhim” Plant”, can be conveniently divided by a functional relation of the treatable structures physicochemical properties into the following groups:

- for light and waxy crude oils;
- for middle oils;
- heavy naphthenic crude oils;
- for drip and sump structures.

Physical and chemical properties	
Physical form	liquid from light yellow to dark brown colour
Pour point of reagents, °C, not exceeding	from – 20 to - 50
Density at 20°C, kg / m ³ , within	910-980
Toxicity level	hazard class IV (according to GOST 12.1.007)

Recommended dosage of the demulsification agents are determined depending on the oil-water emulsion physical and chemical properties, content and composition of salts contained in them.

The demulsification agents of series “**Unicor-8**” main advantages:

- low water and salts content in the treated oil;
- prevention of intermediate layers formation;
- phase interface clear boundary;
- high quality of wastewater;
- pressure drop in oil gathering systems at low temperatures of wellbore fluids;
- high rate of water dumping.

VI. Hydrate inhibitors.

Hydrate inhibitors of «Unicor-9» series are intended both for prevention hydrates deposits in processing equipment and for elimination of hydrate blocks in equipment, pipelines etc. The reagents don't effect on corrosion wear of downhole equipment and plant equipment. They contribute to gas and gas condensate treatment process on complex gas treatment plant or petroleum refinery, don't make foam and emulsion in liquid phase.

Principal characteristics of the reagents series «Unicor-9»:

Physical form	liquid from transparent to yellow colour
Density at 20°C, kg/m ³ , within	0,790 – 0,820
Solidification temperature, °C, not exceeding	- 30
Effective dosage, g per 1000 m ³	10-30

Effective dosage of «Unicor-9» series depend on indicators of moisture content, individually for each production unit staying in the range of hydrates formation:

- well bore;
- pipelines;
- production units on complex gas treatment plant (freezing units: low temperature separation unit with throttling (Joule-Thomson) effect or monoblock turbo expanding assembly, ammonia or propane refrigerating unit).

Inhibitors of "Unicor-9" series completely meet with oil&gas industry requirements and work on several directions:

- exert influence on gas-liquid flow, preventing hydrate lattice gathering on a pipe walls and equipment units because of accumulation of hydrate lattice on inhibitor flobulas;
- has antiagglomerate influence on generated gydrates with stable and dense structure located within the pipeline. Because of prompt and qualitative hydrate deposits elimination "Unicor-9" series allows to save time and funds when it comes about hydrate counteraction.

Using of hydrate inhibitors of "Unicor-9 series" ensures trouble-free and uninterrupted operation of equipment and considerably reduces expenditures for methanol use which requires high safety precautions and liable to special regulations.

VII. Surface-active agents (SAA).

Surface-active agents of Unicor-10 series are aimed to solve a whole number of reservoir engineering problems and uniform drainage of oil and gas accumulations. The reagents don't effect on corrosion wear of downhole equipment and plant equipment. They allow to delete the fluid accumulated on the hole bottom which can be both organic origin and highly mineralized stratal water. Reagents of this series contribute to well bore refinement of redundant fluid, stabilize the performance of oil and gas processing facilities and improve fluid influx from oil pool to bottom hole.

Principal characteristics of the reagents series "Unicor-10":

Physical form	1) liquid from light yellow to dark brown colour 2) solid SAS soap sticks
Density at 20 ° C, kg / m ³ , within	0,790 – 0,820
Solidification temperature, °C, not exceeding	-30
Effective dosage, g per 1000 m ³	1-10

Effective dosage of «Unicor-9» series depends on percentage of water production, mineralization and sediment content. SAA product range comprises liquid forms which solution may be delivered without production shutdown and solid forms which may be applicable on a fields with lack of special-purpose machines or at final stage field development.

SAA of Unicor-10 series are multifunctional in terms of principle of operation. They act depending on type of dissociation of water-oil and gas system and completely meet with oil&gas industry requirements:

- Nonionic SAA that prevent fluid accumulation by forming adsorption layer of unoriented molecules on the surface of the fluid molecules. Applicable for neutral ambient with pH=7;
- Anionic SAA that prevent fluid accumulation by forming adsorption layer of cation oriented molecules on the surface of the fluid molecules. Applicable for acid and corrosion mediums with pH≤7;
- Amphoteric SAA, universal products that prevent fluid accumulation on the bottom of a well by showing acidity and alkalinity of dissociation. Applicable for any mediums, pH=1 – 14.

Due to its multifunctionality and high efficiency with low dosage and cost, SAA of Unicor-10 series are one of the most reasonable and affordable solution of a problem of wellbore fluid withdrawal.

VII. Cooling lubricants (CL).

Universal cooling lubricant “Unicor-11-emulsion-CL” is developed on cationic surface-active reagents base. It is manufactured from natural raw materials, mineral and synthetic oils.

Physical and chemical properties		
1.	Physical form	Liquid from brown to black colour
2.	Density at 20°C, kg / m ³	0.99
3.	Viscosity at 50°C, cSt	43
4.	Consistency at low temperatures	Saves properties during solidification and subsequent melting
5.	Outer appearance 3% and 50% emulsion in water	Homogeneous colloidal solution of brown colour, turbidity is allowed
6.	Pour point, °C, not exceeding	minus 50
7.	Friction coefficients reducing of 1% - CL aqueous solution, not less than %	70

Colloidal solution is formed spontaneously, without vigorous stirring and remains stable during the entire application. The solution is stable to acids, metal ions, mineral oil ingress.

Environmentally friendly lubricating additive to drilling fluids “Unicor-11-emulsion-CL” is applicable to a variety of composition and mineralization types of water-base drilling fluids (polymer, polysaccharide polymer and salt, clayish, process water). Its high lubricating properties and hydrophobized ability allow to use this CL in the operations, associated with the metal working, for temporary preservation of ferrous metals as well as for the lubrication of forms in the concrete products manufacturing.

The optimum concentration is 0.5-1.0% of the solution volume. The selected dosage is performed on the basis of the reagent laboratory experiments and pilot testing.

The CL working solution refers to low-toxic substances (Hazard Class 4 according to GOST 12.1.007-76).

VIII. Adhesive additives.

An adhesive additive “**Dorintekh**” is an innovative product that provides a high adhesion degree of viscous and liquid bitumen with stone materials, which have highly acidic properties in the process of manufacturing asphalt concrete and bitumen-mineral mixtures.

The “**Dorintekh**” additives introduction in bitumen the in the process of bitumen asphalt mixes production allows:

- to increase the adhesion of liquid and viscous bitumen with mineral materials of different nature;
- to increase a roadway surfacing working life by means of waterproofing of bitumen concrete;
- to prevent a road carpet desintegration, leading to the formation of corrugation;
- to reduce the bitumen flow to 10%;
- to reduce the tendency to cracks formation over the working life of the road carpet;
- to slow down a coupling agent solidification in case of a bitumen “aging” over a period of storage.

It is recommended for the bitumen modification of bitumen manufacturing and storage bases before shipment to customers, as well as for an adhesion heightening of polymer asphalt. The maximum effect from the additive introduction is achieved with vigorous stirring with the bitumen thorough mixing not less than 3 hours at a temperature of 140-180^o C. Thus as a result of chemical interaction between the additive components of hot bitumen, modifying properties with subsequent stabilization and preservation occur for a few days.

The additives introduction into the heated bitumen up to 170-190^o C in the process of the polymer asphalt manufacturing drives up chemical interaction of a polymer with the bitumen components.

The “**Dorintekh**” additive outer appearance is a viscous liquid of light brown to dark brown colour.

The product is practically insoluble in water; soluble in alcohol, kerosene; density at 40 ° C is (900-950) kg / m³. The product is low-volatile, non-explosive.

As per a hazard class, the product is a low-toxic substance of the 4th hazard class according to GOST 12.1.007-76.

The LLC “Giprokhim” Plant” ensures consistent quality of its products and its full compliance with technical standards.

IX. Polymeric additives for an asphaltic bitumen modifying.

A road bitumen polymer-modifier “**Giprobit**” is a high-tech product that improves the properties of the bitumen by combining them with elastic additives. Introduction of this polymer asphalt (PA) gives large thermal stability to bitumen (up to 100° C), flexibility, increases resistance to cyclic oscillating loads, expands plastic range, improves a tensile strength.

Through the PA usage an average service life of road surfaces is 10-15 years, while the exploitation of areas without the use of these technologies is limited to 5-6 years. The running cost of such roads is 20-30% lower than that constructed without the PA usage.

The “**Giprobit**” additive is specially designed for the bitumen modification and an asphalt-concrete mix preparation, and is compatible with a wide range of bitumen grades.

After the “**Giprobit**” bitumen additives long-duration test it has been established and validated in independent testing facilities, that it has a positive impact on an asphalt binder and improves the road performance, namely:

- Prevents cracking;
- Eliminates wheel track rutting;
- Increases resistance to aging.

The bitumen properties improving are occurring by the PA adding in an amount of 5-12% of the bitumen weight. The additive optimum concentration is selected in the laboratory with regard to the nature and properties of original minerals and binding materials.

The additives introduction is produced to the bitumen, heated to a temperature of 190 - 200°C with equal amounts of it for 5-7 minutes.

Stirring is carried out mechanically for 1 hour with agitation speed of 200-300 rpm.

Control of complete and uniform additive distribution is carried out by applying a thin film of the derived mixture on a glass surface. In the absence of mechanical inclusions on such a film (grains, crumbs), the mix preparation process is considered to be completed.

At the moment the polymer-modifying additive “**Giprobit**” has no analogues on such indicators as high efficiency, flexible pricing and economic expediency of application.

The LLC “Giprokhim” Plant” ensures a compliance of produced PA to technical requirements of GOST R 52056-2003, which corresponds to the world standards for modified bitumen for the road construction.

ГИПРОХИМ

LLC "Plant"Giprochim" ensures consistently high quality of its products and its full compliance with technical standards.

Because we ourselves produce the main components for the production of inhibitors, we are able to combine high quality products to their low price.

Given the low cost of these reagents, as well as minimum consumption rate at high efficiency, the proposal is the maximum competitive in the market of chemical protection solutions gas and oil field equipment and pipelines from corrosion and deposits different nature.

Modern technology combined with strict quality control of products serve as the basis of efficiency and reliability of our agents.

Our objective - using modern technology, combining the experience and knowledge of the best professionals to ensure consistently high product quality, improve the efficiency of our partners.

We work for your success!