ZAVKOM ENGINEERING



Petrochemical technologies

ZAVKOMGROUP.COM

8 800 555 06 09





CONTENTS

Engineering 4
Technologies 5
Adhesive compound production 6
Formalin and UFC production 7
Rectification 8
Amine treatment 10
Evaporation plants. LWTT complexes 12
Water treatment and wastewater treatment systems . . . 14
Modular skid-mounted equipment 15
Resin production 16
Integrated gas treatment units 18
Crude oil primary refining units 19

INTRODUCTION

ZAVKOM-ENGINEERING
One of Russia's leading EPCM contractors, providing complete delivery of high-tech, energy-efficient industrial plants and equipment for the petrochemical, biotechnology, food and pharmaceutical industries.

COMPANY
REFERENCE LIST

THEY HAVE ENTRUSTED THEIR PRODUCTION TO US
Gazprom, Rosatom, Sibur, Samson Med, Tatneft, Metadinea, Novatek, Geropharm, Schattdecor, Transneft and many other industry leaders.

ZAVKOMGROUP.COM

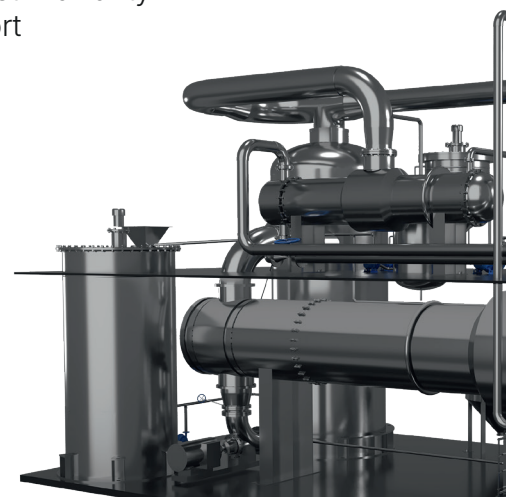
8 800 555 06 09



ENGINEERING

EPCM

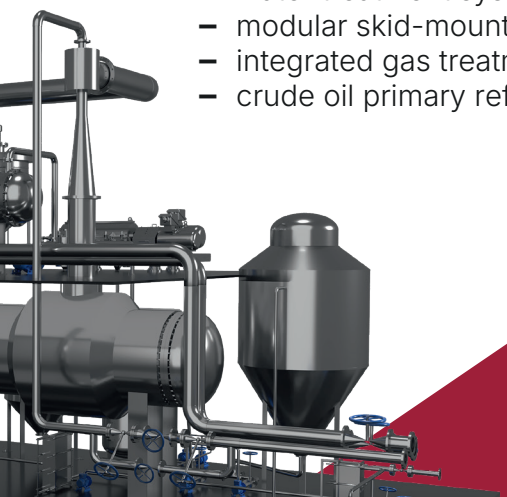
- pre-project studies
- basic and detailed engineering design
- process design
- general design
- support during the review of design documentation
- development and supply of process control systems (PCS)
- manufacture of shut-off and control valves under our own brand
- supply and installation of process equipment
- installation supervision and commissioning
- personnel training
- warranty and post-warranty personnel support



TECHNOLOGIES

UNITS:

- formalin and UFC production
- formaldehyde resin production
- adhesive compound preparation
- rectification
- solvent recovery and separation of mixtures
- purification of naphthalene, benzene and other chemicals
- caustic treatment
- crystallization
- bitumen units
- evaporation units for industrial wastewater treatment
- evaporation units for the production of marketable salt forms, liquid waste thermal treatment complexes (LWTT)
- water treatment systems
- modular skid-mounted equipment
- integrated gas treatment units
- crude oil primary refining units





ZAVKOMGROUP.COM

8 800 555 06 09



EQUIPMENT FOR THE PRODUCTION OF ADHESIVE COMPOUNDS

ADVANTAGES OF OUR UNITS:

- ability to work with a wide range of adhesive formulations;
- automatic feeding of dry bulk and liquid components into the dissolver reactor;
- high dosing accuracy of the components, with an error of less than 1%;
- highly efficient mixing of the adhesive composition components in a specially designed dissolver reactor;
- fully automated control of the production process;
- automated filling of the service tanks at the rollers with the adhesive composition and return of surplus adhesive;
- Input of adhesive formulations via software (the number of recipes is unlimited) and data archiving;
- the process engineer can monitor every stage of adhesive composition preparation;
- the units are supplied with a resin cooling system that cools the resin down to 15–20 °C in order to improve the quality characteristics of the finished adhesive;
- an adhesive composition of uniform quality from batch to batch.

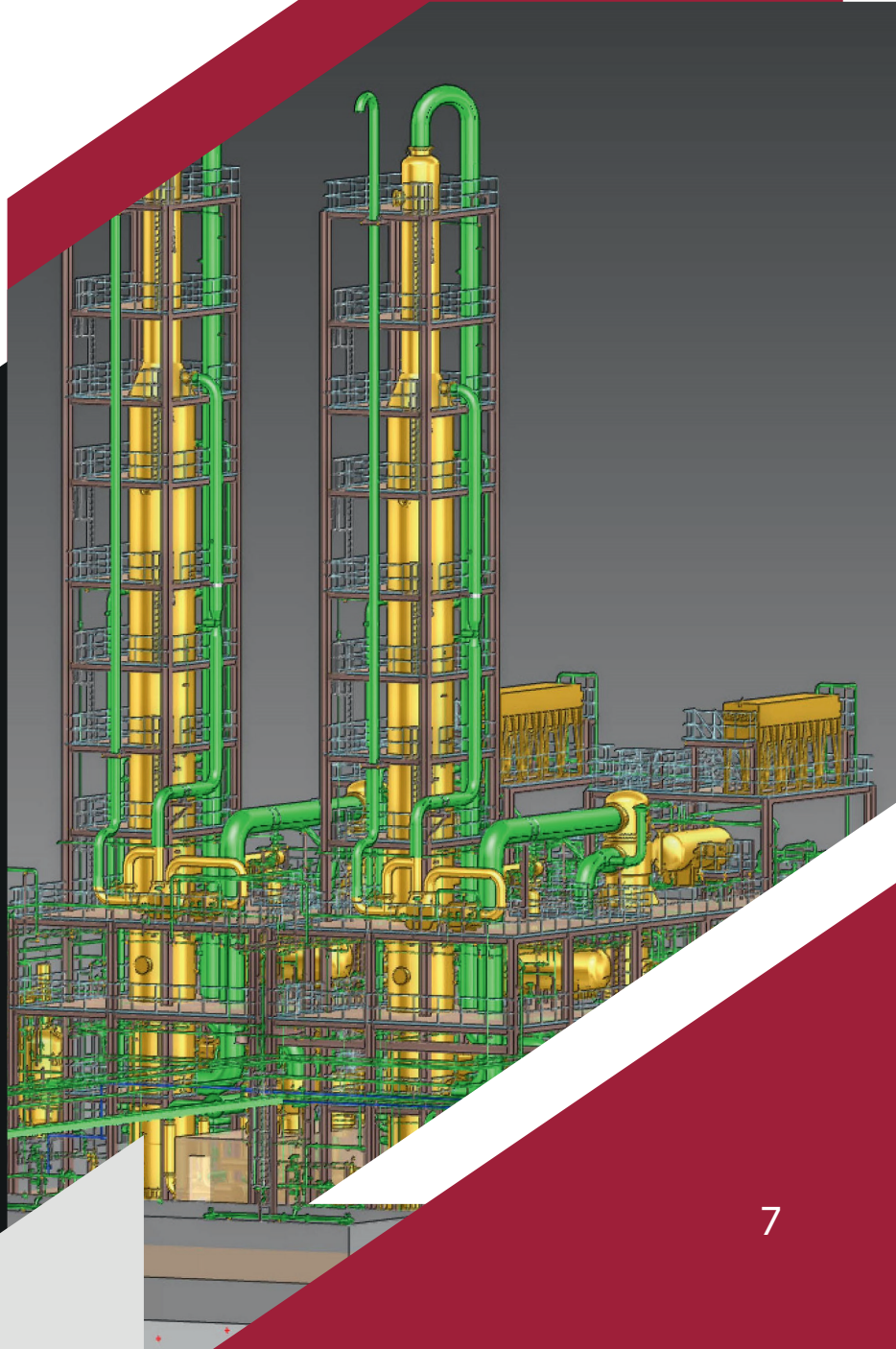
FORMALIN AND UFC PRODUCTION

Turnkey construction of plants for the production of formalin and urea-formaldehyde concentrate (UFC) with a capacity from 30,000 tonnes per year calculated as 37% formalin.

The process for producing formalin and UFC is based on the catalytic oxidation of methanol with oxygen in the presence of an iron-molybdenum catalyst.

The formalin and UFC unit can produce both formalin with a formaldehyde concentration of 37 to 55% and UFC of various grades, with a minimum changeover time from formalin to UFC and back.

The heat of reaction from the formaldehyde production process is recovered by generating saturated steam at a pressure of up to 15 bar. If required, the unit can be additionally equipped with a catalytic off-gas incineration system to reduce gaseous emissions into the atmosphere.





RECTIFICATION

We offer rectification units for the following processes:

- solvent recovery;
- recovery of pure substances (purification by rectification);
- separation of liquids.

ADVANTAGES OF OUR UNITS:

- high equipment reliability;
- main substance content in the product of at least 99% (depends on the composition of the feedstock and on customer requirements)
- low energy consumption;
- process automation.

RECTIFICATION

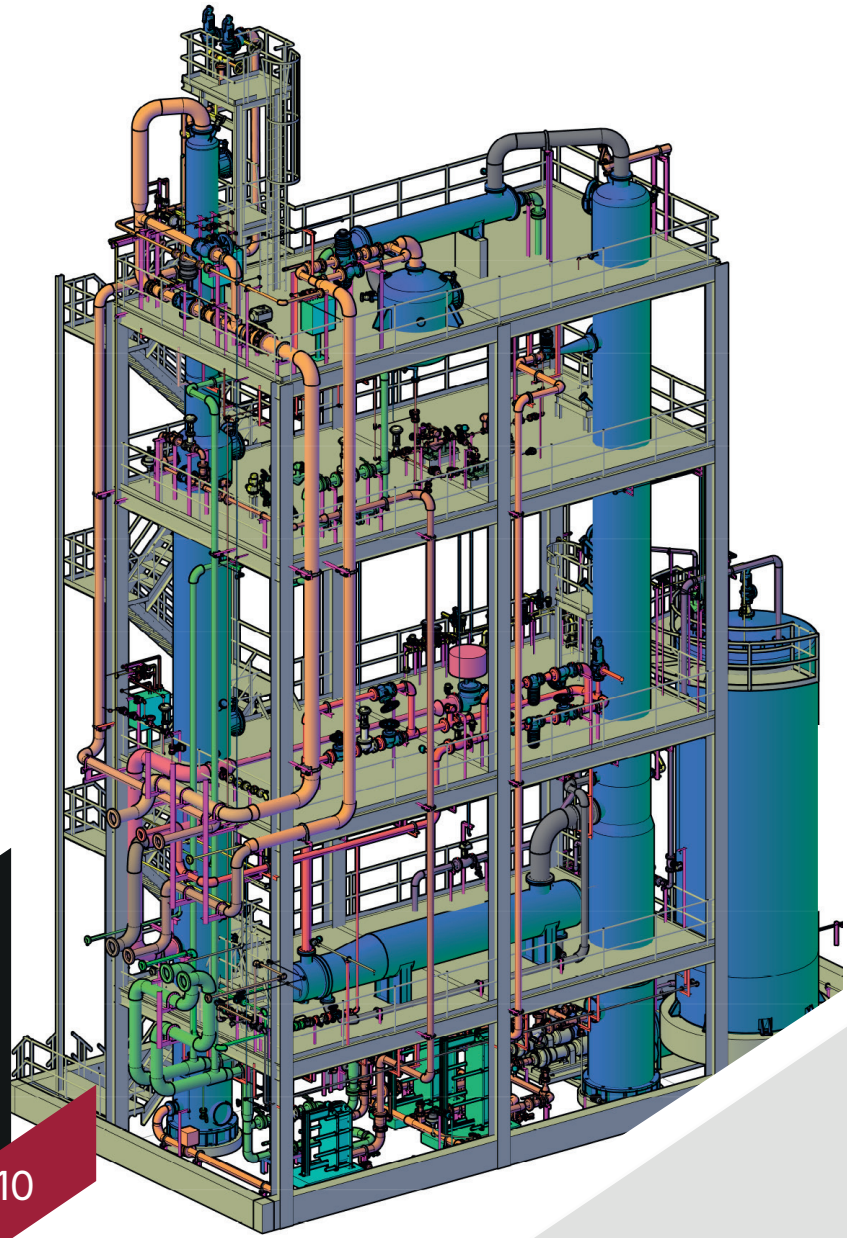
ZAVKOM-ENGINEERING LLC has extensive, long-standing experience in the design and manufacture of column equipment and in the process hardware design of rectification processes for a wide range of industries.

Building on our experience, we offer the best solutions for obtaining high-quality finished products; our designs take into account energy efficiency and the minimization of the operating and capital costs of setting up production.

To determine the optimum conditions for mass transfer processes and thus obtain a high-quality finished product at the outlet of the units, we use both our own research and pilot facilities and cooperate with leading international and Russian institutes and laboratories capable of carrying out analytical studies.

ZAVKOM-ENGINEERING LLC offers a full range of services, from analysis of the feedstock composition and studies of the optimum process conditions and equipment parameters through to the delivery of complete plants based on rectification units.





AMINE TREATMENT

The most common contaminants in hydrocarbon feedstock are hydrogen sulfide, sulfur compounds and carbon dioxide.

Because these substances are highly corrosive, they have to be removed from the feedstock. The most effective removal method is absorption of these compounds in an aqueous amine solution.

ZAVKOM-ENGINEERING LLC offers customized, highly efficient gas treatment solutions for such traditional applications as the treatment of synthesis gas from ammonia production, pipeline gas and liquefied natural gas (LNG).

AMINE TREATMENT

ADVANTAGES OF OUR UNITS:

- guaranteed high purity of the gas streams and completeness of treatment;
- a reliable process using a stable and environmentally safe solvent;
- low capital and operating costs compared with competing solutions;
- savings on unit maintenance owing to the non-corrosive nature of the solution;
- low solvent make-up rates;
- no need to reclaim the solution from degradation products;
- the solvent is non-toxic and biodegradable;
- capacity can be increased simply by modifying the solvent.





EVAPORATION UNITS FOR WASTEWATER TREATMENT

Types of wastewater treatment evaporation units from ZAVKOM-ENGINEERING:

- units for the treatment of wastewater from chemical plants;
- units for the treatment of wastewater from petrochemical plants;
- units for the treatment of wastewater from gas condensate fields.

ZAVKOM-ENGINEERING LLC offers an extensive range of evaporation unit sizes that can be used to obtain a variety of products and to dispose of spent liquid media in the chemical, food, metallurgical, pharmaceutical and other industries. These units can be integrated into existing production chains or serve as the basis for new production facilities.

The range of units offered includes both single-effect and multiple-effect units with a capacity of 1.0 to 100 m^3/h of feed solution. A common feature of the units is the use of tubular evaporators of various types, optimized for the specific needs of the customer.

EVAPORATION UNITS FOR THE PRODUCTION OF MARKETABLE SALT FORMS. LIQUID WASTE THERMAL TREATMENT COMPLEXES (LWTT)

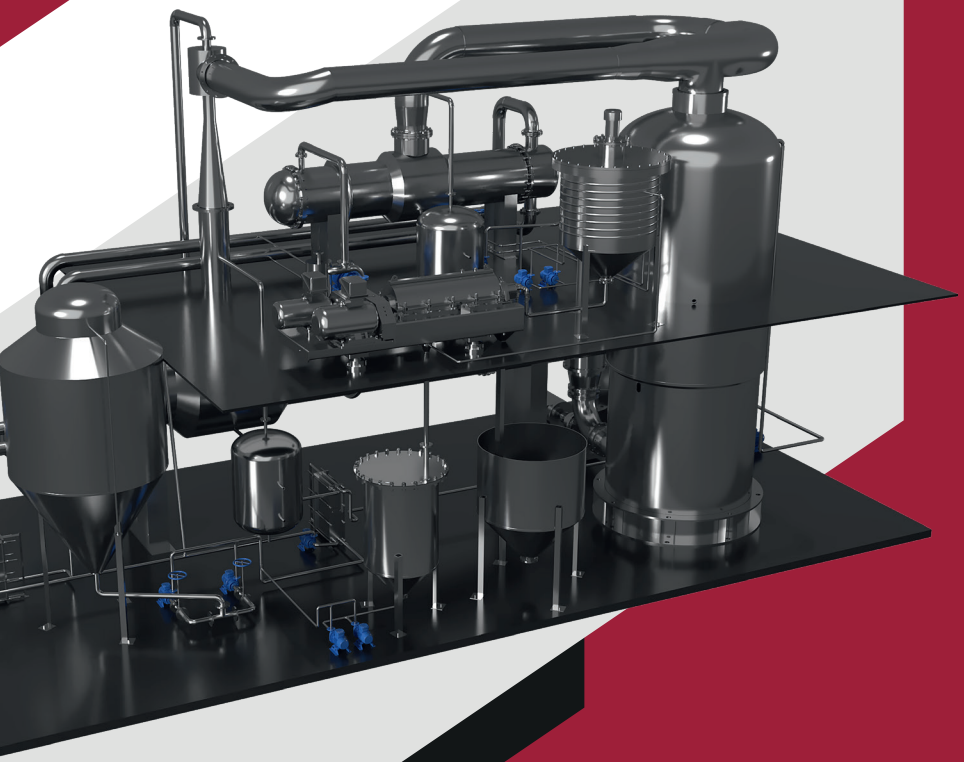
Types of evaporation units for the production of marketable salt forms from ZAVKOM-ENGINEERING:

- units for the production of “Extra” grade evaporated salt;
- units for black liquor evaporation at pulp and paper mills;
- units for hydrometallurgical plants;
- units for the production of active pharmaceutical ingredients;
- units for the production of lithium salts.

ADVANTAGES OF OUR EVAPORATION UNITS

- they are designed to meet all customer requirements for the final evaporation products;
- the materials of construction are selected with account of the corrosivity of the solutions being processed and of the service life of the units, and cover a wide range of high-quality corrosion-resistant steels and alloys;
- they are supplied with modern instrumentation and control equipment as well as a process control system that allows operation in either fully automatic or semi-automatic mode;
- the configuration and flow scheme of the evaporation units are based on proven process solutions that guarantee the minimization of both the capital and the operating costs of the customer.





WATER TREATMENT AND WASTEWATER TREATMENT SYSTEMS

We offer wastewater disposal units with zero discharge of contaminated water. Based on data on the wastewater composition, our company performs the calculations, studies and development of a wastewater disposal technology using various methods (filtration, evaporation, rectification, crystallization, chemical treatment, etc.), as well as combinations of these methods. It is thus possible to recover individual substances from the wastewater contaminants, which can be used in the customer's own production or sold as an additional marketable product.

The flow scheme is selected individually and is determined by the nature of the contaminants, the quality requirements for the treated water and the possibility of obtaining marketable products.

ZAVKOM-ENGINEERING LLC is ready to offer a wide range of services and equipment tailored to the customer's requirements for setting up water treatment and wastewater treatment systems.

We calculate the required treatment system for natural water on the basis of the latest ion-exchange and membrane technologies wherever iron removal, softening and deep demineralization of process water are needed, and we also create recirculating water supply systems.

MODULAR SKID-MOUNTED EQUIPMENT

Skid-mounted packaged equipment manufactured by ZAVKOM-ENGINEERING LLC is used in integrated gas and gas condensate treatment units, in crude oil primary refining schemes and in other units of the oil and gas chemical industries, and is supplied fully factory-assembled and ready for operation.

Skid-mounted packaged equipment may include:

- main process equipment (separator, regenerator, column, vessel, heat exchanger, etc.);
- base frame;
- piping with shut-off and control valves;
- instrumentation and measuring devices;
- electrical installation equipment (cables, junction boxes, cable trays, etc.);
- electric heat tracing and thermal insulation system;
- lighting, gas detection and fire alarm systems;
- local control system;
- maintenance platforms and walkways.







RESIN PRODUCTION

TURNKEY DELIVERY OF UNITS FOR THE PRODUCTION OF:

- urea-formaldehyde resins for the manufacture of glass mats and fiberglass products, foam plastics, thermal insulation products and for woodworking (production of plywood, particleboard, MDF and glued products);
- phenol-formaldehyde resins for the manufacture of thermal insulation and abrasive materials, laminated paper and plastics, and for woodworking (plywood production);
- melamine-urea-formaldehyde resins for the manufacture of thermal insulation products, abrasive materials, laminated paper and plastics, and for woodworking (production of glued products, OSB, etc.);
- hybrid resins for various industries.

RESIN PRODUCTION

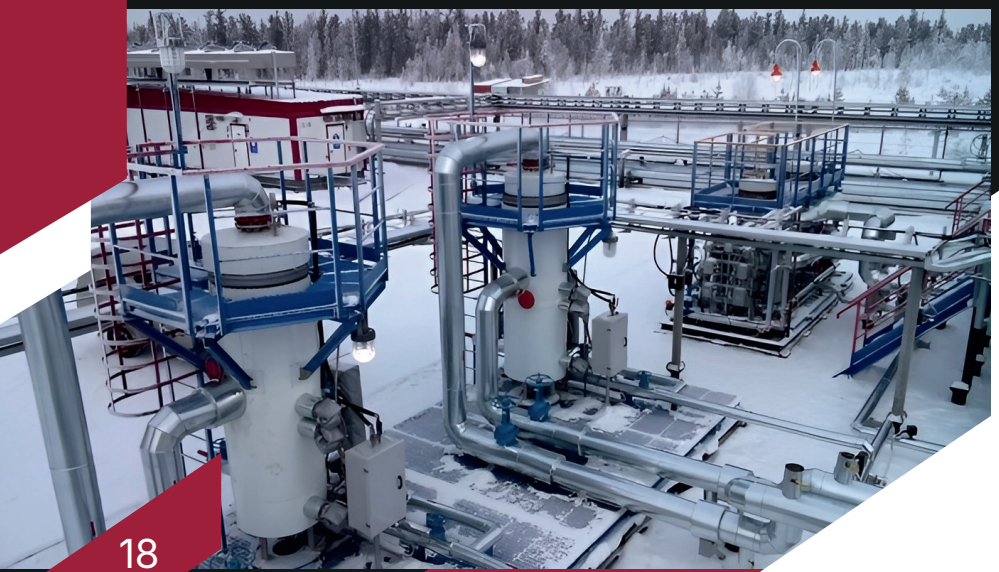
ADVANTAGES OF OUR UNITS:

- consistent quality of the product obtained from batch to batch, thanks to the use of highly efficient mass transfer and heat exchange equipment and an automated process control system;
- the human factor is completely eliminated;
- Input of formulations via software (the number of recipes is not limited by the software) and data archiving;
- the process engineer can monitor every stage of the process.

In addition, at the customer's request, our company — together with leading international consulting agencies experienced in formulation development and implementation — is ready to provide resin formulations for the equipment supplied or to adapt the customer's existing resin formulations to individual requirements.







INTEGRATED GAS TREATMENT UNITS

An IGTU is a complex of process equipment and auxiliary systems that provide the gathering and treatment of natural gas and gas condensate. At the IGTU the gas is cleaned of impurities (separation), dehydrated and cooled.

The marketable products of an IGTU are dry gas from gas fields, dry stripped gas from gas condensate fields, and gas condensate.

An integrated gas treatment unit from ZAVKOM-ENGINEERING comprises:

- a pre-treatment package;
- gas dehydration, treatment and cooling units;
- a booster compressor station;
- auxiliary production systems (fire-fighting, water supply and communication systems).

CRUDE OIL PRIMARY REFINING UNITS

We sell units for the primary processing of crude oil. We work with customers from Russia, Belarus, Kazakhstan and from other neighbouring and more distant countries. Our specialists will provide all the information you need and answer any questions you may have.

The configuration of the unit is determined in conjunction with the customer and depends primarily on the quality of the feedstock, the intended capacity and the required end products. ZAVKOM-ENGINEERING specialists are ready to develop several options (so that the most cost-effective one can then be selected) while observing the necessary environmental safety requirements.

The main types of finished products can be obtained at CDU/CDVU (AT/AVT) units:

- kerosene fraction (used in the blending process and for in-house production needs);
- diesel fuel grades DT-E-K4, DE-A-K4, DT-3-K4;
- domestic heating oil;
- marine fuel DMA/DMZ in accordance with GOST 32510-2013;
- fuel oil (heating oil grade 100) in accordance with GOST 10585-2013;
- AI-80 motor gasoline.



ZAVKOM
ENGINEERING

392000, Tambov, 51
Sovetskaya St., office 319

8 800 555-06-09

office@zavkomepc.com

zavkomgroup.com