



Dear Sirs!

With due regard to public prominence and importance of environmental safety challenge there is an **urgent need** to take exhaustive **measures to ensure cleanliness** of public and special **transport**, regional **infrastructure**, petroleum products **tank battery**, etc.

Clean technologies Group, due to great experience in solution problems of environmental safety and resource conservation, offers the possibility of implementation of a comprehensive innovation **Project "Clean regions"** so that you can build a single **washing** system for regional **transport**, **infrastructure** and petroleum products **tank battery**. **All of the above will rely upon high-quality production base.**

The **first stage** which can be implemented in the near future, involves creating structure focusing on:

1. **Optimization** of work and **reconstruction of existing** and **construction** of new **washing** facilities for municipal transport, including **buses and trolley-buses, trams and underground, rail and road tanks, trucks, cars and specialized vehicles**, etc.
2. **Construction** of network of the city **entry** washings for commercial vehicles.
3. **Creation of a centralized system**
- **cleaning tanks** from liquid hydrocarbons with their subsequent

All of the above **activities** or individual lines thereof can be **carried out** both within the framework of public-private partnership and private investors, without need for **budgetary investments**. **Clean technologies** Group possessing in its records all required design and construction documentation for the specified technologies and equipment, more than 15 years of work experience in this field with implementation of more than 60 large objects, as well as experienced and skilled experts is ready to **propose itself** as a **coordinator** and **technical manager** of the project, **providing with** its **process engineering support** throughout implementation and operation.

We hope, Ladies and Gentlemen, that you are interested in our offer and we can count on your support in the regions of your control.

Sincerely,
Chairman of the Board of Directors,
Professor, D.Eng.Sc. merited scientist



V. M. Smolyanov

Enclosures:
- Some developments.

OPTIONS
FOR WASHING COMPLEXES
(CLEANING, WASHING, RINSING, DRYING)
FOR CONTAMINATED SURFACES
OF VARIOUS FACILITIES
OF “**CLEAN REGIONS**” PROJECT

No.	Name	Designation
1.	<i>Railway liquid hydrocarbons tank internal washing complexes</i>	KVO-JC
2.	<i>Car washing complex for railway passenger rolling stock, including underground and electric trains of tunnel type</i>	VMK-T
3.	<i>Car washing complex for railway passenger rolling stock, including underground of portal type</i>	VMK-P
4.	<i>Car washing complex for railway passenger rolling stock, Including underground and electric trains Manual</i>	VMK-na
5.	<i>Car washing complex for trams tunnel type</i>	VMK-TrT
6.	<i>Vehicle washing complex for trolleybuses tunnel type</i>	AMK-TT
7.	<i>Vehicle washing complex for buses tunnel type</i>	AMK-AT
8.	<i>Vehicle washing complex for buses portal type</i>	AMK-AP
9.	<i>Vehicle washing complex for commercial vehicles tunnel type</i>	AMK-GT
10.	<i>Vehicle washing complex for commercial vehicles portal type</i>	AMK-GP

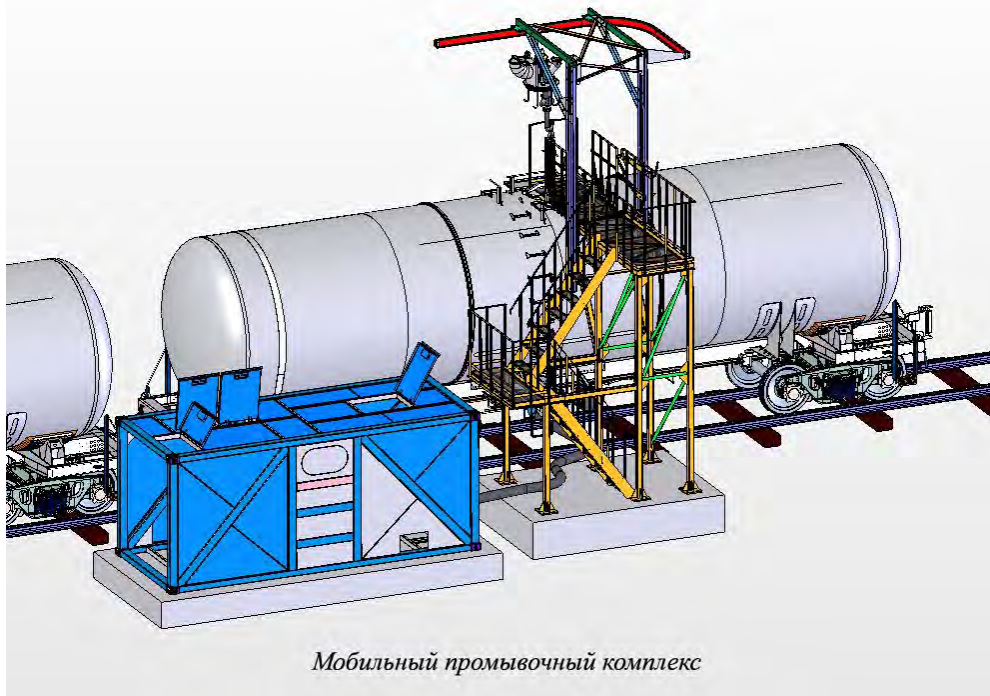
11.	Vehicle washing complex for passenger cars tunnel type	AMK-LT
12.	Vehicle washing complex for passenger cars portal type	AMK-LP
13.	Vehicle washing complex for special transport tunnel type	AMK-ST
14.	Vehicle washing complex for undercarriage of construction machinery tunnel type	AMK-StT
15.	Vehicle washing complex for military vehicles portal type	AMK-VP
16.	Vehicle washing complex for agricultural machinery portal type	AMK-ShP
17.	Vehicle washing complex for vehicles manually	AMK-na
18.	Vehicle washing complex for petroleum products car tanks combine	AMK -ACS
19.	Internal washing complexes for ship tanks mobile	KVO-STp KVO-STr
20.	Internal washing complexes for fixed containers	KVO-StR-zo KVO-StR-no

RAILWAY LIQUID HYDROCARBONS TANK INTERNAL WASHING COMPLEXES

XOMV

Modern washing and recirculation technology proposed by «CTG» (EP European Patent No. 1389229 and RF Patent No.2200637) for washing of contaminated surfaces are absolute alternative to traditional resource-intensive washing and steam-curing technologies.

It should be brought into focus that there are **no analogues** to such compact and resource-light systems for tank surface treatment in the world. Alternative proposals are focused on high resource consumption and complex water purification system which is repaid only by creating washing and steam-curing complexes with efficiency of several hundred tank-cars per day. Features of the same proposals by «CTG» provide significant rate of return and with low, a few units of tank-cars per day, performance, make them extremely attractive, in particular for equipping car repair plants, depots, etc. Moreover, to perform a minimum of installation works at the project site and for the possibility of mobile move to another location, again with minimal costs, all the main systems involved in the technological process are compactly arranged inside a 20-foot container called “washing module”.

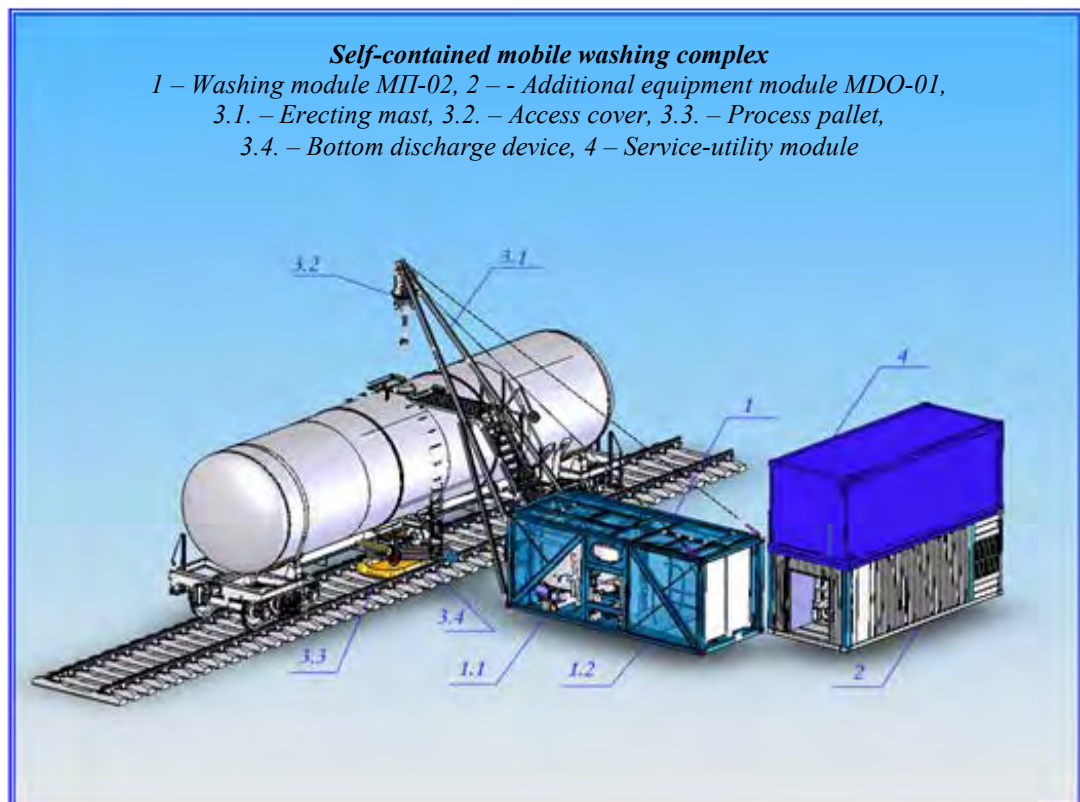


Мобильный промывочный комплекс

Mobile washing complex

At the same time, more and more often experts of «CTG» are challenged to ensure self-containment operation of washing equipment which is required in cases of non-availability at sites of individual types of energy or when need to apply washing equipment in "open field". This challenge is also successfully solved. In this case, equipment that provides "washing module" with necessary energy is placed in another, same 20-foot container where peripheral products providing technological process are arranged, incl. access cover, washing machine, bottom discharge device, necessary systems of pipes and hoses, fittings, etc., Such design allows transportation of "additional equipment module" on the same platform with the "washing module", and if necessary operation directly "just-in-time" and in "open field". In addition, equipping of "additional equipment module" with specialized devices (carriages, tripods, local heaters, high pressure pumps, discharge sleeves etc.) can greatly extend the range of possibilities of the washing complex designed by «CTG» up to possibility of washing of fixed containers, tanks, etc. To ensure maximum "self-containment" the complex can be additionally equipped with a second car or train platform with two 20-foot containers, serving as heated modules for storing water and diesel fuel as well as for storage of oil residues and oil sludge collected from containers after their treatment.

Non-availability at the site of welfare spaces is quite often. For such case possibility of installation on the roof of the "additional equipment module" of the so-called "service-utility module", designed to provide the serving staff of washing complex with the necessary social and living conditions.



CAR WASHING COMPLEX
FOR RAILWAY PASSENGER ROLLING STOCK,
INCLUDING UNDERGROUND AND ELECTRIC TRAINS
OF TUNNEL TYPE
VMK-T



Car washing complex of tunnel type *VMK-T* is designed for washing of external surfaces of different rail cars of railway transport rolling stock (single- and double-deck passenger cars, electric trains of different configurations) and underground. It is characterized with high capacity.

Washing equipment is installed permanently. Process of cars external surfaces washing is performed when the train is passing through the car washing complex at a speed of up to 2 km/h.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	up to 200
2.	Dimensions of the washing plant space: - length - width - height	mm	60000 9000 7500
3.	Dimensions of the recycling water supply wastewater treatment plant space: - length - width - height	mm	36000 6000 6000
4.	The installed capacity of electric equipment	kW	110,00
5.	Water consumption for technical needs	m ³ /day	14,00
6.	Coolant consumption	GCal/day	3,10
7.	Compressed air consumption	m ³ /day	4,80
8.	Maintenance manpower	person/shift	3

**CAR WASHING COMPLEX
FOR RAILWAY PASSENGER ROLLING STOCK,
INCLUDING UNDERGROUND AND ELECTRIC TRAINS
OF RQTVCN TYPE
VMK-P**



Car washing complex for washing of external surfaces of different rail cars of railway transport rolling stock *VMK-P* is applied when needed washing of stationary wagon or train for example, directly on one of the ways of repair depot before it repairs and painting.

Basic operations for car washing are performed by self propelled modular systems moving by additional rails.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	до 160
2.	Dimensions of the washing plant space: - length - width - height	mm	162000 7900 6000
3.	Dimensions of the recycling water supply wastewater treatment plant space: - length - width - height		36000 6000 6000
4.	The installed capacity of electric equipment	kW	155,00
5.	Water consumption for technical needs	m3/day	10,00
6.	Coolant consumption	GCal/day	2,40
7.	Compressed air consumption	m3/day	4,50
8.	Maintenance manpower	person/shift	3

**CAR WASHING COMPLEX
FOR RAILWAY PASSENGER ROLLING STOCK,
INCLUDING UNDERGROUND AND ELECTRIC TRAINS
MANUALLY
VMK-na**



Car washing complex *VMK-na* is designed for manual washing of external surfaces of rail cars of railway transport rolling stock and can be applied for locomotives of hood type, freight cars, tank-cars, passenger cars and electric train cars before their repair or painting. Detergent application, high pressure washing, rinsing are performed manually.

To comply with standards of water consumption and water removal, as well as water saving the

complex includes recycling water treatment plant module.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	Up to 40
2.	Dimensions: - length - width - height	mm	36000 12000 6000
3.	The installed capacity of electric equipment	kW	80,00
4.	Water consumption for technical needs	m3/day	Up to 2,5
5.	Coolant consumption	GCal/day	3,00
6.	Compressed air consumption	m3/day	1,98
7.	Maintenance manpower	person/shift	2

CAR WASHING COMPLEX FOR TRAMS

TUNNEL TYPE

VMK-TrT



Equipment of car washing complex for external washing of trams **VMK-TrT** is designed in compliance with clearance to the contact wire for safe works and is installed permanently at the sites.

Process of trams external surfaces washing is performed when passing through the washing complex at a speed of up to 2 km/h.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	Up to 200
2.	Dimensions of the washing plant space: - length - width - height	mm	32000 6500 6000
3.	Dimensions of the recycling water supply wastewater treatment plant space: - length - width - height	mm	13716 2438 2896
4.	The installed capacity of electric equipment	kW	124,00
5.	Water consumption for technical needs	m ³ /day	14,00
6.	Coolant consumption	GCal/day	3,10
7.	Compressed air consumption	m ³ /day	4,80
8.	Maintenance manpower	person/shift	2

VEHICLE WASHING COMPLEX FOR TROLLEYBUSES

TUNNEL TYPE

AMK-TT

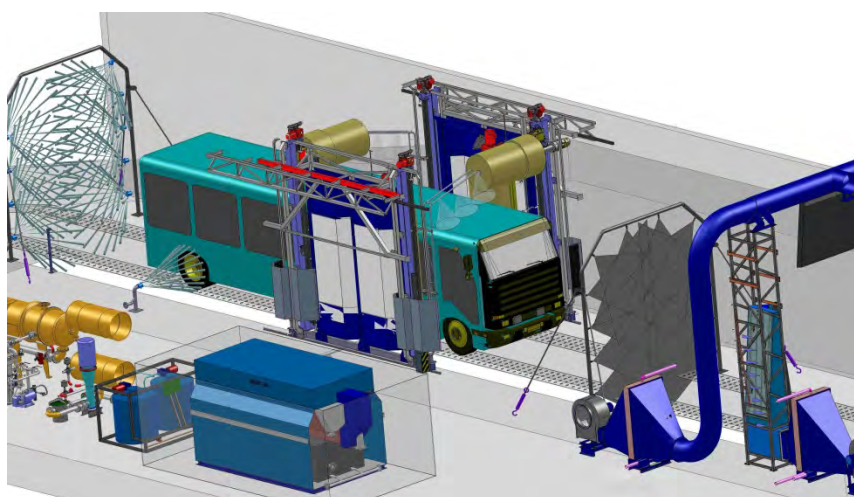


Vehicle washing complex equipment of tunnel type **AMK-TT** is installed permanently. Trolleybuses are storage battery moved through the complex with stops at the required places Moving speed is up to 2 km/h. To ensure safety the complex is equipped with restrictors, providing vehicles move for a given path.

For year-round operation the equipment is installed in a heated room, however, for seasonal (summer) operation can be made with special design and installed outdoors.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	Up to 200
2.	Dimensions: - length - width - height	mm	36000 12000 6000
3.	The installed capacity of electric equipment	kW	135,00
4.	Water consumption for technical needs	m3/day	25,00
5.	Coolant consumption	GCal/day	3,00
6.	Compressed air consumption	m3/day	1,98
7.	Maintenance manpower	person/shift	2

**VEHICLE WASHING COMPLEX
FOR BUSES
TUNNEL TYPE
AMK-AT**



Vehicle washing complex equipment for buses external surfaces washing of tunnel type *AMK-AT* is installed permanently. Buses are moving through the complex by themselves with stops at the required places. Moving speed is up to 2 km/h. To ensure safety the complex is equipped with restrictors,

providing vehicles move for a given path.

For year-round operation the equipment is installed in a heated room, however, for seasonal (summer) operation can be made with special design and installed outdoors.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	до 200
2.	Dimensions: - length - width - height	mm	36000 12000 6000
3.	The installed capacity of electric equipment	kW	110,00
4.	Water consumption for technical needs	m ³ /day	25,00
5.	Coolant consumption	GCal/day	3,00
6.	Compressed air consumption	m ³ /day	1,98
7.	Maintenance manpower	person/shift	2

**VEHICLE WASHING COMPLEX
FOR BUSES
RQTVCN TYPE
AMK-AP**



AMK-AP is designed for washing buses external surfaces. Main operations are carried out by self propelled gantry due to which high quality of surfaces cleaning, including front-end, is provided. If necessary, for specific bus models roofs washing is possible.

For year-round operation the equipment is installed in a heated room, however, for seasonal (summer) operation can be made with special design and installed outdoors.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	Up to 100
2.	Dimensions: - length - width - height	mm	42000 12000 6000
3.	The installed capacity of electric equipment	kW	165,00
4.	Water consumption for technical needs	m3/day	12,00
5.	Coolant consumption	GCal/day	1,50
6.	Compressed air consumption	m3/day	0,85
7.	Maintenance manpower	person/shift	2

VEHICLE WASHING COMPLEX FOR COMMERCIAL VEHICLES

TUNNEL TYPE

AMK-GT



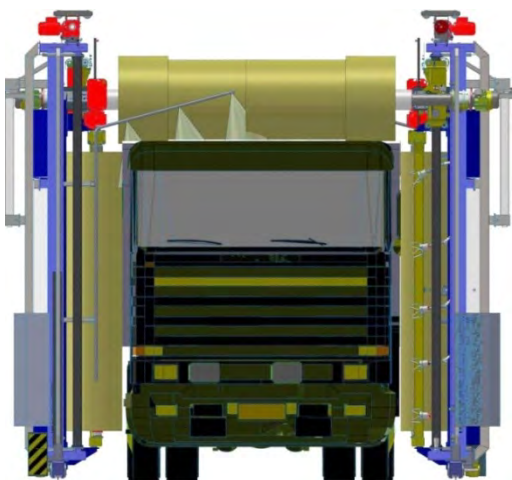
Vehicle washing complex equipment for commercial vehicles external surfaces washing of tunnel type **AMK-GT** is installed permanently. Commercial vehicles are moving through the complex by themselves with stops at the required places. Moving speed is up to 2 km/h. To ensure safety the complex is equipped with restrictors, providing vehicles move for a given path. For year-round operation the equipment is installed in a heated room, however, for seasonal (summer) operation can be made with special design and installed outdoors.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	до 200
2.	Dimensions: - length - width - height	mm	36000 12000 6000
3.	The installed capacity of electric equipment	kW	110,00
4.	Water consumption for technical needs	m ³ /day	25,00
5.	Coolant consumption	GCal/day	3,00
6.	Compressed air consumption	m ³ /day	1,98
7.	Maintenance manpower	person/shift	2

VEHICLE WASHING COMPLEX FOR COMMERCIAL VEHICLES

RQTVCN TYPE

AMK-GP



AMK-GP complex is designed for washing commercial vehicles external surfaces. Main operations are carried out by self propelled gantry due to which high quality of surfaces cleaning, including front-end, is provided.

For year-round operation the equipment is installed in a heated room, however, for seasonal (summer) operation can be made with special design and installed outdoors.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	до 100
2.	Dimensions: - length - width - height	mm	24000 10000 4500
3.	The installed capacity of electric equipment	kW	130,00
4.	Water consumption for technical needs	m ³ /day	12,00
5.	Coolant consumption	GCal/day	1,50
6.	Compressed air consumption	m ³ /day	0,85
7.	Maintenance manpower	person/shift	2

VEHICLE WASHING COMPLEX FOR PASSENGER CARS

TUNNEL TYPE

AMK-LT



Vehicle washing complex equipment for passenger cars external washing of tunnel type **AMK-LT** is installed permanently. The complex is equipped with a conveyor belt, which moves cars through the processing arches due to which high performance of this complex is provided. The best treatment quality is guaranteed by the use of high-efficiency detergents. At the first stage, bodies are processed with water under high pressure to remove particles

of sand, which can damage during subsequent brush handling. Brushes are made of soft pile, and automatic system when they are driving on the car body provides safety of the attached equipment.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	до 70
2.	Dimensions: - length - width - height	mm	20000 7000/12000 3500
3.	The installed capacity of electric equipment	kW	140,00
4.	Water consumption for technical needs	m ³ /day	77,00
5.	Coolant consumption	GCal/day	4,62
6.	Compressed air consumption	m ³ /day	4,7
7.	Maintenance manpower	person/shift	2

VEHICLE WASHING COMPLEX FOR PASSENGER CARS

RQTVCN TYPE

AMK-LP



AMK-LP complex is designed for washing passenger cars external surfaces. All operations of detergents application, brush processing, rinsing and moisture blowing are carried out by self propelled gantry due to which high quality of cleaning is provided.

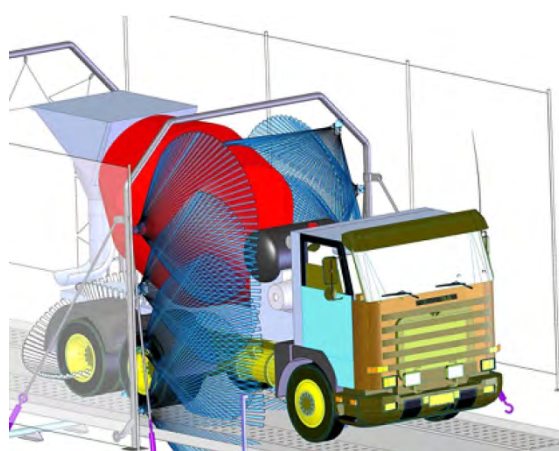
For year-round operation the equipment is installed in a heated room, however, for seasonal (summer) operation can be made with special design and installed outdoors.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	Up to 120
2.	Dimensions: - length - width - height	mm	12000 7000/12000 3500
3.	The installed capacity of electric equipment	kW	80,00
4.	Water consumption for technical needs	m ³ /day	12,00
5.	Coolant consumption	GCal/day	1,50
6.	Compressed air consumption	m ³ /day	0,85
7.	Maintenance manpower	person/shift	2

VEHICLE WASHING COMPLEX FOR SPECIAL TRANSPORT

TUNNEL TYPE

AMK-ST



AMK-ST complex is a permanently installed washing equipment designed for washing of special, including construction, transport and is used in cases when it is necessary to promptly remove coarse dirt, including when leaving the construction site.

Vehicles are moving through the complex by themselves with stops at the required places To ensure safety the complex is equipped with restrictors, providing vehicles move for a given

path required for their washing.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	до 200
2.	Dimensions: - length - width - height	mm	36000 12000 6000
3.	The installed capacity of electric equipment	kW	110,00
4.	Water consumption for technical needs	m ³ /day	25,00
5.	Coolant consumption	GCal/day	3,00
6.	Compressed air consumption	m ³ /day	1,98
7.	Maintenance manpower	person/shift	2

VEHICLE WASHING COMPLEX FOR UNDERCARRIAGE OF CONSTRUCTION MACHINERY

TUNNEL TYPE

AMK-StT



Vehicle washing complex for undercarriage of construction machinery **AMK-StT** is a mobile equipment with the possibility of rapid transportation, mounting and dismounting. It is designed for washing of undercarriage of construction machinery and is applied in cases where it is necessary to promptly remove coarse dirt, for example when leaving the construction site, which will ensure compliance

with requirements of local authorities.

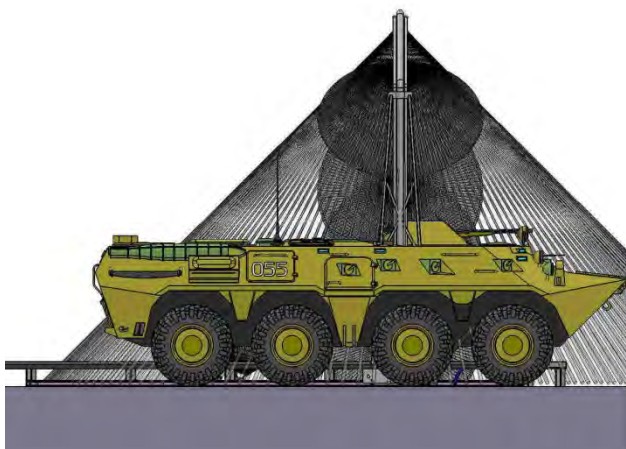
Vehicles are moving through the complex by themselves with stops at the required places to ensure safety the complex is equipped with restrictors, providing vehicles move for a given path.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	Up to 200
2.	Dimensions: - length - width - height	mm	36000 12000 6000
3.	The installed capacity of electric equipment	kW	58,00
4.	Water consumption for technical needs	m ³ /day	25,00
5.	Coolant consumption	GCal/day	3,00
6.	Compressed air consumption	m ³ /day	1,98
7.	Maintenance manpower	person/shift	1

VEHICLE WASHING COMPLEX FOR MILITARY VEHICLES

RQTVCN TYPE

AMK-VP



AMK-VP complex is designed for washing military vehicles. Main operations are carried out by self propelled gantry due to which high quality of military vehicles washing is provided. The complex is equipped with individual bottom and undercarriage washing module.

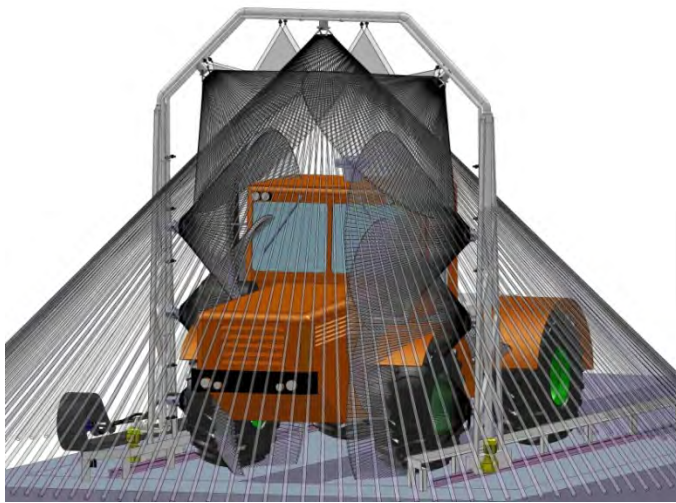
For year-round operation the equipment is installed in a heated room, however, for seasonal (summer) operation can be made with special design and installed outdoors.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	до 100
2.	Dimensions: - length - width - height	mm	16000 7000/12000 6000
3.	The installed capacity of electric equipment	kW	100,00
4.	Water consumption for technical needs	m ³ /day	12,00
5.	Coolant consumption	GCal/day	1,50
6.	Compressed air consumption	m ³ /day	0,85
7.	Maintenance manpower	person/shift	2

VEHICLE WASHING COMPLEX FOR AGRICULTURAL MACHINERY

RQTVCN'TYPE

AMK-ShP



AMK-ShP complex is designed for washing agricultural machinery. Main operations are carried out by self propelled gantry due to which high quality of military vehicles washing is provided. The complex is equipped with individual bottom and undercarriage washing module.

For year-round operation the equipment is installed in a heated room, however, for seasonal (summer) operation can be made with special design and installed outdoors.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	до 100
2.	Dimensions: - length - width - height	mm	16000 7000/12000 6000
3.	The installed capacity of electric equipment	kW	100,00
4.	Water consumption for technical needs	m ³ /day	12,00
5.	Coolant consumption	GCal/day	1,50
6.	Compressed air consumption	m ³ /day	0,85
7.	Maintenance manpower	person/shift	2

VEHICLE WASHING COMPLEX FOR VEHICLES

MANUALLY

AMK-na



Car washing complex *AMK-na* is designed for manual washing of vehicles. Detergent application, high pressure washing, rinsing and when required drying are performed manually.

To comply with standards of water consumption and water removal, as well as water saving the complex includes recycling water treatment plant module.

№ п/п	Technical characteristics	Unit of measurement	Value
1.	Dimensions of the washing space:		Depending on vehicle dimen- sions
2.	Dimensions of the recycling water supply wastewater treatment plant space: - length - width - height	mm	13716 2438 2896
3.	The installed capacity of electric equipment	kW	37,00
4.	Maintenance manpower	person/shift	2

**SYSTEMS
FOR WASHING
TANKS AND RESERVOIRS**

MOBILE

Tank cleaning problem is solved around the world through contaminated surface exposure to high pressure superheated steam, which naturally requires enormous energy resources.

At the same time, there is a way fundamentally different from existing traditional ones. No need to spend a lot of money for the creation of a system for high-quality surface treatment and cleaning of contaminated sewage and harmful fumes, and then not less money for maintenance service. You can also qualitatively treat surfaces at low cost and not to dump anything in the external networks and therefore not to clean discharges. Processing systems, where surface is qualitatively cleaned at low temperatures and with no drains are created in «CTG».

Basis for these cleaning systems for tanks and reservoirs of different size and designation is designed modern equipment at all stages of engineering process by which can be processed:

- *Vehicle and railway tanks;*
- *fuel and cargo tanks of oil tankers and other vessels;*
- *vertical and horizontal, aboveground and underground stationary tanks;*
- *other containers for liquid hydrocarbons storage and transportation.*

Such **facilities**, in general can be divided into **two groups**:

- “**moving**”- vehicle and railway tanks, marine tanks, etc.;
- “**stationary**” - vertical and horizontal, aboveground, underground storage tanks, stationary tanks, etc.

**VEHICLE WASHING COMPLEX
FOR PETROLEUM PRODUCTS CAR TANKS**
COMBINED
AMK-ACS



AMK-ACS includes permanently installed equipment for both interior and exterior washing of liquid hydrocarbons car tanks. Vehicles are moving through their own complex with stops in the required field. To ensure safety the complex is equipped with restrictors, providing vehicles move for a given path.

The first step is to wash internal surfaces of car tanks, which is implemented through the use of specially designed technological cover, successively put into each of the tank compartments. At the end of the internal washing tank truck moves through the arches of contactless external processing. Speed of movement through the external treatment arches is not more than 2 km/h.

No.	Technical characteristics	Unit of measurement	Value
1.	Efficiency	units/day	до 20
2.	Dimensions: - length - width - height	mm	54000 12000 6000
3.	The installed capacity of electric equipment	kW	145,00
4.	Water consumption for technical needs	m ³ /day	5,00
5.	Coolant consumption	GCal/day	3,75
6.	Compressed air consumption	m ³ /day	0,68
7.	Maintenance manpower	person/shift	3

***INTERNAL WASHING COMPLEXES
FOR SHIP TANKS
MOBILE***

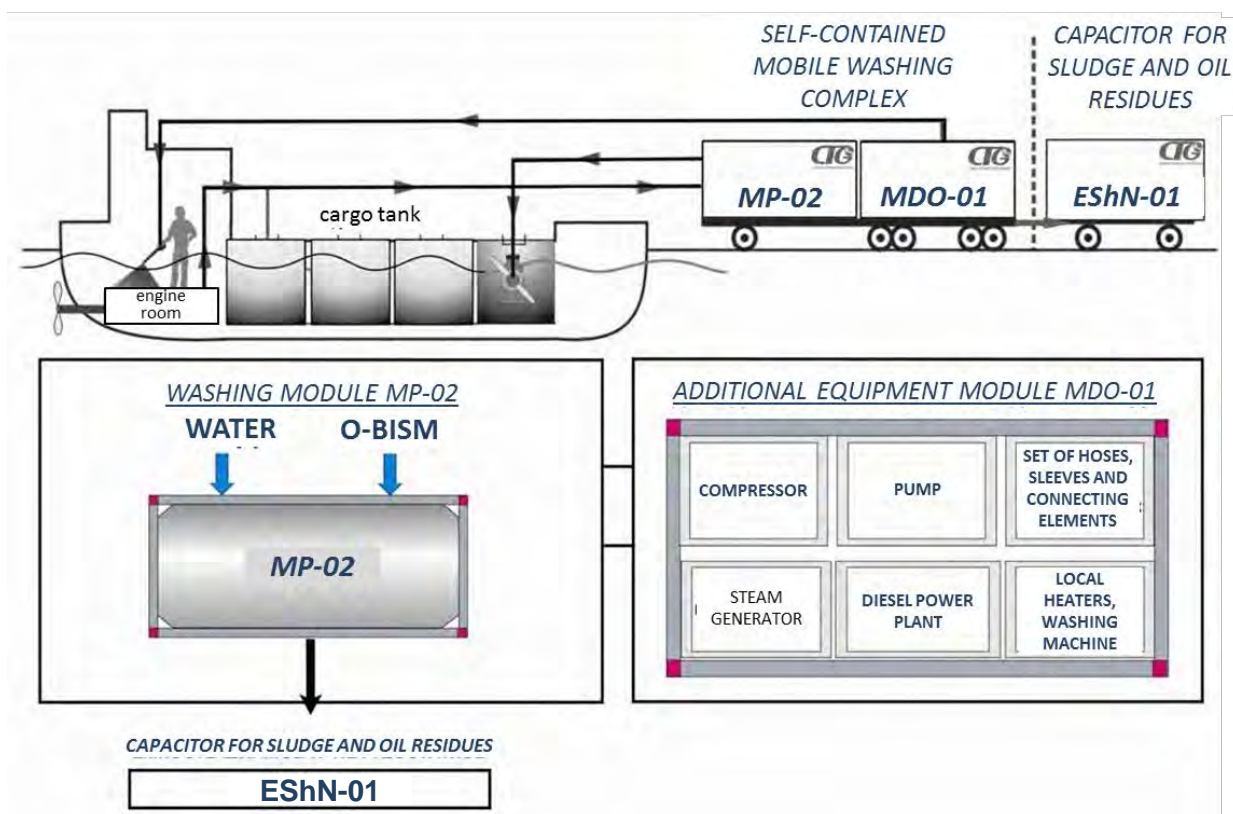
***SHIP TANKS WASHING COMPLEXES
BERTHING VERSION
KVO-STp***

Technologies currently used for cleaning (washing) of cargo and fuel ship tanks use traditional detergents, including expensive, or just hot water, which entails high level of energy consumption and formation of large volumes of water contaminated by petroleum, which is discharged to special collecting vessels and further to onshore fixed treatment plants, where they are recycled and disposed. This technology is ineffective, requires enormous costs (including heat) for directly washing, disposal of wastewater polluted with oil products and oil sludge. In addition, upkeep and maintenance of onshore fixed treatment facilities in operating condition also require considerable financial resources.

The proposed technology version with use of self-cleaning detergents of ***O-BIS*** series and mobile equipment ***CTG*** cut the cost of this process by many times and relieve many environmental problems.

KVO-STp consists of washing module (MP-02) and additional equipment module (MDO-01) and also the capacitor module for collecting sludge and oil residues. These modules and tank are placed inside a 20-feet container, which, in turn, can be installed on containerships, enabling rapid move to objects of washing.

Washing module MP-02 includes all main systems providing engineering process of tank washing, namely, preparation and purification of detergent, delivery of detergent to the surface to be washed, pumping out to the module for separation, etc. Additional equipment module MDO 01 has: steam generator, compressor, diesel power plant, pumps, washing machines with fittings, a set of hoses, sleeves and connecting elements, local heaters etc.



Operating costs

No	Equipment name	Efficiency	Consumable resources
1.	Steam generator	Steam 1000 kg/h Pressure 1-16 bar	Diesel fuel 60 l/h, water 1000 liters for initial filling, water consumption for topping up to 50 liters/hour; electricity 2.7 kW
2.	Diesel generator	Electricity 380-440 V, 50 Hz, Nominal 40 kW/h	Diesel 13 l/h
3.	Compressor	Compressed air 320 l/min, pressure up to 10 bar	Electricity 3.0 kW
4.	Water consumption for initial filling of module MP-02		15,00 m ³

**WASHING COMPLEXES
FOR SHIP TANKS
ROADSTEAD VERSION
KVO-STr**

Roadstead washing of ship tanks from washing ship is expected to be very promising. In this capacity it is possible to use marine steam tug or petroleum contaminated water collector vessel. Available on this vessel cargo tanks can serve both for carriage of petroleum products, as well as service capacity tanks for:

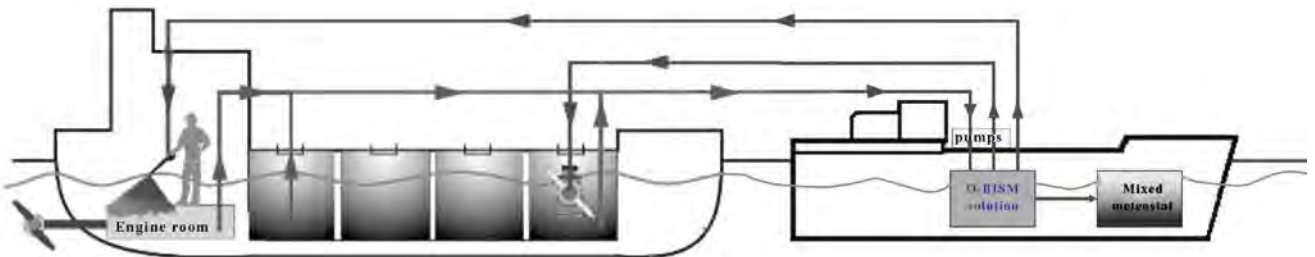
- pure water detergent **O-BISM**;
- released high-quality petroleum product;
- waste water contaminated by petroleum products;
- solid waste and sludge.

Pumping equipment available on the vessel can be used for delivery and discharge of detergent when performing washing.

Heating of detergent is performed from own boiler, or diesel generator. The vessel shall be equipped with washing machines and hoses.

Thus, the vessel becomes multi-purpose: for collection and transportation of water polluted with oil products, as well as for washing of ship's tanks. With such use with its appropriate environmental safety and efficacy, can perform the following kinds of works on the roadstead:

- washing cargo and fuel tanks of tankers;
- washing of drinking water tanks;
- cleaning and washing of machine-boiler compartments;
- washing of double bottom space;
- reception of waste water contaminated by petroleum products.



When performing works the washing ship is placed next to the vessel to be washed and connects to the objects of washing by hoses for delivery and pumping solutions. The process of detergent preparation and removal oil from the detergent is performed directly on the washing ship. In addition, there is no need to discharge the detergent - it will be required for washing next vessel, etc.

Availability on the shore of a small stock of tanks for petroleum products and water detergent O-BISM provides with possibility receive and accumulate for sale washed petroleum products and store, if needed, water detergent **O-BISM**.

Besides **O-BISM** solution has anticorrosive properties, which positively affect effective life of vessel's hull.

***INTERNAL WASHING COMPLEXES
FOR FIXED CONTAINERS***

***INTERNAL WASHING COMPLEXES
FOR FIXED CONTAINERS***

SIGNIFICANT VOLUME

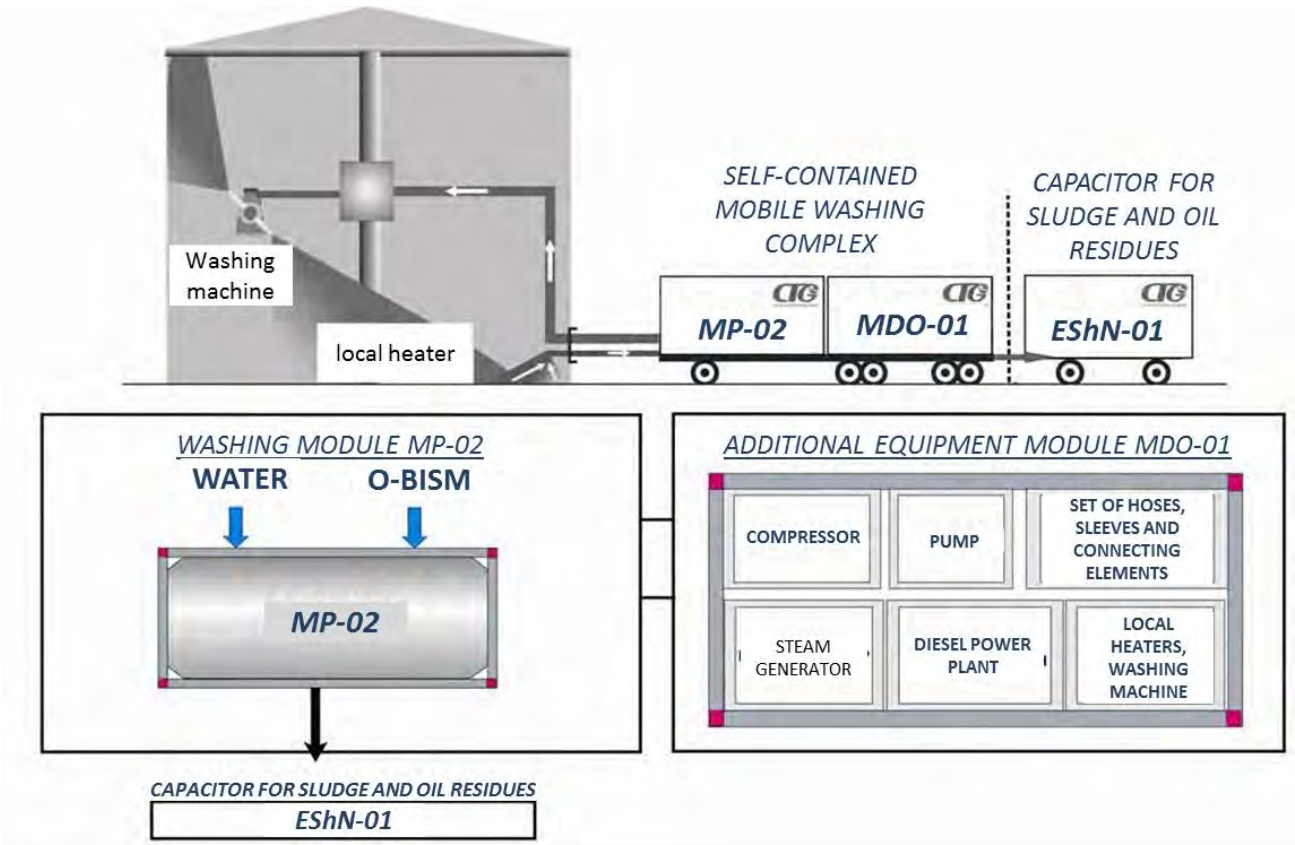
KVO-StR-zo

The cleaning process of cylindrical vertical and horizontal, surface and subsurface fixed tanks of significant volume is usually complicated by presence of heavy bottom sediments.

The proposed complex of process equipment, which provides cleaning and washing of fixed tanks of significant volume, consists of washing module (MP-02) and additional equipment module (MDO-01) and also the capacitor module for collecting sludge and oil residues. These modules and tank are placed inside a 20-foot container, which, in turn, can be installed on container vehicles, enabling rapid move to objects of washing.

Washing module MP-02 includes all main systems providing engineering process of tank washing, namely, preparation and purification of detergent, delivery of detergent to the surface to be washed, pumping out to the module for separation, etc. Additional equipment module MDO 01 has: steam generator, compressor, diesel power plant, pumps, and washing machines with fittings, a set of hoses, sleeves and connecting elements, local heaters etc.

Principle diagram of MXQ-StR-zo



Operating costs

No	Equipment name	Efficiency	Consumable resources
1.	Steam generator	Steam 1000 kg/h Pressure 1-16 bar	Diesel fuel 60 l/h, water 1000 liters for initial filling, water consumption for topping up to 50 liters/hour; electricity 2.7 kW
2.	Diesel generator	Electricity 380-440 V, 50 Hz, Nominal 40 kW/h	Diesel 13 l/h
3.	Compressor	Compressed air 320 l/min, pressure up to 10 bar	Electricity 3.0 kW
4.	Water consumption for initial filling of module MP-02		15,00 m ³

**INTERNAL WASHING COMPLEXES
 FOR FIXED CONTAINERS**

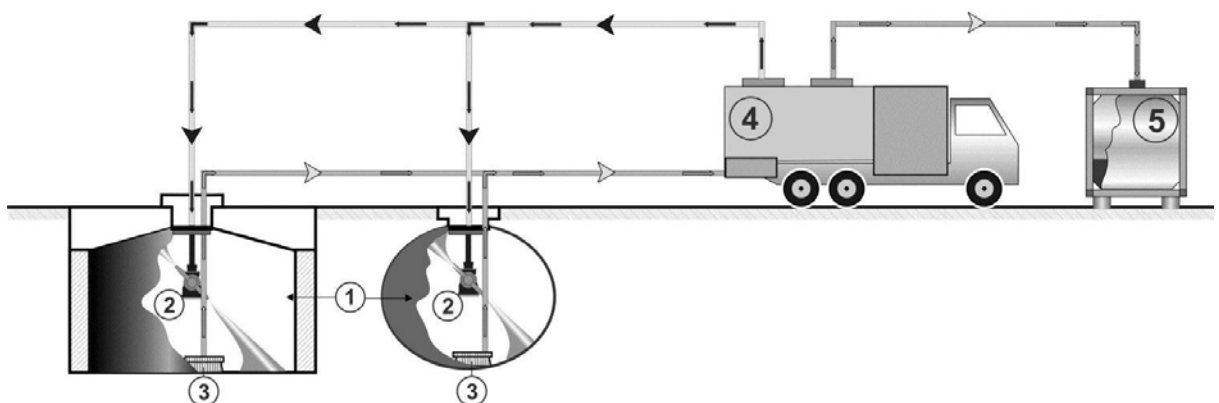
SMALL VOLUME

KVO-StR-no

For cleaning and washing of tanks of a relatively small volume of tank, such as subsurface tanks at petrol stations, we offer complex of equipment which is mini mobile washing station (MMWS).

MMWS is a converted lorry based on tanker truck (sewage tank trucks, gasoline tank truck etc.). Vehicle with MMWS is equipped with two tanks, or with one tank, divided by a partition into two parts and equipment required for operation (pumps, washing machine, sleeves, etc.). Car loads in one of its tanks (compartments) detergent of ***O-BIS*** series and moves to the place of processing. On Installation of equipment is made on the site, as shown in the diagram below, and washing and cleaning is performed. Pumping out the contaminated solution is made to the empty tank (compartment) of MMWS. Released oil products and sludge are transported to the place of accumulation and pumped into a separate tank for subsequent neutralization and recycling, and the purified solution is regenerated for subsequent processing cycles.

Principle diagram of MXQ-StR-no



Designations:

- 1 – washed tank for petroleum products storage;
- 2 – washing machine;
- 3 – nozzle;
- 4 – MMWS for clean ***O-BISM*** solution delivery to tank 1, and for separation of cleaned petroleum products and ***O-BISM*** solution;
- 5 – tank for decanted oil products discharge.