



**“IRBIS” bottom
sediments
prevention
and tank liquid
stirring equipment**

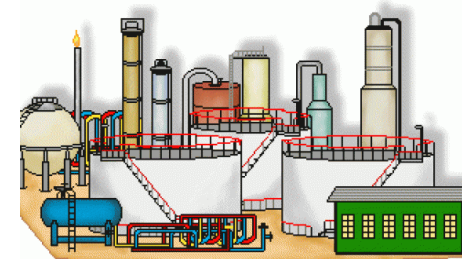
Equipment Designated Purpose

“IRBIS” Tank Liquid Stirring Device (“IRBIS” TLSD) is designed for vertical steel tanks (VST) of various types with the capacity from 50 m³ to 150 000 m³, used for storage, processing and transportation of crude oil and petroleum products (gasoline, residual fuel-oil, diesel oil fuel, etc.).

The device helps to solve the following tasks:

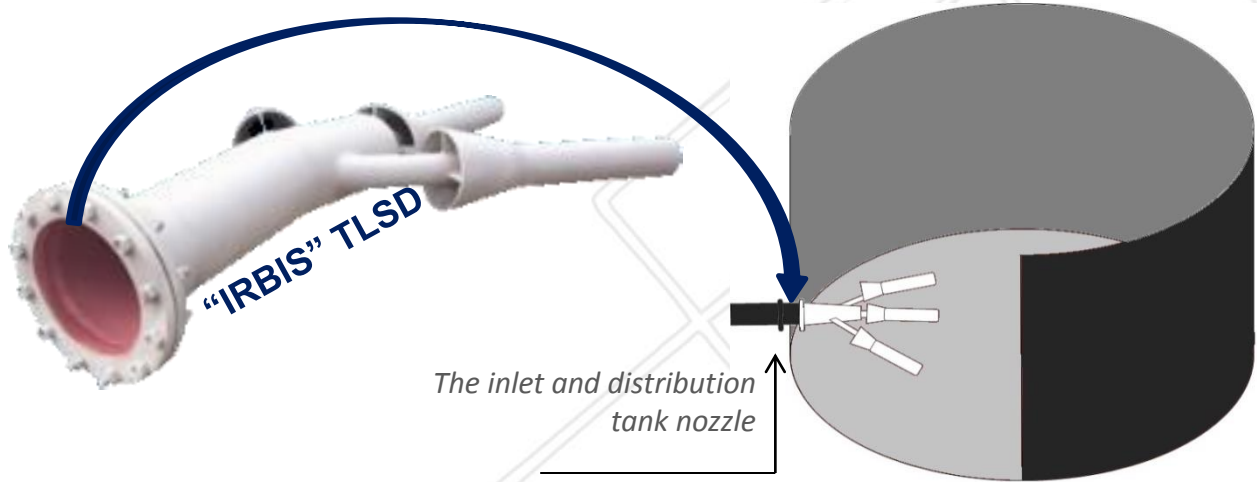
1. To prevent bottom sediments formation in tanks
2. To stir (homogenize) liquid throughout a tank, eliminating the possibility of its decomposes into fractions

The device is suitable for use at plants processing liquid products with the viscosity of up to 400 cSt.



“IRBIS” TLSD is a unique patented Russian device.

The device is attached to the inlet and dispensing nozzle by flange connection



The inflowing petroleum product is passed through the device and is divided into three equal streams, each having a precisely specified direction.

A required stream pressure capacity for petroleum product throughout the tank and removal of bottom sediments, if any, is achieved due to reduced diameter of central and side nozzles.

The device does not require electricity supply. It uses only pipeline flow energy.

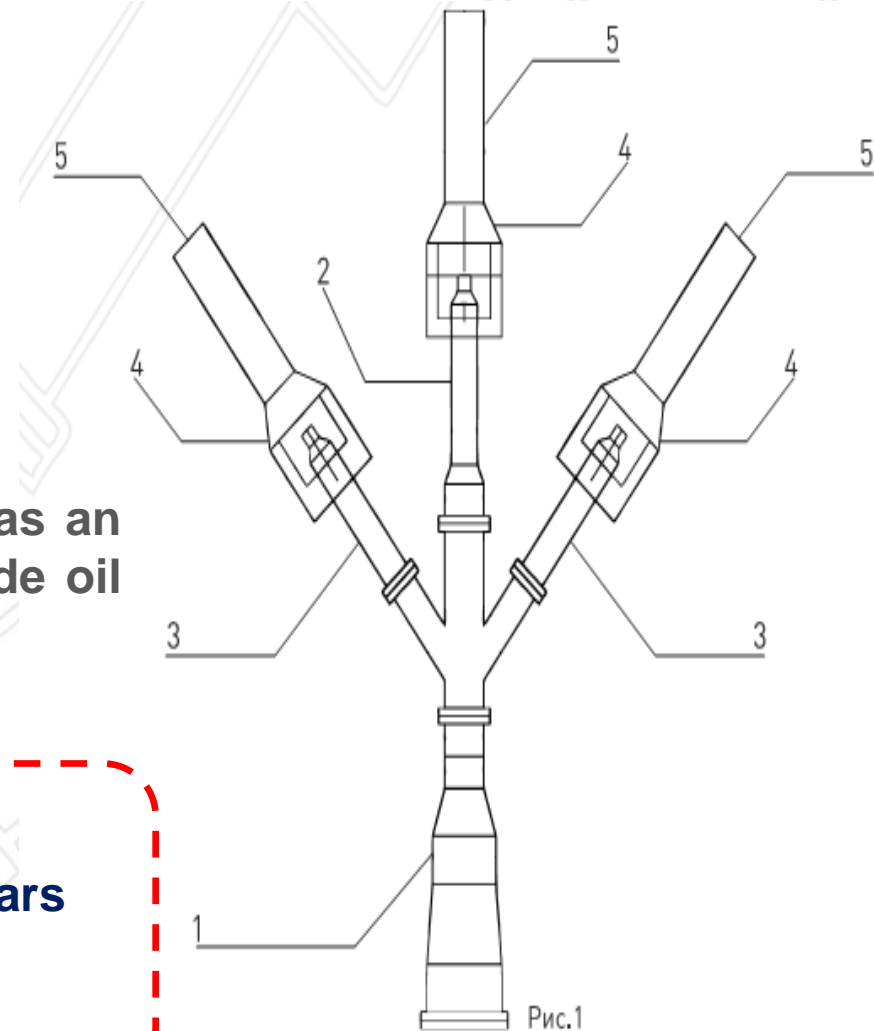
“IRBIS” TLSD Structure Diagram

“IRBIS” TLSD device consists of:

1. an inlet branch pipe,
2. a central nozzle,
3. two side nozzles,
4. a confuser,
5. a mixing chamber.

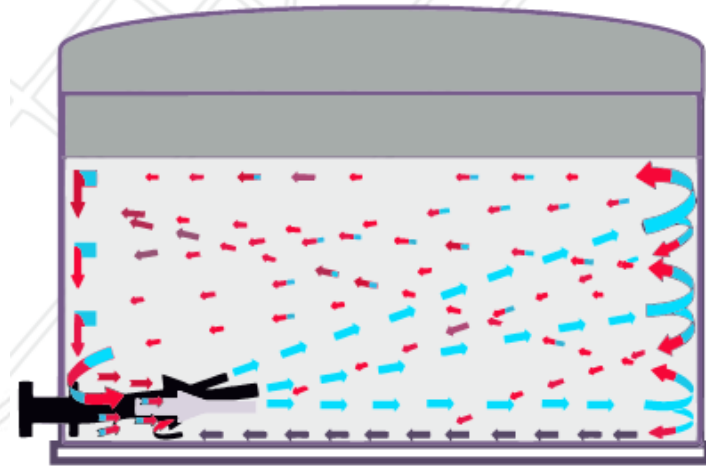
The mixing chambers at each nozzle act as an ejector, thus enabling to properly stir crude oil and petroleum products in a tank.

- ❖ “IRBIS” TLSD is made of corrosion-resistant steel and provides over 10 years of tool service life.
- ❖ The device warranty period is 2 years.



“IRBIS” TLSD Operation Principle.

- ❖ The inflowing petroleum product is passed through the device via the inlet and distribution nozzle and is divided into three equal streams.
- ❖ Stream propagation angle of 40 degrees is achieved by turbulence factor $a=0,1$.
- ❖ Two side nozzles are also 40 degree horizontally inclined to the central nozzle axis so as to provide maximal tank bottom cover.
- ❖ Aggregate impact of three streams of oil or petroleum products, flowing out of “IRBIS” TLSD, intensively stirs and properly homogenizes the products inside throughout the whole tank.
- ❖ The product pump-out is conventionally performed through available inlet and distribution nozzles of the tank.



“IRBIS” TLSD Installation

“IRBIS” TLSD is installed into the preliminarily cleaned (or new) tank to the inlet and distribution nozzle.

Primary tank filling up to the height of 3 meters is performed via a back-up inlet and distribution nozzle, bypassing “IRBIS” TLSD.

Later on, the whole stream of oil or petroleum product is directed through “IRBIS” TLSD

The device performs its function in the tank filling mode and circulation mode. In some cases, circulation is not necessary.

Minimum service life of “IRBIS” TLSD without any extra settings is 10 years.

Technical Specifications

Parameter	Indicator
Operating fluid	Oil / fuel oil residuals / gasoline / diesel oil fuel / kerosene, etc.
Liquid load, m ³ /hr	from 150 to 10 000
Design pressure, MPa	from 4 to 6
Nominal diameter, mm	from 150 to 700
Length, m	1,2 – 5,5
Housing wall thickness, mm	from 5 to 10
Housing material	Steel 20
Internal parts material	Steel 20
Device pressure loss, mPa	0,05-1,5
Free gas content % of volume, max.	50
Operating medium temperature, C°	from +5 to +70
Ambient temperature, C°	from -60 to +50
Weight, kg	300-900
Ejection coefficient	0,5-3

Major Advantages

- ❖ **No energy costs.** The device operation does not require any energy supply, thus energy costs are considerably lower if compared with other stirring systems.
- ❖ **High stirring speed and efficiency.** “IRBIS” TLSD application in gasoline, diesel oil fuel, kerosene and other tanks enables to avoid the division of these fluids to heavy and light fractions and sedimentation. The device provides an opportunity to store fuel in tanks for a long time, preserving its performance characteristics according to GOST /(state standards)/, and technical regulations.
- ❖ **Bottom sedimentations prevention.** The device application eliminates the need to carry out long-term, hazardous and expensive operations such as removing up to several dozens of tons of bottom sediments from the tank and their disposal.
- ❖ **Improving tank useful capacity and its turnover rates.** The tank useful capacity is increased due to device application.

Major Advantages

- ❑ **Extra oil storage tanks become available**, as medium pumping from tank to tank is not needed any more.
- ❑ **Tank service life extension.** The device has no rotating and moving elements, thus it causes no vibration or high and medium acoustic waves, so the service life of the tank and its component parts is extended. “IRBIS” TLSD protects the tank from corrosion caused by bottom sediments accumulation and equipment contamination.
- ❑ **Fire Safety.** Oil inflammation is impossible unlikely. Fixed structure guarantees complete watertight integrity of grease-retainers and seals.

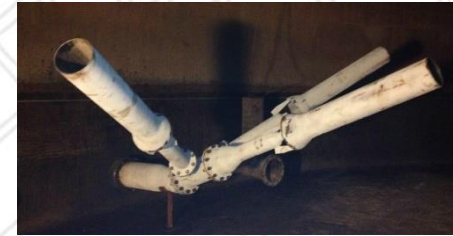
“IRBIS” TLSD fully compensates its cost for a single application at accumulated residuals washing. Replacing the whole range of operations over 10 year of trouble-free operation, “IRBIS” TLSD becomes the most optimal and cost- effective solution.

Energy Saving & Environmental Compatibility

- ❖ The device operation does not require any energy supply, thus energy costs are considerably lower if compared with other stirring systems;
- ❖ Electricity consumption reduction. It is enough to circulate $1/4 - 1/3$ of the tank volume so as to stir the whole tank volume;
- ❖ Industrial device application eliminates the need for bottom sediments disposal;
- ❖ Technological process of tank sludge wash-out and disposal is non-polluting (washed out bottom sediments are pumped to the pipeline together with feedstocks);
- ❖ The device operation does not require any extra environmental protection measures.

“IRBIS” TLSD Implementation to the Customer’s Sites

Our device has been successfully implemented and operated for over 2 years at the facilities of “Gazpromneftekhim Salavat” JSC (light oils stirring) and “Bashneft-Dobycha” JSC (tanks and vessels prevention from bottom sediments).



Our Company has a highly qualified staff and complies with all requirements of technological infrastructure. We have all licenses and permits applicable field operations implementation at any fuel and energy complex sites.

FAQs /Frequently Asked Questions/

1. What is the differential pressure? Won't the tank be filled out?

Answer: A tank won't be filled out for one simple reason : as pressure increases in nozzles and further pressure drop restores pressure balance, i.e. we do not increase the amount of incoming fluid before and after "IRBIS" TLSD installation;

2. How is it possible to operate the device, if the tank is operated in a non-synchronous mode? I mean, it is operated for 10 days and then turns into standby mode.

Answer: to answer this question, we need to know the asphaltene sedimentation rate so as to estimate the routine break;

3. May your device be installed in a pontoon roof tank?

Answer: Yes, it may. But the angle of horizontal nozzle raise will be determined in accordance with the lowest point of the pontoon roof location;

4. Is there any standard range of "IRBIS" TLSD models?

Answer: No, the device is individually designed (cutomized) for every particular case depending on the tank capacity, fluid type, pumps characteristics, inlet nozzle location, etc.

Patent and certificate of conformity

РОССИЙСКАЯ ФЕДЕРАЦИЯ



ПАТЕНТ

НА ПОЛЕЗНУЮ МОДЕЛЬ

№ 172559

**УСТРОЙСТВО ДЛЯ ПЕРЕМЕШИВАНИЯ ЖИДКОСТЕЙ
В РЕЗЕРВУАРАХ**

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Срок действия исключительного права
на полезную модель истекает 02 ноября 2026 г.

Руководитель Федеральной службы
по интеллектуальной собственности

Г.П. Илвиев Г.П. Илвиев



ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ
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отвечающий требованиям технического регламента
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ЗАЯВИТЕЛЬ Общество с ограниченной ответственностью «ПрофТрейд».

Место нахождения: 450078, Российская Федерация, Республика Башкортостан, город Уфа, улица Владивостокская, дом 7, корпус 2, квартира 33. Место осуществления деятельности: 450103, Российская Федерация, Республика Башкортостан, город Уфа, улица Сочинская, дом 18, офис 3. Основной государственный регистрационный номер: 1160280074338 Телефон: 7(347)2164931, адрес электронной почты: prof2164931@gmail.com.

ИЗГОТОВИТЕЛЬ Общество с ограниченной ответственностью «ПрофТрейд».

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ТИПОВОЙ ОБРАЗЕЦ ПРОДУКЦИИ Оборудование химическое, нефтегазоперерабатывающее: Устройство для перемешивания жидкости в резервуарах, модель «Ирбис» заводской номер 001-0108216. Продукция изготовлена в соответствии с ТУ 28.99.39-001-01814928-2017 «устройства для перемешивания жидкости в резервуарах «ИРБИС» (УПЖР Ирбис).

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- УПЖР ИРБИС ОБ «Устройство для перемешивания жидкости в резервуарах ИРБИС. Обоснование безопасности»;
- ТУ 28.99.39-001-01814928-2017 «Устройство для перемешивания жидкости в резервуарах «ИРБИС» (УПЖР Ирбис). Технические условия»;
- Руководство по эксплуатации «Устройство для перемешивания жидкости в резервуарах (УПЖР «ИРБИС»).

ОРГАН ПО СЕРТИФИКАЦИИ продукции Общества с ограниченной ответственностью «Гарант Плюс». Место нахождения: 121170, Российская Федерация, город Москва, Кутузовский проспект, дом 36, строение 3. Фактический адрес: 121170, Российская Федерация, город Москва, Кутузовский проспект, дом 36, строение 3. Телефон/факс: +7(495) 532-86-08, адрес электронной почты: garantplus-os@inbox.ru. Аттестат аккредитации регистрационный № РОСС RU.0001.11АЛ16 выдан 05.02.2013 года Федеральной службой по аккредитации

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ДАТА ВЫДАЧИ 21.03.2016

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ПрофТрейд

THANK YOU FOR ATTENTION

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