



CREDIBILITY  
FEASIBILITY  
RELIABILITY

# FLEXIBLE ALUMINIUM INTERNAL FLOATING ROOF FAIFR-1

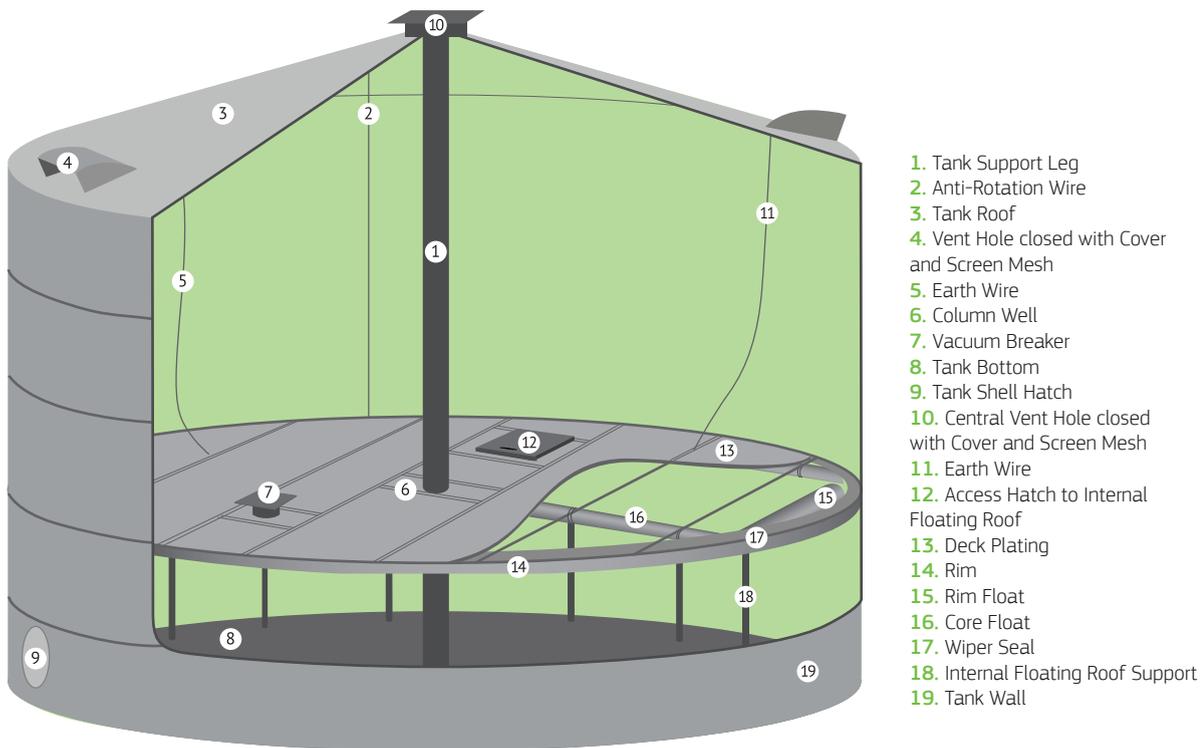
FOR OIL AND  
PETROCHEMICALS

CERTIFIED PRODUCT



**Our Project Ltd** is a Russian-based manufacturer that produces **Flexible Aluminium Internal Floating Roofs FAIFR-1** for Oil and Petroleum Product Tanks. Since Our Project Ltd was found in 2008, it holds the leading position in design, manufacture and assembly of Flexible Aluminium Internal Floating Roofs. FAIFR-1 are delivered and installed at the leading factories in Russia and CIS, and received the highest ratings.

## FAIFR-1 LAYOUT DIAGRAM



The Company's founder and developer of Pontoon FAIFR-1 is **Vladimir G. Dmitriev**, the USSR Council of Ministers` Prize Winner, Ph.D. in Engineering Science, Associate Professor over more than 30 years, who worked previously as **the Chief Welder at Angarsk Petrochemical Company** («APCC» JSC).

When designing **FAIFR-1** he based on his own experience with Tanks, also taking into account domestic and foreign experience of his colleagues. As a result he designed the Flexible Aluminium Internal Floating Roof with Vents which fully complies with the **Rostekhnadzor regulatory documents** (the Federal Service for Ecological, Technological and Nuclear Supervision), both **Russian and American API-650 Petroleum Institute Standards**.

The main distinctive feature of the Pontoon FAIFR-1 is the use of a Porous Conductive Wiper Seal made of Petrol-Resistant Rubber with high wear resistance (**PPRS - Pontoon Porous Rubber Seal**). This material has been developed and patented especially for FAIFR-1 and **has no analogues on the market**. It isolates the space between the Tank Roof and Internal Floating Roof, which increases its efficiency up to 99,5 %. PPRS is used for oil and petroleum products at operating temperatures from -45 °C to +120 °C, as well as at 130 °C at short-term (72 hour).

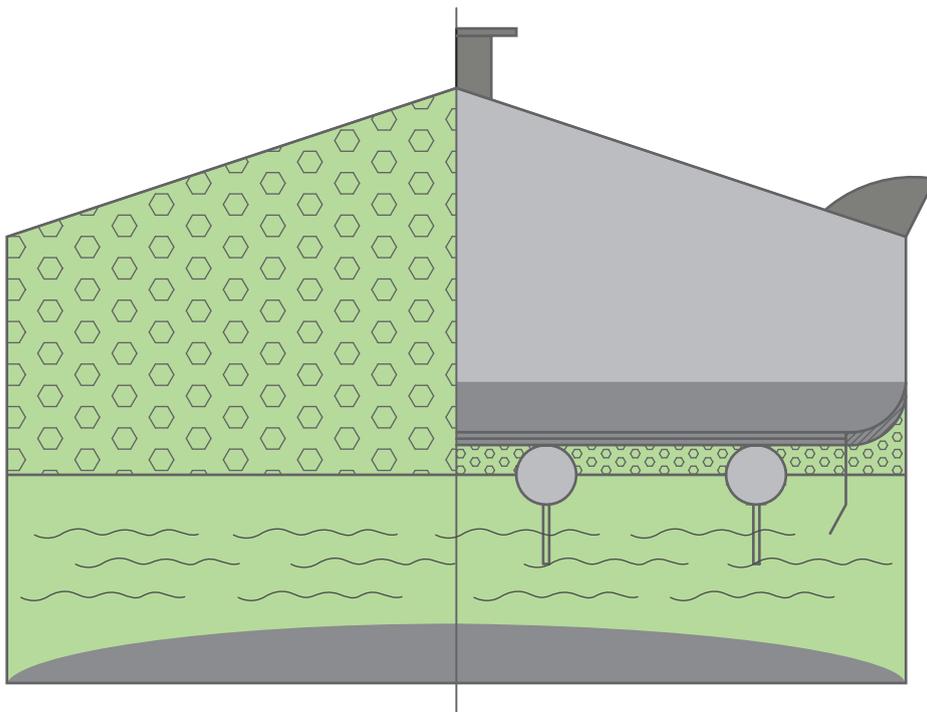


Pontoon Porous Rubber Seal (PPRS)

## PURPOSE

**Flexible Aluminium Internal Floating Roof (FAIFR-1)** is a pontoon type internal floating roof that covers the surface of the stored product. They are designed to equip Vertical Cylindrical Steel Tanks and solve major problems in storage of oil and petroleum products.

FAIFR-1 PERFORMANCE EFFICIENCY MAINTAINS UP TO 99,9% OF EVAPORATION

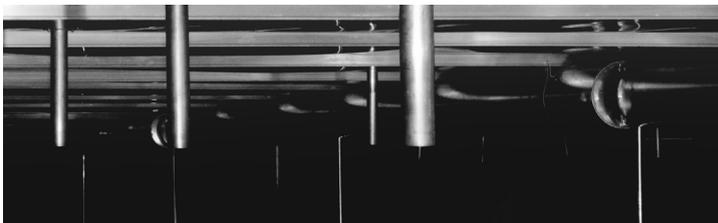


FAIFR-1 BENIFITS ARE THE FOLLOWING:

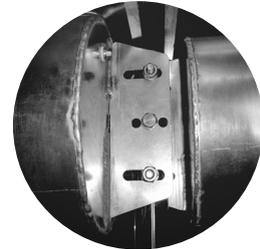
1. **Saving** of stored fuel in the Tank by reducing evaporation losses.
2. **Reducing** environmental pollution due to the high efficiency of reduced light oil and petroleum products (hydrocarbon) emission (99,5%).
3. **Fire safety** during the Tank operation by low concentration of hydrocarbons above the Internal Floating Roof space due to its cient service and available mandatory natural ventilation.
4. **Prevent oxidation** of petroleum products stored in the Tank.
5. **Increased service life** of Steel Fixed Tank Roof.

# FAIFR-1 DESIGN FEATURE

- Aluminium Alloy Floating Tube with Sealed Deck made of 0.6 mm thick sheet has a rim around the perimeter which immerses 150 mm below the liquid surface. Thus, the Aluminium Internal Floating Roof even without PPRS prevents the evaporation, locking the layer of saturated vapors that accumulating on the surface of the stored product at 98% of the total area of the Tank
- Tube welded structure of Sealed Floats DN 260 mm forms 100% surplus buoyancy. Core Floats are interconnected with Hinged Joints that makes the Internal Floating Roof flexible and resistant to exposure of liquid turbulence in the Tank and eliminates the Internal Floating Roof dismantling or disrupting (for example, when filling or unloading, especially when stirring, as well as breakout of gas and air pockets)
- Internal Floating Roof is equipped with Drainage Pipes that allows any product on the upper surface to return below



- Wiper Seal PPRS for FAIFR-1 is made of conductive NBR rubber with additives that improve the mechanical and chemical resistance. PPRS Design Service Life is 6 years or 100 m kilometers across abrasive metal surface dipped by petroleum products



Hinges from different sides

- The Internal Floating Roof is hung on the Pillars (Supports) attached to the Floats and is equipped with Anti-Rotation Wire, Earth Cable, Manhole and Vacuum Breaker
- All FAIFR-1 components freely pass through the standard Manhole of Typical Tanks. FAIFR-1 can be easily assembled in the Tank within short timeframes using the mounting accessories and power tools.

# FAIFR-1 SPECIFICATIONS

## Operating Conditions, Warranties



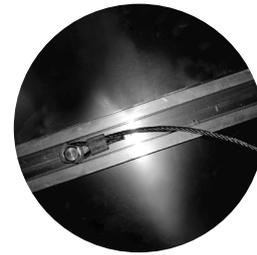
Under-Internal Floating Roof Space



Vacuum Breaker



Access Manhole Earth



Wire

Parameter Name	Features
Tank Range and its Design Features	Vertical Cylindrical Steel Tank for Oil and Petroleum Products (200 m <sup>3</sup> to 100,000 m <sup>3</sup> )
Tank Internal Equipment and its Configuration	Compatibility is guaranteed by customization as per Evaluation Checklist
Stored Product Name	Oil, Petroleum Products, Solvents, Aromatic Hydrocarbons
Acid Content, pH	pH = 5-9
Stored Product Temperature	-45 C ... + 120 C
Distance from Tank Bottom to Floating Roof on Support Legs	1,450-1,900 mm
Product Pump Maximum Flow Rate	Depends on the number of Vacuum Breakers. One VB Flow Rate is 1,500 m <sup>3</sup> /h
Surplus Buoyancy at Minimum Product Density	Minimum 100% of FAP-1 Weight
FAP-1 Efficiency	Depends on the actual operating conditions. At afloat position and temperature above 0 C the emission efficiency factor is reduced to 98-99,5%
Product Vapour content in above FAP-1 Space at afloat* position	5% of hydrocarbons' LEL (lowest explosive level)
Warranty Period	3 years
Anti-Static System	All FAP-1 equipment conductive part are electrically interconnected by minimum two flexible stainless Steel Wires to the outer structure
Compliance with Rostekhnadzor (Federal Environmental, Industrial and Nuclear Supervision Service of Russia) regulatory documents	Design, fabrication and inspection of FAP-1 comply with the requirements of regulatory documents of Federal Environmental, Industrial and Nuclear Supervision Service of Russia, which is confirmed by approval of FAP-1 Technical Specifications and issue of Production and Use Permit

# ADVANTAGES OF FAIFR-1 FOR VERTICAL STOCK TANKS

as compared with other similar structures:

1. **Flexibility** enabled by Pitch Hinges with Plain Bearings at Float interjunctions and wider width of Shell Plates (2 m) are the main distinguishing features that set FAIFR-1 apart from nearly all other Aluminium Floating Roofs of domestic and foreign manufacture.
2. **Greater Margin of Safety** enables Aluminium Internal Floating Roof FAIFR-1 to maintain the distributed loads up to 900 kg. Built-in Margin of Safety ensures the required reliability and durability of all structure. Designed Service Life of FAIFR-1 is 20 years minimum.



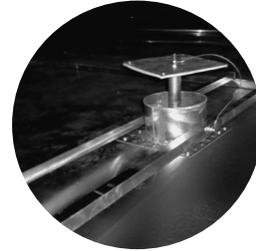
Installer`s Team standing on FAIFR-1

3. **Pitch Hinges** at Float fastening points eliminate the edge tension, make them more flexible and prevent surface cracking.

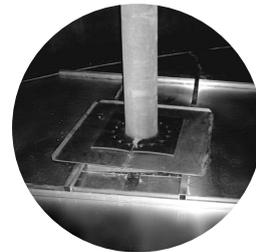


Float Fasteners to Rim

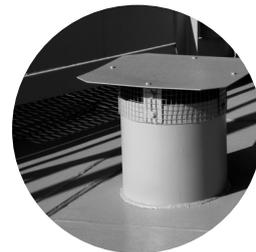
4. Overlapping of Cylinder Clamp Beams with M10 Stainless Steel bolts ensures FAIFR-1 **firm-and-impervious joints throughout the entire operating life**.
5. For **maximum flexibility** of FAIFR-1 Shell Plates is 2 m wide and 0,6+0,1 mm thick. Other structural units are 1-1,5 m wide and 0,5 mm thick, which increases the weight and rigidity of the entire Floating Cover.
6. Only Floating Roofs FAIFR-1 (among the domestic counterparts) are flexible enough to **replicate the wave shape in turbulent flows and attenuate them**.
7. Only Floating Roofs FAIFR-1 in case of vapour locks (flows) in the Tank due to its flexibility **can conglobate and release gas flows** through Drainage Tubes, Wells and Vacuum Breaker as well as into the gap formed between Wiper Seal and Tank Vertical Wall. Floating Roof smoothly returns into service position after the gas flow stopping.
8. FAIFR-1 is **unsinkable** due to its double buoyancy.
9. FAIFR-1 is supplied in set with Pontoon Porous Rubber Seal (PPRS) made of conductive NBR rubber with additives that improve mechanical and chemical resistance, enabling efficiency that reduces hydrocarbon emissions **up to 98% - 99,5%**.
10. FAIFR-1 standard equipment necessarily includes Ventilation Equipment Type «B» that guarantees the **non-explosive concentration of gas mixture** in VSTP.
11. Absence of hydrogen disulphide (only traces) in the space between FAIFR-1 and Tank Roof significantly reduces their corrosion rate and prevents formation of pyrophoric compounds, which **eliminates any potential ignition**.
12. FAIFR-1 design is based on the best domestic and foreign experiences and practices. The knowledge base enabled to creation of **the perfect and simple structure**, which provides for its **assembly with simple tools** and not highly qualified workforce. The Company`s representative conducts instruction and supervises installer's activities, which allows **to complete the FAIFR-1 assembling as soon as practicable**. For example, Tank 10.43 m (V = 1,000 m<sup>3</sup>) may be installed with team of 6 workers for 2 days and Tank 23.00 m (V = 5,000 m<sup>3</sup>) may be installed with team of 6 workers for 4-5 days.



Column Well, View 1



Column Well, View 2



Central Vent



Manhole



FAIFR-1 Assembling

# ECONOMIC FEAGURES

## Aluminium Internal Floating Roof FAIFR-1

Name	Unit of Measure	Tank Volume м <sup>3</sup>									
		1000	1000	2000	3000	5000	5000	10000	10000	20000	20000
Diameter	m	10.43	12.34	15.18	18.98	20.93	23.00	28.50	34.40	39.90	45.60
Transport Volume	m <sup>3</sup>	9.0	10.0	13.0	16.0	19.0	21.0	27.0	35.0	45.0	55.0
Weight	kg	890	1,050	1,220	1,720	2,015	2,250	3,270	4,430	5,600	7,350
One-Pump Fuel Saving	t	1.0	1.0	2.2	3.6	4.4	4.8	8.2	9.6		
Annual Saving of Fuel and Light Oils depending on Operating Conditions	t	70-90	80-120	100-150	180-220	200-250	250-300	300-500	400-600	600-1,000	800-1,500
Efficiency	%	97	97	97	98	98	98	99	99	99	99
Payback Period	1 year	1-1.5	1-1.5	1-1.5	1	1	1	> 1	> 1	> 1	> 1

All relevant approvals are valid and available.



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