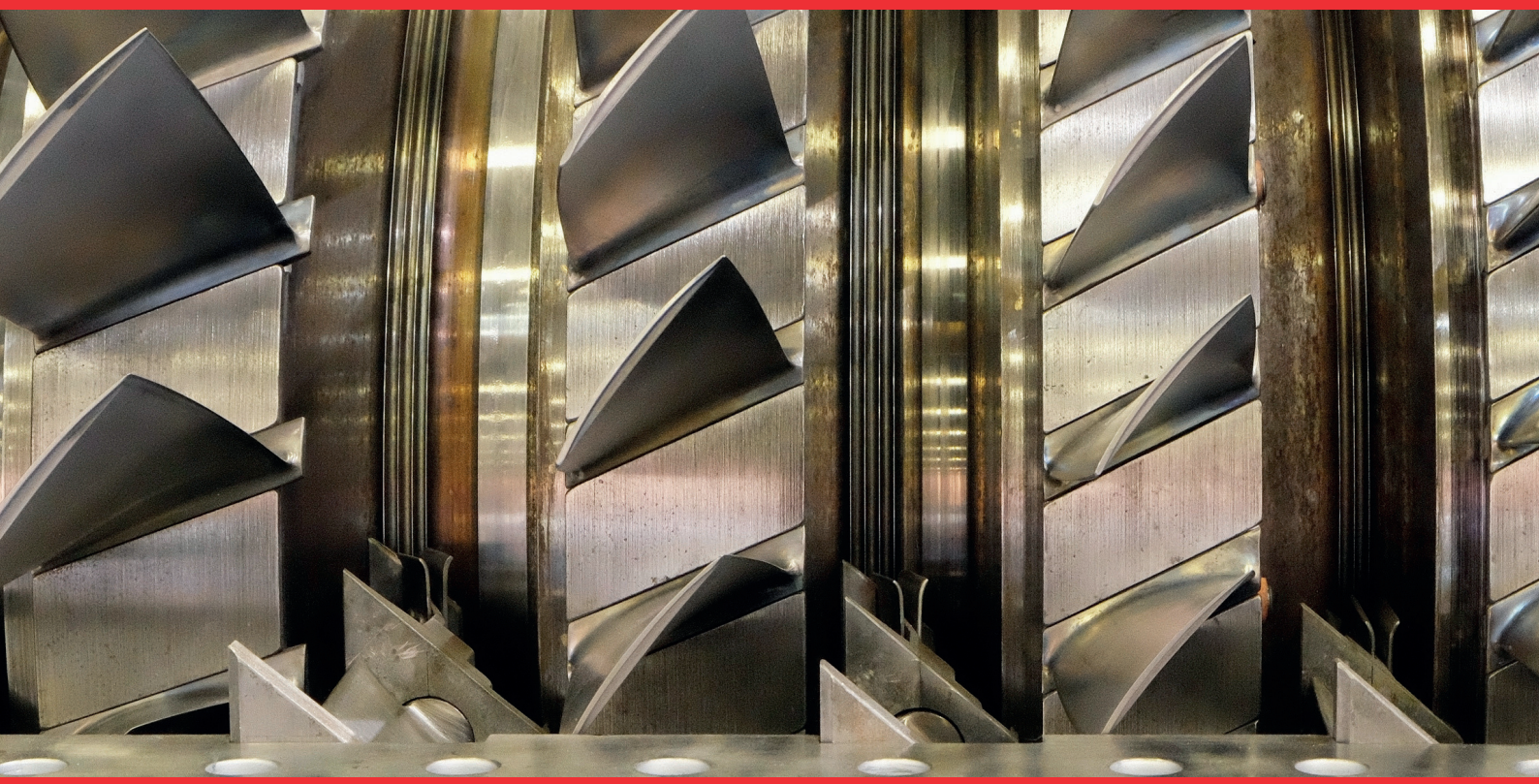
Turbotect

# Professionals in Gas Turbine Compressor Cleaning



## Turbotect Wash Solutions

## TURBOTECT 2020, biphase water-based and biodegradable

**DESCRIPTION**

TURBOTECT 2020 is a biphase water-based, superior quality cleaner for on- and off-line application with an extremely high cleaning performance comparable to solvent-based cleaners.
TURBOTECT 2020 is a unique blend of non-ionic surfactants and solubilizers in a water-based solution.

**KEY FEATURES**

- Biphasic
- Highly effective water-based compressor cleaner outperforming conventional water-based compressor cleaners
- Low-foaming product
- High performance with cold or hot water
- Low non-volatile residue
- Biodegradable
- Conforms to the specifications of all major gas turbine manufacturers

**PACKING**

- 20 litres non-returnable cans
- 208 litres non-returnable polyethylene drums
- 1'005 litres ECOBULK-IBC's

**PROPERTIES**

Compared to conventional monophase detergents TURBOTECT 2020 as a biphasic compressor cleaner has the following unique benefits:

- Significant reduction of surface tension – to facilitate ideal wetting of surfaces and the contact of the cleaning liquid with the contaminant
- Reduction of interfacial tension – to facilitate detachment of the contaminant from surfaces
- Emulsification and stabilization – Encapsulates the contaminant in the biphasic, micro-emulsion network of the cleaner

### Pictures provided by a Turbotect customer upon switching to TURBOTECT 2020:

**Fig. 1**
Regular on-line and off-line cleaning with a monophase detergent did not prevent massive build-up of hydrocarbon deposits on the blade surface.

**Fig. 2**
A switch to biphase TURBOTECT 2020 brought the removal of a large portion of the hydrocarbon deposits from the blade surface leading to efficiency and power output increases.

Fig. 1

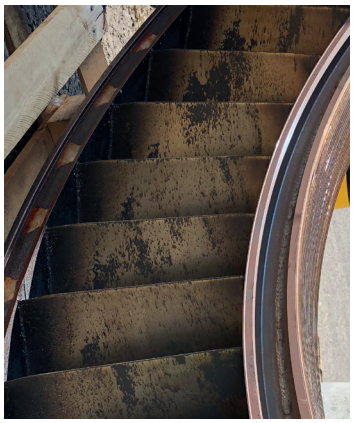


Fig. 2

Cleaning with a monophase cleaner allowed the build-up of deposits leading to a degradation of power output and a decrease in efficiency of the gas turbine. Switching to TURBOTECT 2020 enabled the plant to recover these losses by increasing the power output and efficiency of the gas turbine.

## TURBOTECT 950, monophase water-based and biodegradable

**DESCRIPTION**

TURBOTECT 950 is a monophase water-based, high quality compressor cleaner for on- and off-line application.

**KEY FEATURES**

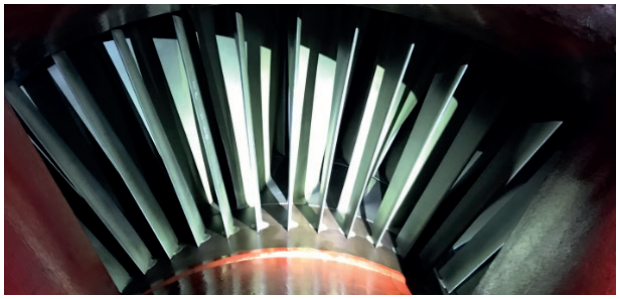
- Monophasic
- Highly effective water-based compressor cleaner
- Low-foaming product
- High performance with cold or hot water
- Low non-volatile residue
- Biodegradable
- Conforms to the specifications of all major gas turbine manufacturers

**PACKING**

- 20 litres non-returnable cans
- 208 litres non-returnable polyethylene drums
- 1'005 litres ECOBULK-IBC's

**PROPERTIES**

- Reduction of surface tension – to facilitate wetting of surfaces and the contact of the cleaning liquid with the contaminant
- Reduction of interfacial tension – to facilitate detachment of the contaminant from surfaces



## TURBOTECT 927, solvent-based

**DESCRIPTION**

TURBOTECT 927 is a solvent-based, high-quality cleaner designed for on- and off-line application. It is specifically formulated from organic solvents, surfactants and emulsifiers designed to remove grease, oil, soot and other deposits commonly found on gas turbine compressor blades.

**KEY FEATURES**

- Most effective solvent-based compressor cleaner for removing severe hydrophobic contamination
- Conforms to the specifications of all major gas turbine manufacturers

**PACKING**

- 25 litres steel cans
- 208 litres steel drums

**PROPERTIES**

- Reduction of surface tension – to facilitate ideal wetting of surfaces and the contact of the cleaning liquid with the contaminant
- Reduction of interfacial tension – to facilitate detachment of the contaminant from surfaces
- Emulsification and stabilization – Encapsulates the contaminant in the emulsion network of the cleaner

# ANTI-ICING FLUIDS

## TURBOTECT ARF-301 antifreeze and rinsing fluid

**DESCRIPTION**

TURBOTECT ARF-301 is a ready to use, high purity, superior quality, specially designed propylene glycol-based gas turbine compressor antifreeze and rinsing fluid for use with all Turbotect compressor cleaners for on- and off-line application in low ambient temperature conditions.

**KEY FEATURES**

- For on-line compressor cleaning at ambient air temperatures from +10 °C to a minimum of -10 °C
- Non-hazardous
- High flash and high boiling point
- No dilution required

**PACKING**

- 208 litres non-returnable polyethylene drums
- 1'040 litres ECOBULK-IBC's

# WASH SERVICES

## TURBOTECT Wash Audit

**DESCRIPTION**

Our wash audit service is designed to share our company's 40 years of experience in cleaning industrial gas turbines. We assist the power plant operators to get the optimum from compressor washing minimizing power degradation, maximizing power recovery and improving overall plant efficiency and profitability.

**KEY FEATURES**

- Optimization of wash procedures
- Testing of nozzle functionality and alignment
- On-the-job operator training
- Improvement of cleaning efficiency and return on investment

## TURBOTECT Wash Services

**DESCRIPTION**

Turbotect's wash services give power plants the option to fully or partially outsource their compressor cleaning activity to Turbotect. The service is tailored to the individual requirements and demands of the power plants. It comprises a selection of performing on- and off-line compressor cleaning, supply of detergent, wash equipment service, effluent waste management, as well as consulting for best compressor cleaning results.

**KEY FEATURES**

- Outsourcing of activities related to compressor cleaning
- Monitoring and supply of detergents based on actual needs and consumption
- Service of existing wash equipment
- Consulting for best compressor cleaning results



## Mobile Wash Cart

**DESCRIPTION**

The mobile wash carts are designed as convenient wash systems, simple to operate and easy to handle. They are the ideal choice for occasional washing of one or multiple gas turbines in one power station. The connection to the compressor injection nozzle manifold is made with a flexible hose.
The mobile wash cart is a compact, workshop-assembled, pre-tested and ready-to-use unit designed to match specific engine requirements and a variety of customer needs.

**KEY FEATURES**

- Mobile stand alone, slow traffic version
- One fluid stainless steel storage tank, typically with a capacity of up to 600 litres
- Manually controlled valves
- Dimensions LxWxH up to approx. 165x135x175 cm
- Wide range of standard products and engineering to customer requirements available

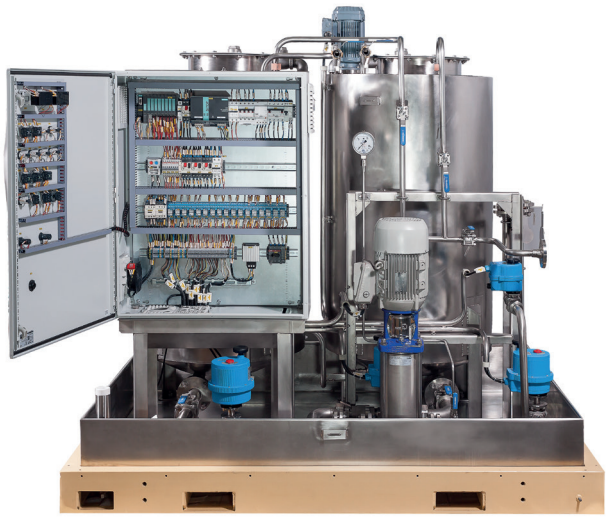
## Stationary Wash Skid

### DESCRIPTION

The stationary wash skids are designed to serve one individual gas turbine or multiple units side by side in one location providing flexibility for on-line and off-line compressor washing.
The control system offers local manual control in a stand-alone version up to full automation with on-board PLC control and interface to the control panel of the power station.

### KEY FEATURES

- Stationary, permanently connected to the compressor of the gas turbine
- Typically, two fluid stainless steel storage tanks
- Selectable degree of automation
- Integration into control system of the gas turbine
- Wide range of standard products and engineering to customer requirements available

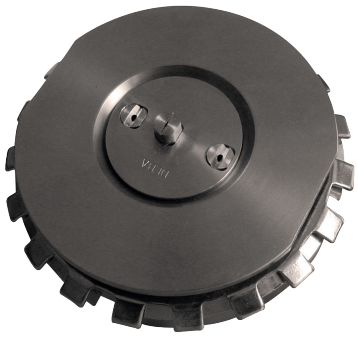
## On-line Injection Nozzles

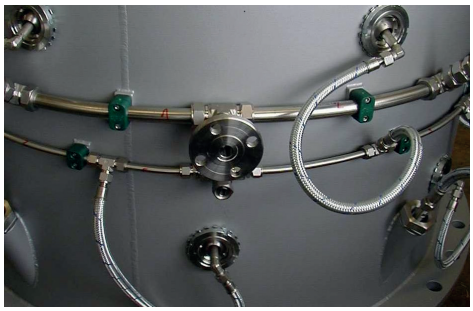
**DESCRIPTION**

Turbotect on-line injection nozzles provide maximum safety for the gas turbine and compressor blades during operation. The flush-mounted design with only an absolute minimum of protrusion into the air stream avoids disturbance of the air flow pattern and prevents losing parts into the air stream. The nozzles with a hollow cone spray pattern provide an ideal droplet distribution in a Low-Pressure Low Flow (LPLF) system.

**KEY FEATURES**

- Low Pressure Low Flow System
- Number of nozzles and flow rate matching the gas turbine compressor geometrics and characteristics
- Optimized droplet distribution





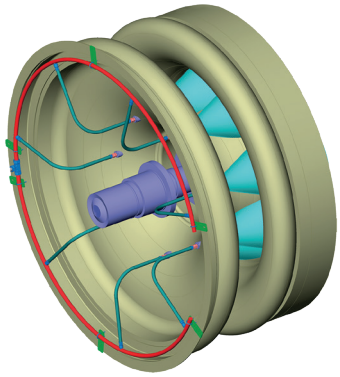
## Off-line Injection Nozzles

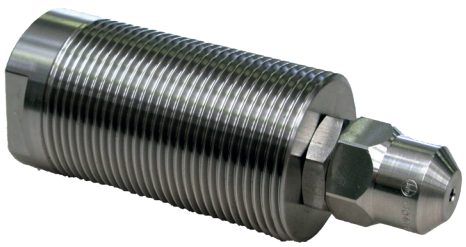
**DESCRIPTION**

Turbotect off-line injection nozzles deliver a full cone spray at a calculated spray angle to cover the whole area of the compressor inlet area.

**KEY FEATURES**

- Full cone Low Pressure System
- Full coverage of the compressor inlet area
- Optimized droplet distribution





# COMPANY INFORMATION

Turbotect Limited was founded in 1978 in Baden, Switzerland. The company is striving to help its customers to improve the efficiency and profitability of their gas turbines primarily in the technology areas of gas turbine fuel treatment and gas turbine compressor cleaning. Turbotect products and services are recognized and endorsed by the gas turbine operators and the OEMs alike, providing excellent local service through a worldwide network of subsidiaries and representatives.

Our products are approved by: SIEMENS Ingenuity for life, GE, ANSALDO ENERGIA, ALSTOM and many more…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