

SULZER

Turbomachinery services for Asia-Pacific region

Sulzer offers technical solutions across an extensive suite of turbomachinery such as turbines, generators, compressors, motors and more, ensuring operational continuity for industrial facilities.



SULZER CONFIDENTIAL

Turbomachinery services

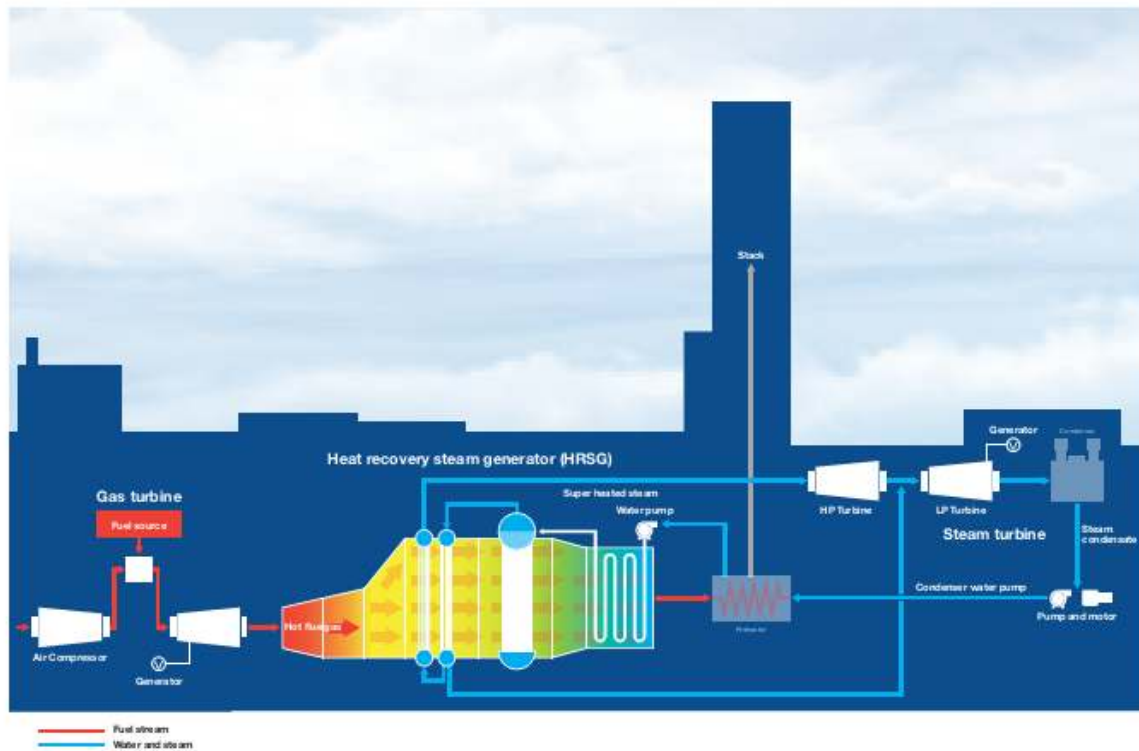
Located at the heart of modern industry, turbomachinery is in operation extensively across the globe and Sulzer has the resources and the expertise to ensure long-term efficiency and

reliability. We offer a complete range of engineering solutions from routine maintenance to complete overhaul and retrofits to extend operational performance and enhance availability.

Your one-stop-shop

Power plant assets services

Experience reduced downtime and improved cost efficiency by working with one servicing partner, capable of fulfilling all your needs for general maintenance, outages and even upgrades for all rotating equipment including steam, gas, aeroderivative gas turbines and compressors etc.



Benefits of servicing with Sulzer

Expertise

Experience and expertise in servicing more than 600 different models and brands of turbomachinery equipment from steam and gas turbines to compressors, aeroderivative turbines and more.

Some of the OEM brands we service

- General Electric
- Siemens
- Mitsubishi
- Mitsubishi +hitachi
- MAN Turbo
- Elliot Ebara
- Fuji Electric
- Toshiba
- Solar Turbines
- Harbin Turbines
- Dongfang Electric
- Nanjing Turbine
- Shanghai Electric

Faster turnaround time

Servicing is our core business, translating to dedicated manpower and capacity to fulfill multiple project requirements at any one time, while OEMs are more focused on product development and manufacturing.

Our global and regional footprint ensures that you'll receive responsive support to reduce downtime for your operations.



Global experience, local support

More than 130 service centres and 1'000 experts on every continent of the globe and centers of excellence focused on turbomachinery repair innovation and technologies.

Leverage on specialised equipment and expertise in centers of excellence for complex projects while receiving responsive local support with due consideration to local business requirements and cultural nuances.

Equipping

Centers of excellence focused on research, innovation and procurement of latest technologies in the field of turbomachinery maintenance.

State-of-the-art facilities and equipping to support the most demanding and complex projects such as AI digital solution (Bluebox), additive manufacturing, 3D scanner and printer, NDT, dynamic balancing machine and more.

Spare parts

We have the know-how, technologies and production capacity to reverse engineer and produce spare parts for multiple categories of turbo equipment, inclusive of those that are discontinued by OEMs.

Flexibility

Have a unique requirement? Our commitment to optimal customer experience ensures that we'll try our best to support contextual-based requirements from costs, timeline, technical, operations and more.



Key services

Maintenance contracts/ LTSA

Reliable contracted plant and equipment solutions to help you manage through-life costs and reliability of your turbomachinery. Clearly defined performance indicators and managed risk transfer ensure that you only pay for solutions benefiting your operations.

High speed balancing

We deliver high speed balancing services for turbine, compressor and generator rotors for up to 62.5 tonnes at low speed and up to 25 tonnes at full operational speed. Offering associated rotor servicing options and balancing thresholds weighing up to 62.5/90(maitland) tons at low speed and up to 25 tons at full operational speed.

Lifetime assessments and extension

Turbine rotor of gas and steam turbines can be greatly affected by stress, fatigue, corrosion, embrittlement or cracking. Maximise the lifespan of your rotor with our thorough assessment services.

Root cause analysis

Understand the specifics that led to risks and failure for future preventive actions. We offer analysis on metallurgical evaluations, rotor dynamic analysis, finite-element structural analysis, field vibration data and more.

Rotor repairs

Test and proven innovative repair methods inclusive of welding and coating technologies that provide optimal quality while remaining cost-effective.

Reverse engineering

Experiencing difficulties sourcing for OEM discontinued parts/ components? We'll help extend the lifespan of your equipment by reverse engineering to produce essential parts to keep your equipment running, processes include 3D scanning, dimensional, material data acquisition of component parts and more.



Retrofits

We perform thorough technical analysis (including rotor dynamic, bearing, seal etc) of your equipment to determine suitable modifications required to improve the performance of your equipment

Relocations

Saara.Kinnunen@sulzer.com

Take advantage of our extensive network of service centers and engineers to relocate or re-purpose equipment efficiently. We offer turnkey services that includes dismantling, relocation and re-commissioning.

Spare parts

For repair services, spares, and replacement of worn or damaged steam turbine parts — regardless of the brand — choose Sulzer. With our broad knowledge of materials and technologies, we can advise on improvement possibilities for your parts. Sulzer has developed refined processes and procedures to manufacture technologically advanced components used in various turbo equipment.

Other services

- Coatings
 - Atmospheric plasma spraying
 - Chemical vapour deposition CVD
 - High velocity oxygen fuel spraying HVOF
 - Low pressure plasma spray LPPS
- Heat treatment
- Hot gas expanders
- Laser weld repairs



Comprehensive sales and service network in APAC



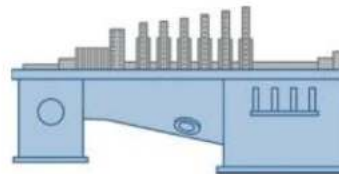
Equipment panorama

When pumps, turbines, compressors, generators, and motors are essential to your operations, you need a service partner you can trust. With our technically advanced and innovative solutions, we give our customers the assurance they need to focus on their operations.

Steam turbines

50+ manufacturers / 450+ models

Working temperature: 950°F (510°C)
Power: up to 600 MW
Speed: 3'600 to 7'200 RPM
Weight: 200'000 lb (90 t)



Combustion turbines

28 manufacturers / 100 models

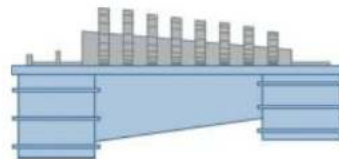
Working temperature: 2'500°F (1'371°C)
Power: 10 – 250 MW (13'000 – 335'000 hp)
Speed: 3'600 RPM
Weight: 200'000 lb (90 t)



Axial flow compressors

20 manufacturers / 50+ models

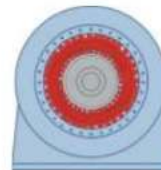
Power: up to 20'000 hp
Speed: 3'000 – 9'000 RPM
Dis. pressure: up to 290 psi (20 bar)
Weight: 100'000 lb (45 t)



Generators

20+ manufacturers

Power: up to 600 MW
Voltage: 440 / 690 / 3'300 / 4'160 / 6'600 / 11'000 / 13'800
Speed: 300 – 3'600 RPM
Weight: 100'000 lb (45 t)



21st century pump services

Our customer support structure for pumping assets is designed to provide the most cost-effective solutions for each application, enabling operators to maximize productivity and keep downtime to an absolute minimum.

The advent of Industry 4.0, together with advancements in manufacturing technology, has led to a data-driven landscape enabling pumps to be more flexible and more efficient. Sulzer has pioneered cutting-edge technology for pump monitoring as well as parts manufacturing and

these solutions are helping operators to optimize performance and reduce costs. Innovative engineering and expert field support ensure that all pumps can be perfectly matched to their task.

Modern industry is under pressure to reduce its carbon footprint and every asset can contribute through improved energy efficiency. Our expertise in pumps, and all other rotating equipment, enables us to support customers with the most effective and reliable solutions, helping them to optimize their business.



Case study: Improved turbine durability extends inspection intervals



Service: Coating

Location: Missouri, USA

Customer: Associated electric cooperative



Challenge

To investigate possibility of extending calendar-based inspection intervals without affecting performance or reliability of turbines for the Holden power plant in Missouri. The plant operates 3X Siemens V84.2 simple cycle dual fuel combustion turbines with a combined output of 321 MW. Deliverables were anti-corrosion coatings, improve cooling structure of flame tube.

Solution

The new compressor coatings greatly improved the corrosion resistance while reducing the reliance on the inlet dehumidification equipment.

- The flame tube F-ring was machined to allow an Inconel 82 overlay to be
- welded in place and machined to the required diameter.
- A full thermal barrier coating was applied to the combustion section.
- Additional cooling holes were drilled in the flame tube to improve durability and minimize erosion and oxidation.

Impact

The HGP inspection has been extended from a six-year interval to at least 10 years. The major inspection will now be carried out after 20 years, instead of the original 12 years.



SULZER CONFIDENTIAL

SULZER Foundation - 1834

Jacob Sulzer found the company in Switzerland during 1834 with a Motto of "Whatever we do, do it right. It will not cost you more time to do it well than to do it badly."

SULZER Rotating Equipment Services

At Sulzer RES, we provide services that are unique and differentiates us from the other service providers. We are not only offering repairs and maintenance for your rotating equipment, we provide solutions of the critical issues with faster and effective results. Maintaining Industry leading international standards for Repair and restoration of capital equipment while providing Routine and Emergency requirement on rotating equipment makes us an edge above the competition.

SULZER Vadodara - India

Following the legacy, SULZER has established a World Class Service Workshop facility at Vadodara, Gujarat, India to offer Advanced Service Solutions on Critical Rotating Equipment under PS (Pump Services) & TS (Turbomachinery Services).



(Figure 1. Bird view SULZER India's Rotating Equipment Service Centre at Savli, Vadodara, Gujarat, India)

VSC is well equipped for Refurbishment and Overhauling of :

- ✓ Radial Compressors and Screw Compressors
- ✓ Steam Turbines
- ✓ Centrifugal Pumps

Inspection and Analysis

Sulzer follows international standards for inspection and repair assessment of received components. Trained technicians and Calibrated instruments are at par with all international OEM requirements.



(Figure 2. Runout Inspection at Flat Surface of Vadodara RES.)

Sulzer Standard Inspection Activities:

- ✓ Dimensional Measurements and Verification
- ✓ Mechanical and Electrical Runout Measurement
- ✓ Verification of clearance / interference protocol
- ✓ Positive Material Identification
- ✓ Hardness Testing
- ✓ Surface Roughness Testing
- ✓ Non-Destructive Testing (DP, MPT, UT)

Rotor Repair Services

Sulzer RES offers repair, replacement of parts, and complete overhaul of all centrifugal, axial, and process screw compressors, Steam Turbines and Centrifugal/Screw Pumps. Our Experienced Engineers ensures Sulzer's motto of "First Time Right" services.



(Figure 3. Inhouse Low Speed Balancing Machine at Vadodara RES.)

Sulzer RES most common repair services:

- ✓ Cleaning
- ✓ Rotor unstacking / stacking
- ✓ Journal and seal area Refurbishment by Laser welding or suitable Coating.
- ✓ Sealing Fin replacement.
- ✓ Replacement of Impellers.
- ✓ Antifouling coating.
- ✓ Replacement of Blades. (Axial comp / ST)
- ✓ Individual Component Balancing and Rotor balancing
- ✓ Final quality control inspections

Complete Cartridge Solutions

While working on rotor repair, Complete overhauling of compressor, pump cartridges are no longer a Mirage. SULZER India is capable to execute overhauling of entire cartridge in the workshop with supervision of expert engineer.



(Figure 4. Overhauling of Cartridge at Vadodara RES)

Such typical overhauling includes:

- ✓ Disassembly and Assembly of Cartridge.
- ✓ Cleaning and Inspection of each removed parts.
- ✓ Balancing of Rotors.
- ✓ Parting Plane ovality and bore eccentricity correction.

Engineering:

Inhouse capacity and capability of engineering team gives SULZER India RES an edge above the competition. The engineering team in India is backed up by specialists across the SULZER's worldwide competence centers at Sulzer – Jakarta, Indonesia; Sulzer – Huston, USA ; Sulzer – Venlo, EU.

SULZER CONFIDENTIAL



(Figure 5. Engineering Office at SULZER India – Mumbai.)

Typical engineering analysis includes:

- ✓ Vibration Analysis.
- ✓ 3D scanning.
- ✓ Failure Investigation Analysis.
- ✓ Design Modification and Trouble Shooting.
- ✓ Lifetime extension of Steam Turbine Blades.
- ✓ Lifetime extension of Impellers.
- ✓ Re-engineering of Components like Blades, impellers, sleeves, etc...
- ✓ Retrofit solutions including equipment efficiency improvement and design upgradation.

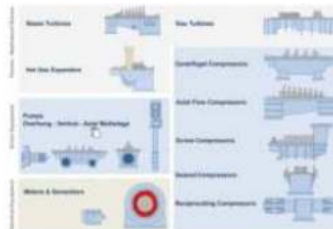


(Figure 6. Actual executed engineering jobs.)

SULZER India a World Class Service Center at your service 24 x 7, 365 days a year.



Competent Service Provider For all Rotating Equipment



SULZER Service Centre now in India

Please visit Vadodara Service Centre (VSC) at :
SULZER Pumps India Private Limited
Pump and Turbo Services Div.
707, GIDC, Manjusar, Savli, Opposite Vasu Health Care, Vadodara – 391775
Gujarat, India
Web : www.sulzer.com

For further details please contact
Mr. Bhavik Patel / Mr. Dhruv Dave
DGM, Head Business / Sr. Manager
Development – / Vadodara Service
Turbo Services / Centre
+91 86556 24982 / +91 77380 52228

SULZER Headquarters

SULZER Management AG
Neuwiesenstrasse 15,
8401 Winterthur
Switzerland
Phone : +41 52 262 30 30

SULZER CONFIDENTIAL



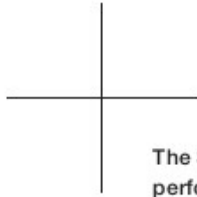
SULZER India
Vadodara Service Centre



SULZER Headquarters
Switzerland



SULZER CONFIDENTIAL



The Sulzer Services division is your partner for uptime and enhanced performance for your rotating equipment and more. Our dedicated people provide unrivalled service and expertise to meet your operational needs – anytime, anywhere.

Through a network of over 100 service sites around the world, Sulzer provides cutting-edge parts as well as maintenance and repair solutions for pumps, turbines, compressors, motors and generators. We service our own original equipment, but also all associated third-party rotating equipment run by our customers, maximizing sustainability and life cycle cost-effectiveness. Our technology-based solutions, fast execution and expertise in complex maintenance projects are available at our customers' doorsteps ensuring minimal downtime.

E10786 en 10.2022, Copyright © Sulzer Ltd 2022

This brochure is a general presentation. It does not provide any warranty or guarantee of any kind. Please, contact us for a description of the warranties and guarantees offered with our products. Directions for use and safety will be given separately. All information herein is subject to change without notice.

