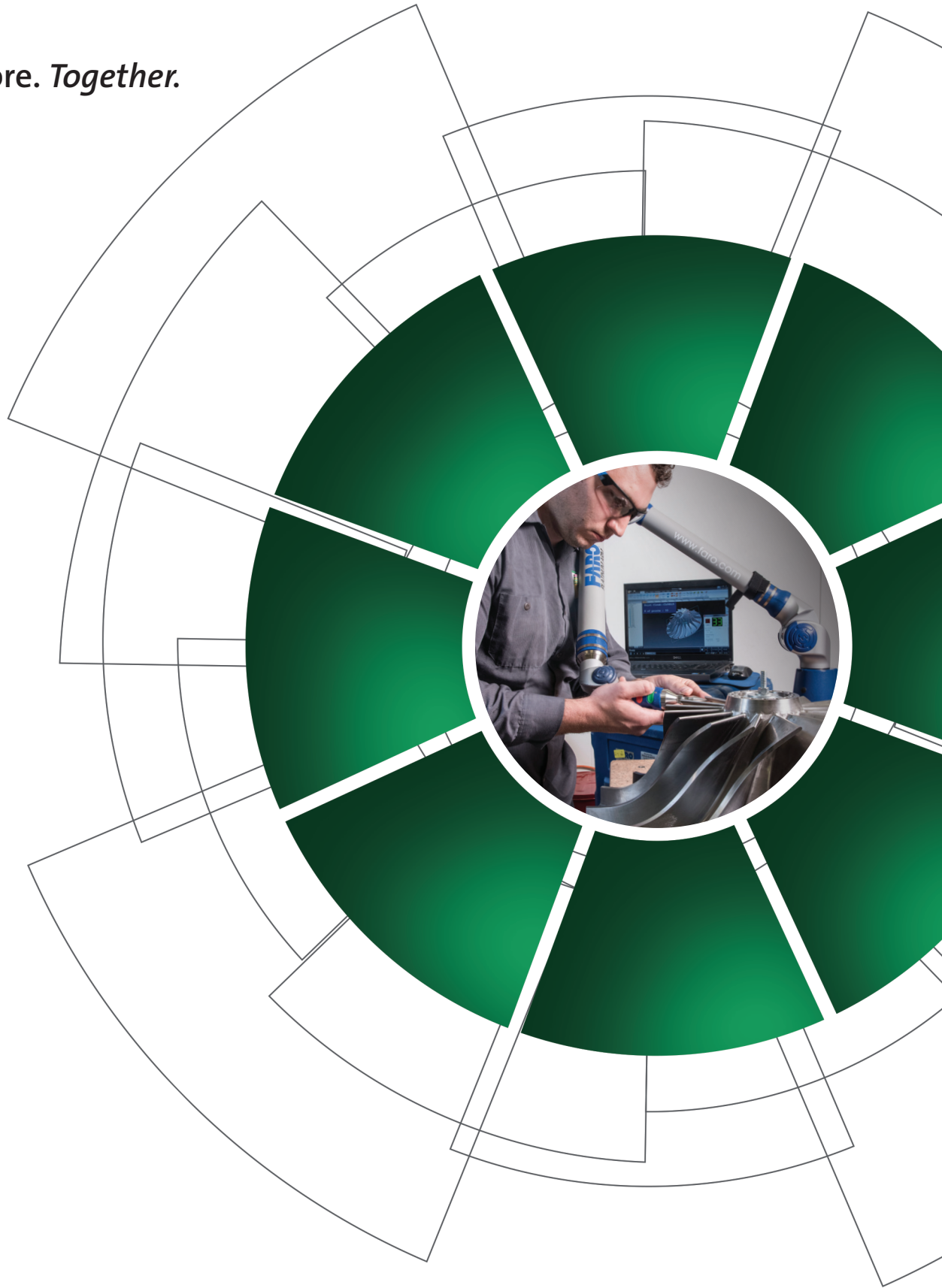


Experience more. *Together.*



ROTOFLOW
An Air Products Business

Experience more. *Together.*

Rotoflow, an Air Products business, combines the industry's most trusted name in turbomachinery with world-leading industrial gas expertise. We are transforming the hydrocarbon, LNG, petrochemical, and industrial gas markets with proven performance and high value.

Our combined capabilities are the key to this new level of quality. Technological innovations expertly integrated with decades of know-how are the foundation for Rotoflow's valued products, proven performance, and world-class service. This synergy helps customers around the world reach their unique technology and operational targets more efficiently than ever before.

Our turbomachinery is built for a long and relatively maintenance-free operational life. We engineer components and conduct analyses that enhance safety, reliability, and top efficiency—for every application requirement.

SOLUTIONS & SERVICES

Expert service and support are critical to keeping operations running at their best. As one of the world's only OEMs in both the manufacturing and operation of turbomachinery, we have extensive experience in equipment, operational processes, and reliability. Rotoflow provides complete technology-driven solutions for all types of turbomachinery and rotating equipment and systems from nearly any manufacturer.

To ensure we are able to readily meet the needs of our customers with world-class support and efficient and cost-effective service and solutions, Rotoflow continues to expand our solutions center locations.

Rotoflow's Dhahran Solutions Center offers complete rotating equipment support, whether your equipment has experienced a performance deviation or failure, or you are looking to optimize performance and reliability. The center is equipped with deep engineering expertise as well as state-of-the-art diagnostic, testing, balancing, and machining equipment and able to provide remote monitoring and support to optimize and troubleshoot equipment.

Our team has extensive experience in root cause analysis, reliability assessments, upgrades, and rerates to increase reliability and performance. Additionally, within the Dhahran Solutions Center we offer inventory management and spare turboexpander plug-in storage.

GLOBAL TECHNICAL AFTERMARKET SOLUTIONS (FULL-SERVICE OEM)

- Performance Assessments
- Reliability Assessments
- Root Cause Analysis
- Field Diagnostics
- Upgrades & Rerates
- Inventory Management
- Fleet Optimization
- Reverse Engineering
- Plant Assessments
- Operational Optimization
- Troubleshooting
- Development & Training

MATERIALS CHARACTERIZATION LAB

The facility is equipped with a materials characterization lab to support materials testing and failure analysis using specialized instrumentation in the areas of spectroscopy, chromatography, electron and optical microscopy, thermal analysis, surface analysis, and materials characterization. Within the lab, the following testing can be performed:

- Fracture failure modes and origins
- Fatigue and other slow crack growth mechanisms
- Brittle and ductile failures
- Corrosion, oxidation, and erosion
- Hydrogen embrittlement failures
- Contamination
- Wear failures
- Heat treatment
- Welding, brazing, and soldering
- Design and materials selection
- Purity evaluations of precious metals
- Determination and classification of alloys
- Conformance according to international or industrial standards
- Examination of grain size and structure and grain boundary analysis
- Vendor comparison studies through metallurgical analysis
- Surface cleanliness of metals to monitor cleaning methods
- Thickness of surface oxides in passivation layer
- Material hardness

TRAINING & EXPERIENCE

Rotoflow's Dhahran Solutions Center, located in the Dhahran Techno Valley, is a comprehensive turbomachinery support facility, including hands-on training for local talent. Contact us to learn more about the solutions center's internship programs and training offerings.

AIR PRODUCTS 



FACILITY

Climate-Controlled

- Facility maintained between 20 to 23°C with less than 40% humidity to maintain part preservation and enable part tolerancing

Overhead Cranes

- 10-ton capacity (2)
- 3-ton capacity

Manufacturing

- 1,200 m²

Parts Storage

- 100 m²

BALANCING

Schenck Hard Bearing HM 40 BU

- 4 gmm minimum achievable residual unbalance
- 3,000 kg rotor weight for symmetric load
- Up to 1,600 mm diameter
- Bearing center distance up to 2.75 m between pedestals

Schenck Hard Bearing HM 20 BU

- 0.1 gmm minimum achievable residual unbalance
- 100 kg rotor weight for symmetric load
- Up to 1,260 mm diameter
- Bearing center distance up to 1.3 m between pedestals

Schenck Soft Bearing

- 0.1 gmm minimum achievable residual unbalance
- 15 kg rotor weight for symmetric load
- Up to 350 mm diameter
- Bearing center distance up to 60-600 mm between pedestals

INSPECTION

Coordinate Measuring Machine (Portable)

- Measures to 1/10,000 of an inch (volumetric accuracy of 0.0008")
- FARO ARM Quantum S 2.5 m 7 Axis

Manual Instruments

- Various instruments for measuring ID/OD, surface finish, electrical runout, etc.
- Positive Material Identification (PMI)

MACHINING

Lathe Machine

- 17" maximum working diameter, 55" maximum working length
- 14" maximum working diameter, 40" maximum working length

Milling Machine

- 52" travel in X direction, 30" travel in Y direction, 25" maximum piece height
- Weight capacity: 1,500 lb

Automatic Surface Grinder

- 20" travel in X direction, 8" travel in Y direction, 10" maximum piece height

Decontamination/Cleaning

Media Blaster

- 60" W x 60" D x 44" H clearance capacity
- Weight Capacity: 2,000 lb

Self-Contained Parts Washer

- 60" W x 60" D x 78" H clearance capacity
- Weight Capacity: 5,000 lb

Oxygen Clean Room

- 400 ft² isolated room
- External crane capabilities

Material Handling Capacities

- 2.5-ton forklift

Pressure Testing

Pneumatic Pressure Testing

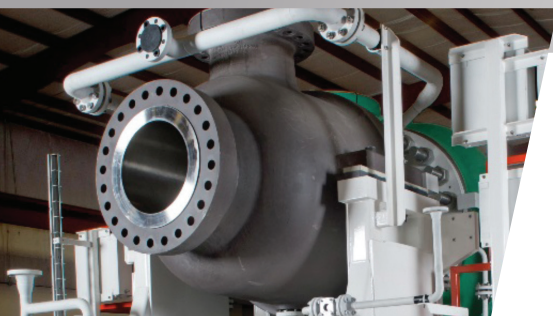
- 3,000 PSI capacity (5,500 psig max pressure)

Hydrostatic Pressure Testing

- 10,000 PSI capacity

Field Diagnostics and Solutions

- 24/7 site assistance (local & global)
- Site assessment
- Removal, inspection, resolution, and installation at site
- Commissioning and start-up
- Technical support



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