

A Backward Glance at TPS 2024

This industry event offers an integral forum for the free exchange of ideas between rotating equipment engineers and technicians worldwide.

Aaron Fagan, Senior Editor

Organized by the Turbomachinery Laboratory at Texas A&M University, the annual Turbomachinery and Pump Symposia (TPS)—the 53rd Turbomachinery and 40th International Pump Users—event was held August 20–22, at the George R. Brown Convention Center in Houston.

TPS is known for its spirited engagement with turbomachinery, pump, oil and gas, petrochemical, power, aerospace, chemical, and water industries through its peer-reviewed technical program and world-class exhibition, Innovation Presents (formerly Turbo Stage), a tour of the Turbomachinery Lab at Texas A&M University in College Station, and more.



Michelle Jordan of Techmar delivered a talk titled “The Role of Emotional Intelligence in the Workplace” at the Women of TPS luncheon.

The Women of TPS luncheon—with special guests Dena Malloy of Atlas Copco and Michelle Jordan of Techmar, is a forum for women of TPS to share experiences and challenges in the industry. It is also an avenue in which those experiences and challenges can be heard and understood by others, including upper management.

TPS 2024 saw 4,769 attendees, hosted 106 technical sessions and had 308 exhibiting companies. Every year attendees emphasize the invaluable networking, conversation and spirited debate at the show. Below is a taste of our experience from the exhibition hall at TPS 2024!

ABB

Low-voltage motors in equipment such as pumps, fans and compressors account for two-thirds of industrial electricity demand. At ABB Low Voltage IEC motors, we are developing solutions that last longer, run smoother, and are easier to install, service, and specify for use across this diverse mix of industries.

ECP5000 Severe Duty

ABB ECP5000 series of severe-duty motors were specifically designed for the rigors of harsh chemical processing applications. Standard features include heavy-duty paint to withstand corrosion, IP66 for increased protection against dust and water ingress, a large left-hand side (F1) conduit box with terminal blocks for easy installation, space heaters to minimize condensation, industry-standard 5000 frame mounting dimensions to allow simple, drop-in replacement, as well as oversized bearings on both ends with an insulated bearing on the ODE.

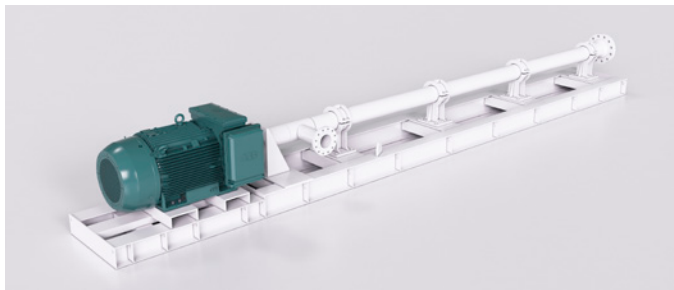


ABB ECP5000 Severe Duty.

These motors quickly found success with H-pump (Horizontal Surface Pump) manufacturers due to design improvements focusing on mitigating vibration. Due to the high speeds (~3600RPM) inherent to these applications, vibration is a typical failure mode. Care was taken to minimize the risk and extend motor life.

Other features added specifically for the H-pump market included supplemental bearing cooling on the drive end and different frame materials for additional vibration dampening. On top of the vibration mitigation developments, bearing and winding RTDs and the ABB Ability Smart Sensor are installed at the factory to assist with predictive maintenance. Also, key to the ECP5000's success in the H-pump market was the local U.S. inventory;

ratings up to 1000HP/460VAC are stocked in warehouses around the country, allowing operators to quickly get back up and running.

This unique combination of features and local availability has allowed users and OEMs to capitalize on the lowered cost of low-voltage drive technology in these tough, high-horsepower applications.

IE6 SynRM

ABB's Synchronous Reluctance motor (SynRM) technology is the first magnet-free motor design to achieve the IE6 hyper-efficiency level, an unofficial but anticipated tier above IE5 motor efficiency standards. In keeping with the logic of previous energy loss reductions of 20 percent from class to class, IE6 motors are deemed to have 20 percent fewer than IE5 motors.



ABB IE6 SynRM.

The SynRM design combines the performance of a permanent magnet motor with the simplicity and service-friendliness of an induction motor, while allowing for safer transport and installation. SynRM motors pair perfectly with ABB drives right out of the box to further simplify operation and are ideal for variable-torque applications such as pumps and fans.

Recent improvements in drive technology have led to increased suitability for constant-torque applications as well, allowing full torque at zero speed if needed. Because there is no current being induced on the rotor (which would typically cause rotor losses as heat), this design enables a significantly cooler running motor with increased bearing lifetimes.

This technology is available in Safe and Hazardous Area designs, as well as other mechanical packages including water-cooled designs for additional power density. The rotor design can even be used in the 5000 frame design discussed above. Ratings are available up to 1,100 hp in voltages up to 1,000 VAC. Because of the diversity of potential applications, these motors are all engineered-to-order to meet the specific requirements of each customer.

abb.com

Cincinnati Gearing Systems

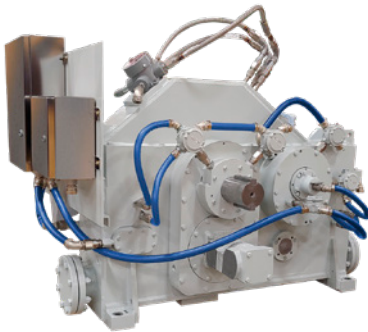
Located in Cincinnati, Cincinnati Gearing Systems (CGS) is a recognized leader in precision component gear man-

ufacturing and design engineering. More than just a gear manufacturer, CGS offers customers over 100 years of experience in producing high-quality, reliable, and cost-effective component gearing and gear units for a wide range of power transmission applications. Configurations include epicyclic gear units, multiple pinion gear units, parallel shaft designs, vertical and horizontal offsets, dual and single input, single and double helical, and hybrid designs. CGS has in-house full-service manufacturing, design engineering, testing, and heat-treating capabilities. Whether it is a clean-sheet design or a standard design, CGS is the single source to satisfy your specific gearbox requirements.



Fracking Gear Unit

- Gas turbine to pump drive
- Double helical gearing, epicyclic configuration
- 16,000/1,455 rpm @ 5,500 hp
- High efficiency, low noise replacement for traditional diesel engine pumping solutions
- Intermediate shafts
- Integrated bearings for planetary gears



Hydrogen Compression and Expansion Services

- Expander to generator drives
- Parallel shaft single helical API 617 integral gear unit
- Expander casing flange mounted to gearbox
- Expander wheel integrally mounted to pinion shaft with Hirth connection

- 33,000/3,000 rpm @ 2,000 hp
- Used in the plastics production process

Faster Machining Processes

With the installation of our new Liebherr CNC shaper cutter, we have significantly reduced the machining time for double-helical gears. This machine doubled our previous cutting speeds. The correction measurement in the machine substantially increases the quality of the gear; and due to the electronic helical guide, we can shape every helix angle without the need for additional tooling.

Our new Kapp Niles gear grinder has automatic onboard checking and the capability to grind internal gears up to a 30° helix angle both left hand and right hand.

cincinnatigearingsystems.com

Regal Rexnord

A new overrunning clutch technology developed by Regal Rexnord is addressing the gap in the turbomachinery market for high-power, high-speed applications.



The FSS (Formsprag Self Synchronizing) clutch is a globally patented design.

Unlike traditional overrunning clutches that are limited to either high power or high speed, but not both, the FSS (Formsprag Self Synchronizing) clutch can manage tens of megawatts of power and thousands of RPM. Its patented radial engagement design offers a thin profile assembly, making it suitable for shaft mount options that can be integrated as a mobile clutch/coupling package that does not require a foot mount. The zero-contact clutch mechanism design provides minimal overrunning drag, allowing the driver to come to rest while the driven machine continues rotating at speed. The self-contained lubrication oil management system also simplifies installation and operational requirements.

Regal Rexnord engineer Willem Sullivan said the FSS clutch aligns with the “Green Power Surge” and addressing new shortcomings that the push for electrification is creating, generating new niches in applications like wind/solar integration, energy distribution, mobility solutions, and micro-reactors.

Sullivan and his colleagues were excited to meet potential partners at the 2024 Turbomachinery and Pump Symposium.



Regal Rexnord engineer Willem Sullivan shows an FSS clutch model to Regal Rexnord TPS booth visitors in August 2024.

“By working closely with our partners we’re learning a lot about these various applications and defining the benefits in system efficiency improvements,” Sullivan said. “Fitting a shaft-mounted clutch can be complicated but by considering the effects on rotor dynamics and system response we can engineer the clutch to meet the specific application requirements.”

One of the clutch’s key features is its ability to synchronize equipment at any speed above 100 RPM. In a nutshell, the FSS was designed to allow power companies to address the secondary effect on the grid phase created by the push for renewable energy generation—especially in retrofits.

For example, initially testing on an ongoing retrofit shows the FSS clutch can successfully transmit power over one to two months of operation, with a potential power rating of up to fifty megawatts.

Additional applications include:

- Inverter Generation—Where local grid stability needs to be ensured, aligning with the global push for electrification and the limitations of wind and solar power in providing phase-correcting capabilities.
- Peaker Plants—By using the FSS in power generation applications such as synchronous condensing, it allows existing generators to lock into the grid to provide phase stability, while reducing the non-driving turbine/motor drag and thereby improving system efficiency.
- Dual Drive (Gas/Electric)—The FSS offers seamless transmission in hybrid configurations for power and compression systems, offering flexibility in power source as LNG and electric power prices fluctuate.

Regal Rexnord also has a diverse high-performance coupling portfolio from industry name brands such as Ameridrives, Kopflex, Bibby Turboflex, and Euroflex, Sullivan noted—as well as a trusted coupling recertification program.

“With a global manufacturing and support footprint, we are truly a one-stop-shop for cost-effective, energy-efficient solutions,” he said.

Overall, the FSS clutch represents a significant technological advancement with potential to enable higher efficiency, expansion of grid stabilization offerings, and integration of renewable energy sources into existing power generation systems.

Those interested in learning more about the FSS clutch can get in touch with Regal Rexnord online.

regalrexnord.com

Sealmatic

Sealmatic is a high precision/high performance mechanical seal for rotary equipment in refinery, oil & gas, chemical, petrochemical, chemical, fertilizer, pharmaceutical, power, marine, pulp & paper, food & beverage, aerospace and many more industrial applications.



One among dozens of designs, the Sealmatic SPX is a single seal in split configuration for plain shafts suited to many industrial applications.

They are an OE supplier to KSB, Sulzer, Sundyne, KEPL, Weir, Andritz, KBL, RuhrPumpen, Flowserve, Wilo, SPX, Seepex, Düchting, ITT (USA), BHEL, IDEX, Egger, PMSL, MSL, Xylem, Metso, Netzsch, Atlas Copco, Burckhardt, Circor and many other renowned OEMs.

Sealmatic is an API Q1 Spec, ISO 19443 (Nuclear), ASME U Stamp, TRCU 010, 012 & 032, ATEX - 2014/34/EU, DSIR, ISO 9000, 14000, 45000 & PED 97/23/EC QA-System, FDA, GMP, RoHS, REACH Certified Company.

Its raw materials are imported from USA, Germany and the UK from approved sources of various international sealing companies:

- Seal faces such as carbon and silicon carbide are imported from USA and Germany.
- Elastomers are imported from Germany.
- Springs and hardware are imported from Germany.

Having worked in the sealing industry since 1989, Sealmatic has more than 50,000 mechanical seals installed globally in more than 53 countries with a primary objective to cater to high-end applications such as API seals, boiler feed pumps, cartridges, split seals and many more sealing applications.

sealmaticindia.com

PTE