Power Generation
Empowering innovation worldwide

Parker

ENGINEERING YOUR SUCCESS.
Energizing the energy business

Advanced technologies and systems that deliver the availability, flexibility, sustainability, reliability, and profitability you need.

**AVAILABILITY:**

**WORLDWIDE AND WORLD RENOWN.**

With 50,000 employees serving 500,000 customers in almost 50 countries, Parker is literally everywhere you need us to be. By working with us, you have access to an integrated network of 316 manufacturing plants, 13,000 distributors and MRO outlets, and over 1,500 ParkerStores. Not only that: our technicians and market-specific engineers are ready to help you with system or subsystem design, on-site or off.

**FLEXIBILITY:**

**SYSTEMS THAT OPTIMIZE VALUE**

As the world’s motion control expert, Parker offers you a complete range of proven, off-the-shelf products. Engineered to work together, these products deliver streamlined systems and subsystems with exceptional quality and durability. Whether for geothermal, wind, and solar ... or nuclear, fossil fuel, gas turbine, and combined cycle plants ... our system solutions reduce costs and advance performance. Cleanly. Efficiently. And reliably.

**PROFITABILITY:**

**LEAN AND CONTINUOUS**

At Parker, we actively seek new and better ways to do things as part of our mandate for continuous improvement. Committed 100% to total support, we partner with our customers to focus on creating solutions that are smaller, lighter, more energy efficient, and highly reliable, as well as cost effective. And we offer services that reduce outage times and operational costs, such as:

- **Custom kits:** With materials organized by order and quantity, these single part number kits streamline procedures, reduce assembly time, and lower costs.
- **An international network of support facilities:** To meet emergency needs and reduce downtime.
- **Vendor-managed inventory:** Including custom-tailored bin-filling programs managed by us.

Want to know more about wind power and other emerging technologies? Call 1-800-C-Parker. International customers call 00800 27 27 5374.

**RELIABILITY:**

**NATIONAL AND INTERNATIONAL CERTIFICATIONS**

Parker can help you meet the need for fuel-efficient, low-emission, high-performance energy. Our advanced technologies and innovations improve emissions performance, minimize waste, meet environmental regulations, monitor air and water quality, offer longer life, and help create greater fuel efficiency.

Our certifications verify that our systems and solutions offer the highest possible quality for the most efficient performance. These include:

- **ASME:** Codes and standards set by the American Society of Mechanical Engineers.
- **ATEX:** Covering equipment operating in mines or potentially explosive gas, vapor, or air/dust environments.
- **B31.1/B31.3:** Certifying process and power piping.
- **CE:** Indicating that a product has met EU consumer safety, health, or environmental requirements.
- **CSA/CRN:** Shows product has been tested and meets applicable national standards in the U.S. and/or Canada.
- **FM:** Assures customers a product or service has been tested and conforms to the highest national and international standards.
- **N Stamp:** Quality assurance of construction materials, design, operation, inspection, and continuing maintenance of nuclear facilities.
- **PED:** Certifying pressure equipment and assemblies.
- **PM:** Globally recognized certification of project management expertise.
- **UL:** An independent product safety certification.
Biogas generated in landfills and wastewater digesters contains siloxane – a man-made chemical that changes into silicon dioxide (sand) when combusted. When landfill and digester gas are used to fuel turbines, reciprocating engines, and fuel cells that generate electricity, silicon dioxide build-up due to siloxane significantly increases maintenance costs, reducing the feasibility of these important green energy projects. Parker’s GES Siloxane Removal System removes siloxanes from biogas, reducing maintenance costs, improving profitability, and ultimately making more of these projects cost-effective. Parker also provides advanced biogas chilling systems and filters to further treat and clean biogas used for power generation. Look to Parker for innovative solutions and filtration protection.
Emmissions reduction
Parker nozzle technology can help reduce NOx, and CO from turbine exhausts.

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Parker nozzle technology can help reduce NOx, and CO from turbine exhausts.

High-temperature metal seals
Parker Advantage:
- Graphite and carbon-reinforced Teflon®, field proven best-performing and longest-lasting.

Fuel control and delivery systems
Parker Advantage:
- Mini-fuel nozzles for the highest MW power augmentation.
- Single point nozzles for the highest MW power augmentation.

Inlet fogging system
Parker Advantage:
- Utilizes patented Macrospray® spider nozzles to uniformly spray water throughout the fog area.

Expansion joints
Parker Advantage:
- Field proven, best-performing, and longest-lasting. Largest vendor in the industry.

Continuous emissions monitoring systems (CEMS)
Parker Advantage:
- Patent-pending Balanced Charge Agglomeration (BCA™) technology prevents coking of the nozzle and spray tips.

CEMS
- Continuous emissions monitoring systems
- Common to their steam and gas turbine applications.

Fuel control and delivery systems
Parker Advantage:
- Mini-fuel nozzles for the highest MW power augmentation.
- Single point nozzles for the highest MW power augmentation.

CB check valves
Parker Advantage:
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- Graphite and carbon-reinforced Teflon®, field proven best-performing and longest-lasting.

Elminate turbine trips
Parker Advantage:
- Varnish buildup in hydraulic fluid.

Fluid varnish causes servos to go "hard over," which can result in costly turbine trips.

Silent bottle sampler
Parker Advantage:
- Units are completely enclosed with user interface and collection of data.

APX servovalves
Parker Advantage:
- Parker ABEX Jet-Pipe® servovalves are result in extended lead times and poor product support.

Parker Advantage:
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HPU system
Parker Advantage:
- Multiple suppliers for HPU components result in extended lead times and poor product support.

Sensc controls
Parker Advantage:
- Simple, affordable, accurate, and adaptable system.

Engineered solutions
Parker – a single source for complete product support, creating operational efficiencies.

Better combustion for cleaner-burning engines.

Power Source: COMBUSTION TURBINE

Look to Parker for:
- Filtration, lubrication, and condition monitoring.
- Inlet fogging system
- Expansion joints
- Continuous emissions monitoring systems (CEMS)
- Inlet fogging system
- Expansion joints

Power Source: COMBUSTION TURBINE

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COMBINED CYCLE

No matter how your combined cycle plant operates – base load, simple cycle, seasonally, or peaking – Parker has everything you need to keep it running at optimum efficiency. Our combined cycle applications include systems, subsystems, and components that work throughout the plant to reduce emissions, lower maintenance costs, preserve plant and component life, and improve turbine efficiency. From hydraulics and pneumatics to electromechanical, instrumentation, filtration, sealing, emissions controls, fluid connections, and HMI, you can turn to Parker for solutions that will meet and exceed both your specifications, and your expectations.

New technologies
HMI solutions for plant control systems and monitoring

The drive toward open solutions and PC-based machine control is fueling a revolution on the plant floor – a revolution Parker is well prepared for. Offering a full range of hardware and software HMI solutions with the connectivity and expandability of an open platform, our integrated touch-screens, industrially-hardened workstations, and software packages focus on meeting the needs of the power plant with products that offer real-time response, high reliability, deterministic control, and ease of development and support.

Highest performing fuel and fog nozzles

Derived from Parker aerospace technology, our patented Macrospray® nozzles offer the highest performance in the industry, driving the lowest NOx emissions and improving gas turbine efficiencies through improved fuel flow, atomization, better combustion, and lower installed and lifecycle costs.
### Power Source: COMBINED CYCLE

Systems, subsystems, and components that improve plant efficiency in all operating modes.

<table>
<thead>
<tr>
<th>Look to Parker for:</th>
<th>Image</th>
</tr>
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<tbody>
<tr>
<td>Steam blowdown assembly</td>
<td>1</td>
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<tr>
<td>Nitrogen generators</td>
<td>2</td>
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<tr>
<td>Expansion joints</td>
<td>3</td>
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<tr>
<td>Diverter damper controls</td>
<td>4</td>
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<tr>
<td>Fuel and air control</td>
<td>5</td>
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<tr>
<td>Hydraulic power unit</td>
<td>6</td>
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<tr>
<td>Hydraulic cylinders</td>
<td>7</td>
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<tr>
<td>Hydraulic lift oil pump</td>
<td>8</td>
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<tr>
<td>Liquid fuel filtration</td>
<td>9</td>
</tr>
</tbody>
</table>

*Engineered Solutions*

**Combined Cycle**

#### A-LOK® TUBE FITTINGS

**PRINCIPLE:** Prevent corrosion

- **Problem:** High levels of particulate and carbon contribute to the degradation of the metal and can be devastating to hydraulic and lubrication systems in combined cycle plants, causing component failure, bearing damage, and decreased oil life.

- **Solution:** Parker Advantage: When hardened with Parker Suparcase, A-LOK’s rear ferrule resists inter-granular corrosion, creating tube fittings that offer superior sealing and performance in demanding corrosive environments.

- **Parker Advantage:** Parker’s SMR system contains patent-protected technology to maintain hydraulic systems.

<table>
<thead>
<tr>
<th>Solution</th>
<th>SMR SYSTEM FOR CORROSION ELIMINATION</th>
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#### MULTI-TUBE® BUNDLES

**PRINCIPLE:** Prevent contamination

- **Problem:** Critical hydraulic and lubrication systems require continuous monitoring to ensure proper cleanliness levels.

- **Solution:** Parker Advantage: Parker’s icount bottle sampler technology is available.

- **Parker Advantage:** Parker’s icount bottle sampler offers continuous monitoring with visual and electrical notification of proper cleanliness levels.

<table>
<thead>
<tr>
<th>Solution</th>
<th>FOR CONTINUOUS EMISSIONS MONITORING (CEMS)</th>
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#### A-Lift® TUBE FITTINGS

**PRINCIPLE:** Prevent contamination

- **Problem:** Stationary off-line systems can contribute to the degradation of the metal and can be devastating to hydraulic and lubrication systems in combined cycle plants, causing component failure, bearing damage, and decreased oil life.

- **Solution:** Parker Advantage: When hardened with Parker Suparcase, A-LOK’s rear ferrule resists inter-granular corrosion, creating tube fittings that offer superior sealing and performance in demanding corrosive environments.

- **Parker Advantage:** Parker’s SOS unit provides LTCs with clean oil, making full and reliable operation possible.

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<tr>
<th>Solution</th>
<th>STATIONARY OFF-LINE SYSTEM ELIMINATES PARTICULATES IN OIL</th>
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#### KOUNT BOTTLE SAMPLER FOR CLEANLINESS MONITORING

**PRINCIPLE:** Prevent contamination

- **Problem:** Contaminated hydraulic and lubrication systems require continuous monitoring to ensure proper cleanliness levels.

- **Solution:** Parker Advantage: Parker’s Kount bottle sampler with Suparcase.

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#### PATENTED BUNDLES FOR CONTINUOUS EMISSIONS MONITORING (CEMS)

**PRINCIPLE:** Prevent contamination

- **Problem:** Critical hydraulic and lubrication systems require continuous monitoring to ensure proper cleanliness levels.

- **Solution:** Parker Advantage: Parker’s Multi-Tube® Bundles offer a consistent and accurate reading with low/high ambient fluctuation durability.

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Parker is proven in the power industry like no other supplier. Our years of technology innovation have created motion and control solutions for applications that range from coal handling to emissions monitoring, and everything in between. Our fluid system solutions are particularly impressive. Whether for hydraulics, hydrogen and air, or high-temperature steam systems, Parker has a vast array of legacy and new performance-enhancing components that improve system life, increase safety, eliminate time and cost, boost efficiency, and accurately meet standards for emissions compliance.

Coal-fired power plant owners are working hard to find ways to reduce EPA-mandated mercury emissions. Key to the challenge? Accurate, reliable, and cost-effective mercury-monitoring bundles like Parker’s Multitube® umbilicals.

Consisting of multiple long lengths of pure fluoropolymer tubing wrapped together with high-temperature heating elements, Multitube umbilicals are used to extract stack gas from a probe located at the top of a smoke stack. The umbilical transports the gas by vacuuming it down to a mercury analyzer, where its mercury content can be verified.

Elevated mercury sample temperatures at the analyzer are critical to achieving quality readings and protecting the analyzer from moisture ingress. Parker’s mercury umbilicals maintain a consistent 395°F (202°C) temperature for proper sample transport. In addition, Parker-manufactured tubing offers reduced cost and improved quality. Long-length umbilicals in excess of 1,000 feet are available, and are estimated to save utility companies approximately 35% over conventional bundles. Plus all Parker Multitube bundles meet IEEE specs.

**Phastite® tube connectors minimize MRO downtime**

An alternative to welding fittings, Phastite® is a new, push-fit (no ferrule) connector system for pressures up to 20,000 psi (1,379 bar). In providing a permanent, leak-free connection without threaded components, Phastite minimizes MRO downtime. In addition, it eliminates the danger of welding and hot work, and does away with the need for hot work permits.
Power Source: FOSSIL FUEL

One supplier, multiple options.

- **Oil monitoring and conditioning systems**
- **High-pressure pumping systems**
- **Expansion joints**
- **Continuous emission monitoring systems (CEMS)**
- **Steam control and instrument racks**
- **Abrasion-resistant CERGOM 10 hose**
- **Abrasion-resistant PD hose**
- **Phastite push-fit (no ferrule) connector**
- **Multitube® bundles**
- **Welded fittings**
- **Metal C-seals, E-seals**
- **Parker’s mercury-measuring solution:**
- **CPI™ tube fittings:**
NUCLEAR

Parker manufactures more than 500,000 components to meet the needs of nuclear power generation companies – components that are installed at more than 200 nuclear plants worldwide and offer the efficiency, reliability, and cost effectiveness the industry demands. But we don’t stop there. Our multi-million dollar commitment to research and development positions us as the company to partner with. Working hand in hand with you to set the standards and engineer the systems that will shape the future of an increasingly critical power source.

The ASME N Stamp quality certification program is critical to the proliferation of nuclear power worldwide. That’s because N Stamp certification is mandatory for plants designed to meet ASME requirements. In addition, Parker meets other international standards for nuclear power plants. These certifications allow Parker to provide a wide variety of products for safety-related and non-safety-related applications.

Parker’s Instrumentation Products Division in Huntsville, Alabama received its N Stamp certification for its Class 1, 2, and 3 valves in 2007, making Parker only one of about 100 companies to achieve this higher standard. N Stamps indicate that all aspects of a component, including design, fabrication, and construction, comply with ASME’s strict specifications, providing an additional layer of safety to nuclear plant operation.

CPI™ FITTINGS: A long-lasting grip on nuclear innovation

When CPI fittings were designed in 1966, installed tube fittings in nuclear plants were dominated by double ferrule technology – a technology subject to ferrule mixup, ferrule loss, vibration sensitivity and multiple sealing points for multiple leak paths. Parker engineers knew there was a better way. In CPI fittings, they created a unique, interchangeable single ferrule technology that addressed the various drawbacks of a double ferrule design – a technology that evolved with the nuclear market. CPI fittings are just one of the many innovations Parker has brought to the nuclear industry. For more, see the Nuclear Engineered Solutions page.
Power Source: NUCLEAR

A multi-million dollar commitment to nuclear innovation.

Look to Parker for:

1. **CCIMS**
   - Our integrated manifold solution provides a precise, high-performance flow measurement and a quick disconnect replacement alternative reducing exposure to radiation. Available in remote and close-coupled mounts.

2. **Specialty valve systems**
   - Specialized valve systems provide solutions for nuclear applications such as 10CFR50 Appendix B and ASME Section II Class 1, Valves. Spring energized metal C-seals for nuclear applications up to 95,000 psi (6,550 bar) with excellent corrosion and fatigue resistance.

3. **Gas spring actuators**
   - Used in safety-critical applications to operate main steam isolation, feedwater bypass, and emergency borating valves on pressurized water reactors.

4. **Spring-energized metal C-seals**
   - In steam turbines, Parker metal seals use jacket forces, spring forces, and hydrostatic forces to seal the turbine casing with increased force, providing high-pressure sealing capabilities up to 95,000 psi (6,550 bar) with excellent corrosion and fatigue resistance.

5. **Automated multi-changeout filter system**
   - An automated purification system removes and disposes of the highly radioactive deposits commonly referred to as CRUD that accumulate inside the piping, fuel pools, fuel transfer canals, reactor coolant/ feedwater, and other areas of the plant.

The Parker Nuclear Portal

Our new Nuclear Portal allows Parker to bring a wide range of products from different Parker divisions to the nuclear market under an industry-compliant quality assurance program. The Portal has been developed under Parker Instrumentation’s existing NQA-1 and 10CFR50 Appendix B quality assurance programs, and utilizes best practices and guidance from industry and regulatory documents. Current products available through the Parker Nuclear Portal include the following:

> **PROCESS CONTROL**
   - Instrument-grade fittings, valves, and manifolds designed to meet industry regulations and systems critical to nuclear plant safety and productivity.

> **HYDRAULICS & PNEUMATICS**
   - Actuators, accumulators, and fittings critical technology components that control pressurized fluids and gases throughout the nuclear power plant.

> **SEALING & HANDLING**
   - Seals and O-rings that provide enhanced equipment performance.

> **FILTRATION**
   - Filters that meet industry regulations and systems designed to remove impurities, maintain safety, and improve production.

> **ELECTROMECHANICAL**
   - Servovalves that offer electric control of mechanical devices in nuclear power generation for improved productivity.