

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



LIFE SCIENCE INNOVATION:

Accelerating development. Reducing risk.



ENGINEERING YOUR SUCCESS.

WHY PARKER?

ONE PARTNER. MULTIPLE OPTIONS.

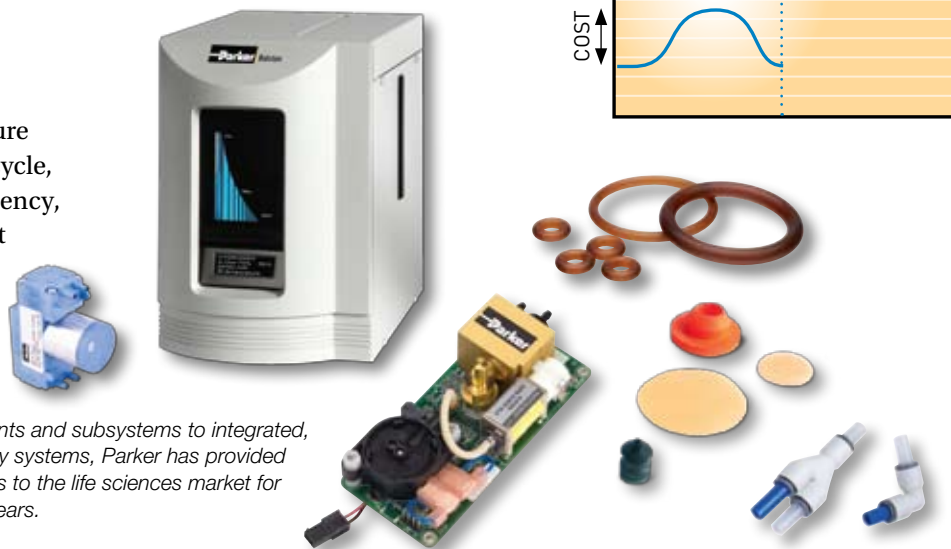
Proven solutions in fluid management, motion and fluid control, filtration and gas generation, materials development, and temperature control give you a wealth of integrated, multi-technology systems, subsystems, and components that meet and exceed your specifications and your expectations. It's expertise that translates into faster development, improved life, reduced risk, and greater value.

Parker has been working with medical and analytical device OEMs – as well as biopharmaceutical and pharmaceutical companies – for more than 30 years. As a collaborative partner, we work one-on-one with you to create and deliver:

- Inventive systems and subsystems utilising our complete range of proven products
- Advances that are smaller, lighter, safer, sustainable, more energy efficient, and highly reliable
- Unique materials suited to written performance specs and functional requirements

Faster development • Complete support

Parker's ability to design, prototype, and manufacture will shorten your design cycle, improve production efficiency, and simplify procurement procedures.

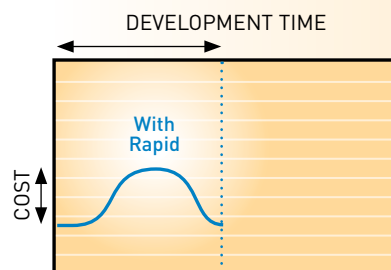
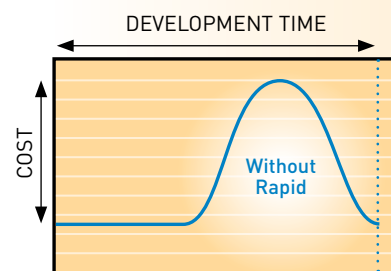


From components and subsystems to integrated, multi-technology systems, Parker has provided proven solutions to the life sciences market for more than 30 years.

From concept through production, we work with you to create competitive advantage. Parker engineers and scientists provide valuable, early-on collaboration for streamlined new product development. Our selectable levels of integration – which include components, modules, and integrated systems – reduce technical risk, lower development cost, and accelerate time to market. In-house tooling and manufacturing capabilities facilitate rapid prototyping. Plus application and process validation support is available as needed. The bottom line? We'll do whatever we can to engineer your success.



Reduce **time,**
cost,
and risk
with rapid prototyping





PROVEN RELIABILITY

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

- Integrity testing
- FDA-registered and cGMP compliant manufacturing facilities
- ISO 7 and ISO 8 clean room inspection and manufacturing
- USP Class VI and ISO-10993 approved materials
- Quality management systems to ISO 13485 and ISO 9001
- European Medical Device Directive MDD
- EMI/EMC Safety Compliance and Design Services

> Prototype > Test and Development > Manufacture



Fewer suppliers Bottom line advantages

When it comes to suppliers in life science, you want fewer companies with more capability. That's why Parker is the right partner for you. With everything from components and subsystems to systems, we have what you need. Plus as a multiple technology provider – offering advanced motion and fluid control, filtration, fluid management, and temperature control systems and subsystems from a single source – Parker saves you time and money by reducing the need for multiple suppliers.

From concept through product launch and long-term production, our proven systems design, integration capabilities, and premier customer service streamline the development process, shorten time to market, and optimise the supply chain.

GLOBAL FOOTPRINT

Your language • Your time zone • Your currency

No matter where you develop, assemble, or manufacture, Parker is there. By working with us, you have access to an integrated network of global manufacturing plants, as well as sales and service offices in every major country.

ANAESTHESIA, RESPIRATORY & PATIENT MONITORING

Innovative solutions for:

Anaesthesia delivery • Home oxygen therapy • Invasive and non-invasive ventilators • Medical gas analysers • Vital signs monitoring

Parker's complete range of critical components and services – in conjunction with our ability to design and manufacture complex, integrated assemblies – make us a strong, reliable partner for med-tech device manufacturers. From product concept and launch ... to long-term sustainability ... we offer critical, risk-reducing solutions that include:

- Rapid prototyping
- Finite Element Analysis
- Custom components
- Integrated solutions
- Logistics management



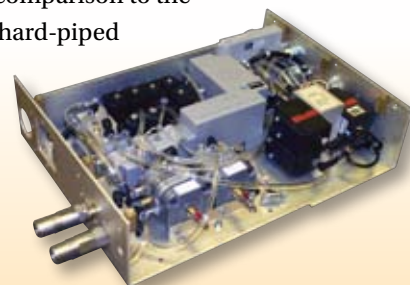
A Parker-designed pump and valves have been integrated into a non-invasive blood pressure module.



ENGINEERING YOUR SUCCESS

Neonatal ventilator module

Working with an OEM, we developed a gas supply and mixing module for a neonatal ventilator. The innovative module controls, mixes, and blends air and oxygen. Custom pneumatic controls were created and integrated into the turnkey control system, along with standard components. Both surface-mounted and embedded valves were also used. This patented process incorporated a complex pneumatic circuit, including volumes and a blending chamber. It dramatically reduced the component count in comparison to the previous hard-piped system.



PARKER TECHNOLOGY AND PRODUCT EXPERTISE

Parker's breadth of technology extends from flow control, fittings, and tubing to materials science, filtration, EMI shielding, and thermal management for the following:

- Proportional and directional valves
- Regulators and flow controllers
- Anesthesia flow tubes
- Gas and liquid pumps
- Fittings and tubing
- Filtration solutions
- Masks and tracheostomy and intubation tubes
- EMI shielding and thermal management



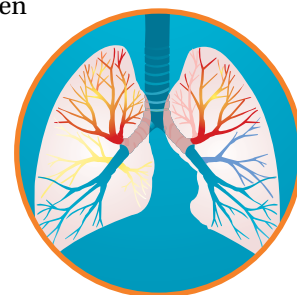
Our proven solutions in filtration and in-home oxygen therapy translate into improved life and greater value.



INNOVATION IN ACTION

Three new actuator technologies

Parker is developing three novel actuator technologies that are small, light weight, and consume significantly less power than other devices currently available. These disruptive technologies are capable of replacing conventional electromagnetic solenoid-based actuators. Parker's new actuators hold enormous potential for small, silent, low-power flow control in respiratory devices such as oxygen concentrators and conservers, as well as ventilators.



PACE Hf, a high flow proportional valve, was the first of many highly anticipated products utilising the new actuator technology. In PACE, the actuator delivers optimal control for inspiratory flow on a ventilator in a miniature, low-power package.

PACE offers the following:

- A wide controllable range and tight control under varying inlet pressures
- High inlet pressure capability with pressure balanced inlet and outlet
- Low power (less than one watt) and low heat generation
- Proven performance testing consistent with the life of respiratory devices
- Small size, light weight, and the highest flow capacity in class
- Low hysteresis and fast response



Parker's technology expertise is applied in areas such as fetal monitoring, speciality tubing, and intubation.

WANT TO KNOW MORE? E-MAIL: pharmaceutical@parker.com

CARDIOVASCULAR & SURGICAL

Innovative solutions for:

Cardiac surgical tools and instruments • Minimally invasive surgical tools • Vascular access products • Endoscopic devices • Sterilisation and infection control

By combining industry-leading advanced materials science, biocompatible materials, and systems manufacturing expertise and integration, Parker provides the following:

- Silicone medical solutions
- Minimally invasive surgical assemblies
- Single-use and reusable assembled solutions

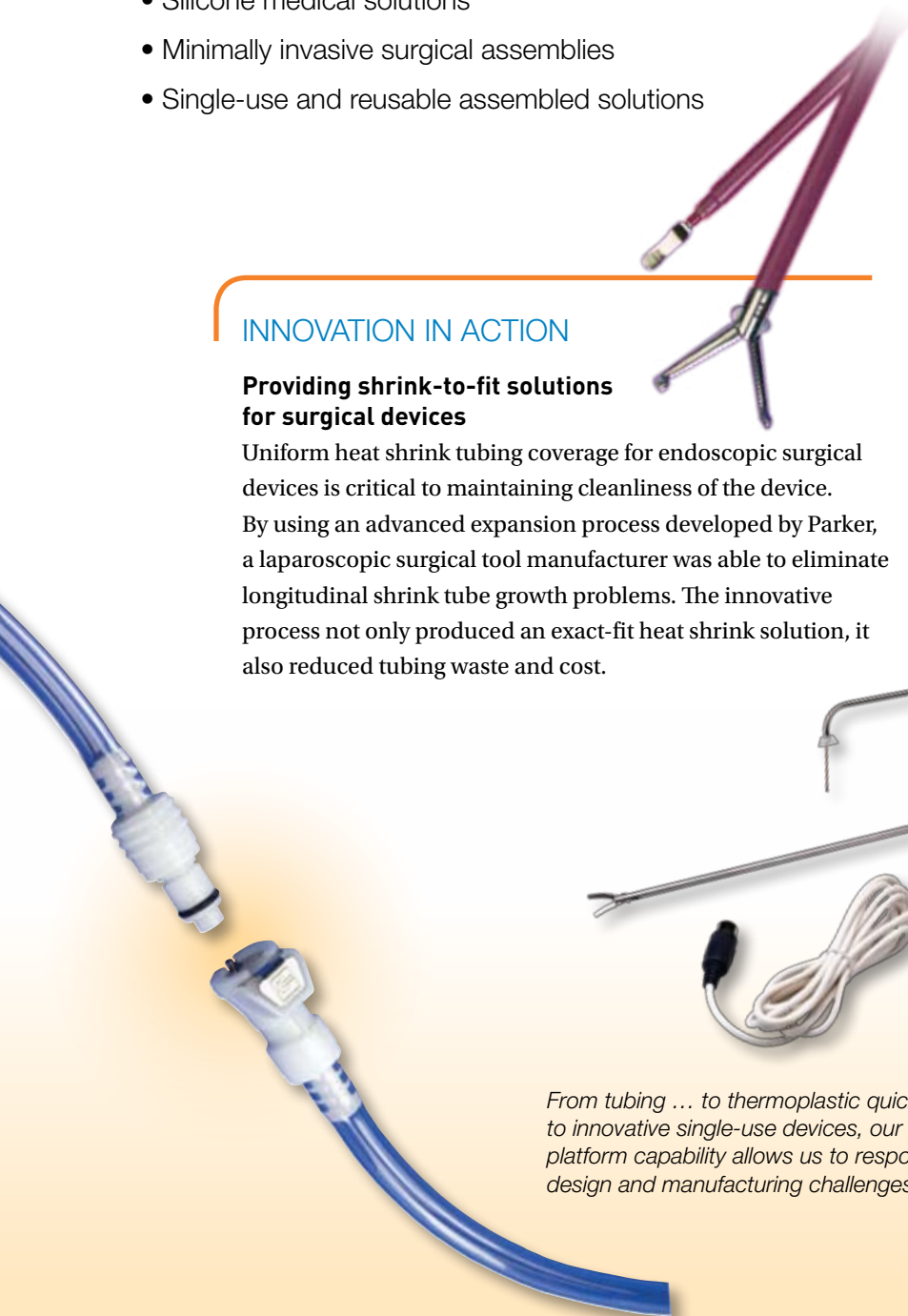
INNOVATION IN ACTION

Providing shrink-to-fit solutions for surgical devices

Uniform heat shrink tubing coverage for endoscopic surgical devices is critical to maintaining cleanliness of the device. By using an advanced expansion process developed by Parker, a laparoscopic surgical tool manufacturer was able to eliminate longitudinal shrink tube growth problems. The innovative process not only produced an exact-fit heat shrink solution, it also reduced tubing waste and cost.



Parker provides water filters for surgical hand-washing stations. Using sterile water helps reduce hospital-acquired infections.



From tubing ... to thermoplastic quick couplings ... to innovative single-use devices, our broad multi-platform capability allows us to respond quickly to design and manufacturing challenges.



PARKER TECHNOLOGY AND PRODUCT EXPERTISE

Our ability to respond quickly to design and manufacturing challenges of complex medical assemblies is a result of a broad, multi-platform capability encompassing a variety of systems and component-related technologies which include:

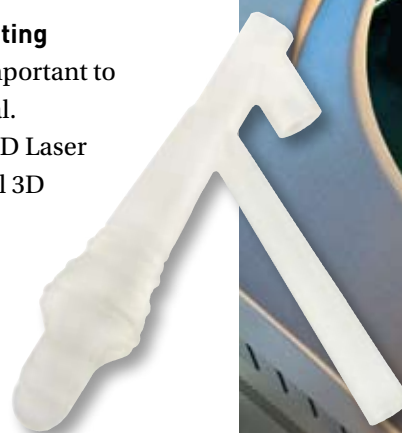


- Mechanical and electromechanical assembly
- Custom-molded and micro-moulded components
- PTFE, PFA, and FEP shrink tubing
- Proportional and directional valves
- Gas and liquid pumps
- Quick couplings, fittings, and tubing
- PEEK tubing and machined components
- EMI shielding and thermal management

ENGINEERING YOUR SUCCESS

Shorten design time and cost with 3D Laser Printing

For critical surgical tools, up-front design time is important to timely product validation and early market approval. By providing rapid prototyping through the use of 3D Laser Printing, Parker has been able to develop functional 3D CAD models with the look and feel of the finished surgical device. By using this type of design visualisation and replication, Parker can build components that facilitate proof of concept, reduce up-front tooling costs, and shorten the design cycle.



WANT TO KNOW MORE? E-MAIL: pharmaceutical@parker.com

MEDICAL FLUID MANAGEMENT

Innovative solutions for:

Dialysis • IV therapy • Drug infusion • Advanced wound care •
Compression therapy • Blood collection • Nutrition

Parker provides complete fluidic solutions for fluid control and conveyance ranging from tubing and connectors to moulded components, control valves, pumps, and pressure/flow controllers. Look to us for:

- USP Class VI certified silicone and thermoplastic elastomers
- Custom material compounds
- Catheter components and assembly
- Electronic pressure and vacuum control
- Filtration systems and components
- Anti-thrombolytic materials



Parker's material science expertise is used to develop custom solutions for stoppers, septums, syringe seals, and more.



INNOVATION IN ACTION

Multi-coupling solution allows easy docking of waste fluid collection system

Reliable, zero-leak connections are essential to waste collection systems used during surgery. Parker BioCare designed and delivered a fluid control system utilising an automated multi-coupling solution that both engages and docks into the disinfection station. The fluid control system not only provides a reliable connection between the waste collection system and disinfection station, it also includes integrated proximity sensors to recognise when the system and station are locked into place and disinfection can begin. The fluid control system also incorporates large, laminar flow passages to ensure large particles do not obstruct flow or create leaks upon disconnection.



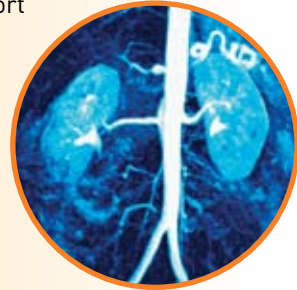
Parker provides complete fluidic solutions for fluid control and conveyance.



PARKER TECHNOLOGY AND PRODUCT EXPERTISE

Parker's ability to provide components, custom assemblies, and custom USP Class VI materials allows fully integrated programme support and extends to many of the following products:

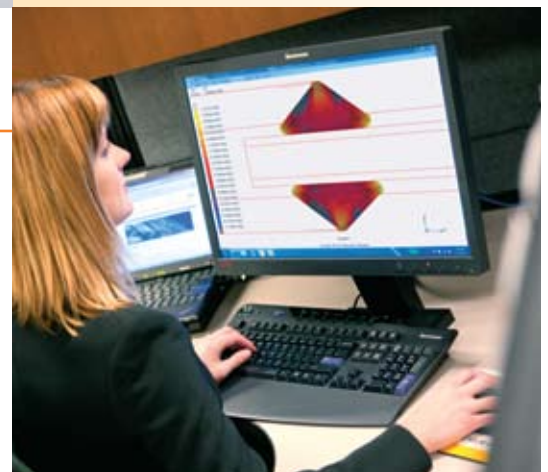
- Silicone, TPU, and TPE multi-lumen tubing
- Hemodialysis and peritoneal dialysis equipment
- Wound drainage tubes
- Luer and quick-connect fittings
- EMI shielding and thermal management
- Manual valves and check valves
- Proportional and directional valves
- Diaphragm pumps
- Filtration solutions
- Custom moulded components



ENGINEERING YOUR SUCCESS

Accelerating development with Finite Element Analysis

Predicting material performance during actual application can be an extremely difficult early validation process. By effectively using Finite Element Analysis (FEA) with fully characterised elastomer and thermoplastic materials, Parker has been able to help our customers improve the speed and quality of product design, offer an accurate visualisation of application performance, provide virtual prototype evaluation, and reduce the overall costs of programme development.



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CLINICAL DIAGNOSTICS & IMAGING

Innovative solutions for:

Clinical chemistry analysers • CT, MRI, and PET scanners •
Ultrasound • X-ray • Image-guided radiation therapy

Parker systems, modules, and components advance the performance of diagnostic tools in the laboratory, hospital, and doctor's surgery. Whether for imaging devices or clinical chemistry instruments, Parker technologies and services support device makers in the areas of gas and liquid handling, EMI shielding, motion control, and temperature control. Specific capability areas include:

- Control, dispensing, and pumping of fluid media
- Electromechanical positioning solutions
- EMI shielding
- Filtration solutions
- Valves, tubing, and fittings for temperature control

INNOVATION IN ACTION

Parker Smart Syringe Pump

With its compact size and integrated intelligence, our new Smart Syringe Pump offers superior performance while enabling revolutionary new OEM instrument design. Capable of being mounted on 9mm centers and weighing a fraction of competing syringe pumps, the Parker Pump offers a better choice for high throughput laboratory automation. Because of its compact size, the Pump can be mounted on motion systems directly at the point where aspirating and dispensing occurs. This eliminates the long lines of tubing and associated dead volume currently used to transfer fluids between pumps and samples, simplifying fluidic design and improving performance. The elimination of transfer lines also reduces instrument footprint, cost, power use, and heat generation.



PARKER TECHNOLOGY AND PRODUCT EXPERTISE

Parker's breadth of technology extends from gas and liquid media solutions to electromechanical positioning equipment.

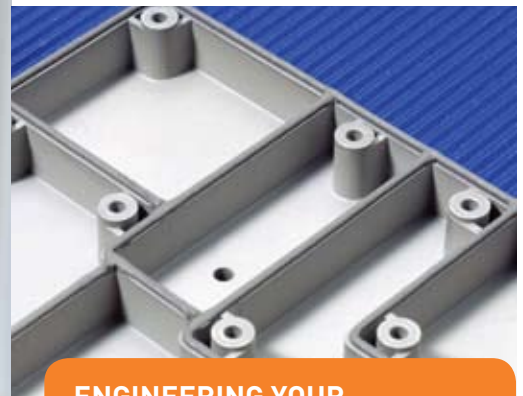
- High performance valves and pumps
- Chemically resistant custom molded shapes
- EMI shielding and thermal management
- Motors, drives, electromechanical positioning equipment
- Temperature control technologies



Parker's expertise in fluid management ranges from miniature fluidics for controlling aggressive media in diagnostic instruments to larger diameter hose and fittings for cooling systems on imaging devices.



Parker provides rotary and linear motion for MRI, CT, and PET scanner patient handling or device positioning.



ENGINEERING YOUR SUCCESS

Reduce weight and lower costs with integrated solutions

Reducing weight and maintaining EMI reliability can be a challenge in any electronic diagnostic application. At

Parker, we utilise a plastic-to-metal conversion that provides a single, fully assembled, integrated solution. By

combining multiple EMI compliant materials, including plastic housings and components, ECOPLATE conductive coatings, and EMI shielding gaskets, we deliver reduced weight, improved product reliability, and lower costs – all from one turnkey component. Parker can also provide EMI shielded optical displays to further protect your system.



WANT TO KNOW MORE? E-MAIL: pharmaceutical@parker.com

LABORATORY INSTRUMENTS

Innovative solutions for:

Micro-arrays • Bio chips • Combinatorial chemistry • Mass spectrometry • Microscopy • Gas and liquid chromatography • High throughput screening • Liquid handling and dispensing

Drug discovery and development companies must tightly integrate their processes in order to operate lean, meet stringent government regulations, and successfully deliver their products to market. Working to increase the pace of DNA and protein research, explore biopharmaceutical opportunities, and drive new discoveries, Parker provides the following:

- Miniaturised precision components and systems
- Fluidic systems
- Control modules
- Microfiltration systems

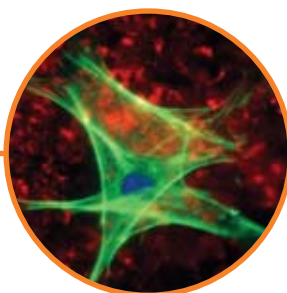
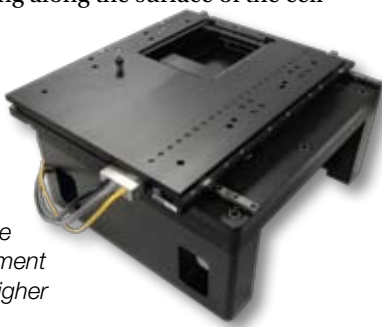
INNOVATION IN ACTION

Advancing microscopy, cytology, and biomolecular imaging

Parker partners with many biomolecular imaging companies that require high precision positioning solutions in a small footprint. In one specific case, Parker provided a motion control solution that more closely integrated optical components, customer-required mounts, and positional locks. The overall system provided the instrument with:

- Precision capabilities eliminating the need to stitch images together
- Sub-micron resolution for indexing along the surface of the cell
- Reduced time to market
- A shorter design cycle due to collaborative engineering

Parker's precision XY stages can be optimised to meet any OEM instrument need, including platform stability, higher precision, and smaller footprints.



PARKER TECHNOLOGY AND PRODUCT EXPERTISE

Parker's products and capabilities range from individual components to integrated fluidic modules, custom motion control systems, and synchronised motion and fluidic control.

- Pumps, precision valves, and controllers
- Fittings for high pressure and low vacuum
- Chemically resistant custom molded shapes
- EMI shielding and thermal management
- Motors, drives, electromechanical positioning equipment
- Temperature control technologies
- PTFE, FEP, silicone, and urethane tubing



ENGINEERING YOUR SUCCESS

Electronic pressure and flow control module

Parker utilised its extensive fluidics and system design expertise to partner with a global leader of Mass Spectrometry and Liquid Chromatography (MS/LC) analytical equipment to design and manufacture a turnkey Electronic Pressure and Flow Gas Control Module. The fluidic subsystem independently controls gas flows for different ion sources. The unit provides a wide range of flows with excellent stability, repeatability, and linearity characteristics. Through this expertise, Parker was able to deliver:



- Shortened design cycle time getting it onto the market faster
- A fully assembled design tested to customer specifications
- Optimised logistics by replacing over 50 part numbers with one system part number
- Improved performance by increasing the analysis resolution from parts per million to parts per billion
- Improved throughput resulting in a lower cost per sample



Parker provides Analytical Gas Generators that are easily paired with gas chromatographs and mass spectrometers for end users, as well as motion control solutions, leak-tight fittings and valves, precision regulators, and fluoropolymer tubing for OEM instrument manufacturers.



WANT TO KNOW MORE? E-MAIL: pharmaceutical@parker.com

BIOPROCESS AND PHARMACEUTICAL MANUFACTURING

Innovative solutions for:

Pharmaceuticals • Biopharmaceuticals • Vaccines • Ophthalmics •
Fill and finish • Bulk fermentation • Packaging automation

Whether for active pharmaceutical ingredients (APIs), large or small volume parenterals, or biopharmaceuticals, today's bioprocess and pharmaceutical manufacturers are looking for end-to-end solutions that drive lean processes, streamlined workflow, and faster throughput while meeting stringent quality, environmental, and safety regulations. To that end, Parker contributes the following:

- Automation technologies
- Customised single-use systems and disposable filtration
- Intermediate and final product processing
- Fermentation solutions
- Components for micronisation, milling, micro dosing
- Buffer and media preparation
- Integrity testing and validation
- SIP, CIP, and compatibility testing



INNOVATION IN ACTION

New disposable filters reduce risk, cost, and contamination

Parker has developed a range of disposable filters – in 10", 20", 30", and 40" sizes – aimed specifically at biopharmaceutical process development and production. Introducing disposable filtration technology to the manufacturing process decreases the risk of product cross-contamination and revenue loss due to wasted product, reduces capital investment, eliminates cleaning requirements of vessels and pipework, and protects the production operative.



Our HMI visualisation software and touchscreens provide industry-leading tools to ease your compliance to 21CFR11 and cGMP requirements.



PARKER TECHNOLOGY AND PRODUCT EXPERTISE

From components to scaleable systems, Parker's expertise in providing solutions for pharmaceutical processes covers a broad range of fully traceable components, integrated systems, and services including:

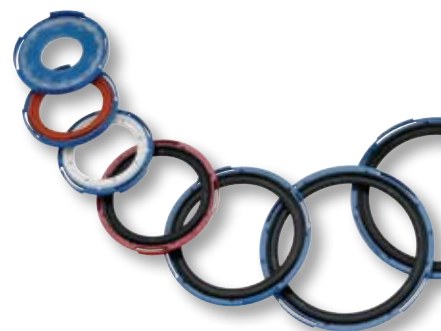
- Disposable filters, multi-element filters, and capsules
- Membrane filters and filter discs
- Bioprocess bags, vessels, tubing, and valves
- Compressed air treatment
- Vent filtration
- Aseptic connectors
- Fittings and connectors
- Gas generation systems, including zero air and dry air systems
- Bio-fluid handling
- Sanitary gaskets, seals, and o-rings
- Mixing systems



ENGINEERING YOUR SUCCESS

New sanitary seal eliminates downstream contamination and reduces costs

Parker has developed a new sanitary seal product line for standard ASME fittings found in pharmaceutical process manufacturing. The new gasket was developed to reduce manufacturing risks by eliminating cleaning issues associated with the intrusion or recess of the gasket, improving long-term sealability and providing full product traceability for the materials used. By helping pharmaceutical manufacturers reduce such risk, Parker is helping them obtain operational excellence and lower overall operating costs.



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