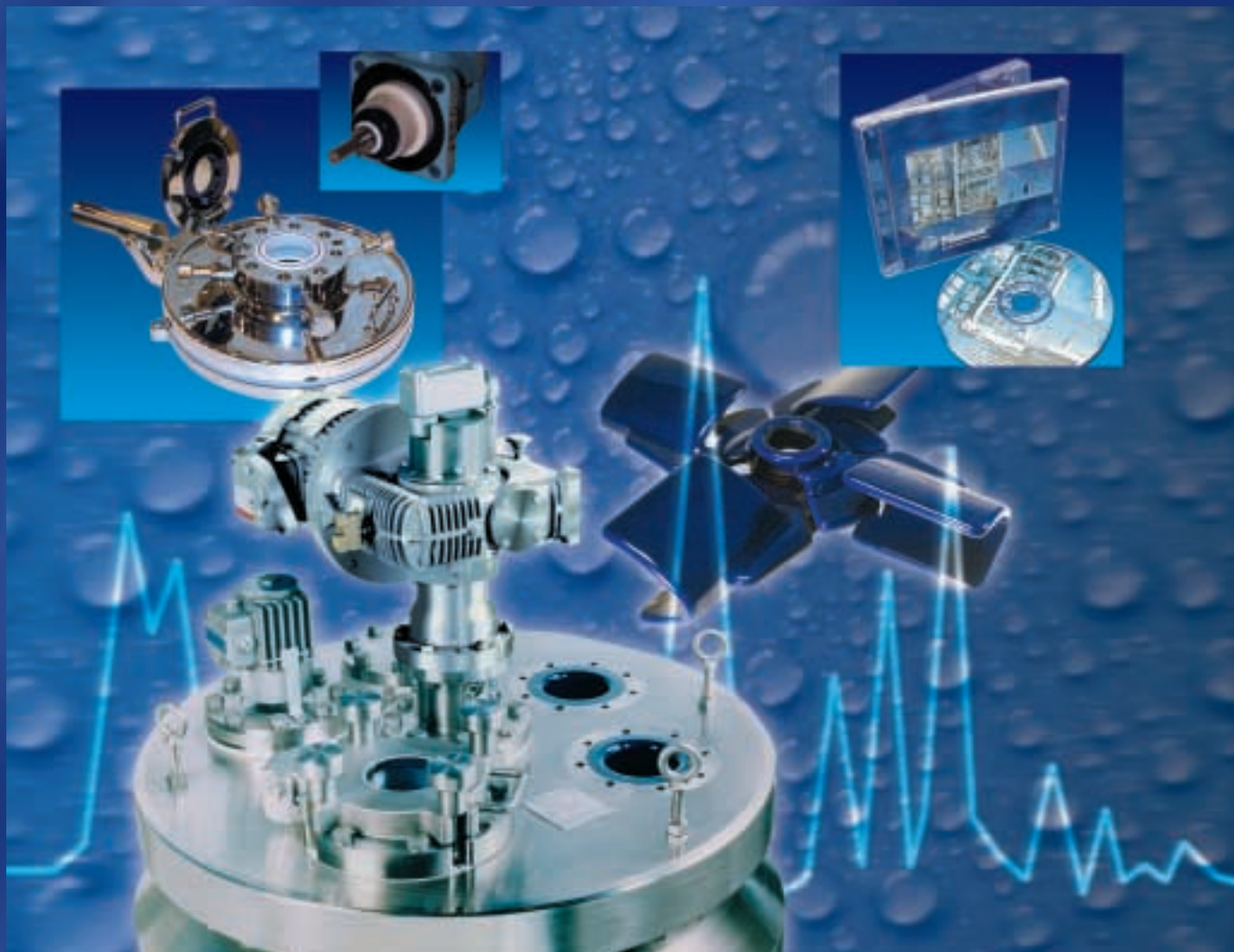




Glasteel® Pharma Reactors



With stringent processing demands and enhanced cGMP requirements, pharmaceutical manufacturers encounter a number of complex decisions when specifying equipment used to process their products:

The best materials of construction.

Cryogenic applications.

Optimum mixing systems.

Cleanability – both interior and exterior surfaces.

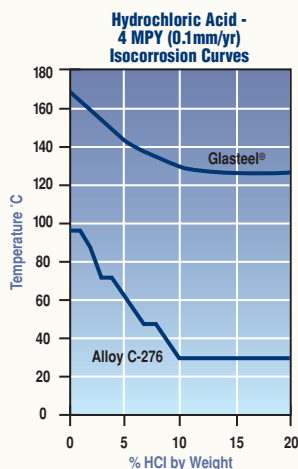
Processing of small batches.

Product sampling.

Product monitoring.

Equipment validation.

Since no single specification covers the unique requirements of all pharmaceutical manufacturers, Pfaudler's RP Series Pharma Reactors are available in 20 through 4000 gallon capacities and offer an expanded range of product options to meet industry demands.



PFAUDLER'S UNIQUE "GLASTEEL®"

The optimum material for the pharmaceutical industry

- Superior corrosion resistance. Only tantalum is comparable. Much better than nickel based alloys in common acidic environments.
- Extremely inert. No chromium, nickel, molybdenum or copper can leach into the product. And these extractable metals can cause undesired side reactions.
- Exceptional surface quality. Typically 8-12 microinch finish – standard! Low surface energy for excellent anti-adhesion properties. Cross product contamination is minimized by the effective cleaning of the smooth glass-lined surface.
- Available in dark blue, light blue and white. Choose the color that provides optimum product visibility during production or cleaning.
- Glasteel® is the material of choice for API development; from lab scale, through pilot plant, to full-scale production

REACTOR FEATURES

A choice of many options such as:

- Cryogenic capability.
- Patented "Clean" main flange eliminates J-clamps and exposed threads.
- Flat glass-lined stainless steel top heads with polished exteriors.
- Conical bottom heads for mixing small batches.
- Conventional, divided and half pipe jacket configurations.
- Quick opening EZ-Port handholes and manways.
- Portable reactors can be designed for easy access to containment areas.



PROSOL MIXING SYSTEMS

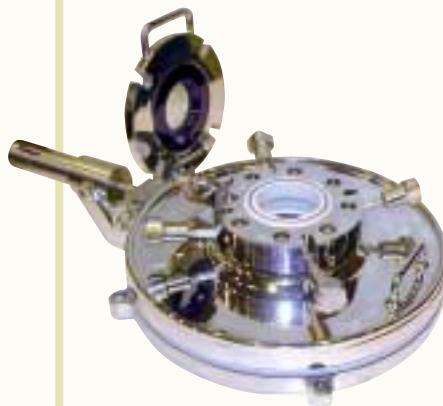
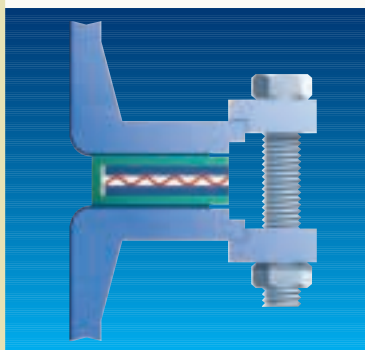
A complete range of impeller configurations.

- Provides the benefits of glass-lined equipment while matching the effectiveness of alloy systems.
- Computer modeling techniques for optimum system design.
- Scalable agitators.
- VMX and SRW drives.
- Gas barrier dry seals – contacting and lift-off.
- Patented, flange mounted, "concave" baffle provides a 20% increase in baffle effectiveness.

FAMILY OF GASKETS

A variety of premium gasket choices is available for the pharmaceutical industry.

- Bull nose. The TFM machined envelope has a lower permeability rate and less deformation than PTFE. Its unique convex geometry reduces product buildup.
- Channel. The special machined PTFE envelope does not protrude into the vessel. Minimizes product buildup and facilitates vessel cleaning.
- Double envelope. The outer envelope protects the outside of the gasket from corrosion and contamination.



EXTERIOR MATERIALS & FINISHES

Pfaudler offers many reactor exterior options such as insulation with polished stainless steel sheathing, polished & matte glass-lined alloy finishes, fluoropolymer coatings, plated surfaces and premium **STEEL IT** paint.

- Improves the reactor's exterior corrosion resistance.
- Reduces maintenance with more easily cleaned surfaces.
- Touch-up or repainting is reduced or eliminated.
- Enhances the reactor's exterior appearance.

CLEAN-IN-PLACE

Pfaudler provides an integrated approach to equipment cleaning – optimum reactor design with the supply of premium cleaning devices.

- One or multiple cleaning devices installed in the reactor.
- These devices are positioned for optimum cleaning.
- In-house Riboflavin testing and certification.





PRODUCT SAMPLING

Either direct or transfer device sampling is available.

- Mounted in either the baffle or dip pipe.
- Opening the manway is not required.
- Sample under process conditions.
- Easy operation.

ON-LINE PRODUCT MONITORING

Pfaunder offers on-line infrared monitoring. This technology provides a comprehensive solution for chemical monitoring utilizing FTIR (mid infrared) and NIR (near infrared) techniques.

- Real time, on-line, chemical monitoring and process analysis.
- Located directly in the reaction zone.
- Single port mounting through a top head, shell or bottom head nozzle.



EQUIPMENT VALIDATION QUALIFICATION DOCUMENTS

Pfaunder offers a detailed qualification documentation package that aids our customers' validation activities.

- A structured, defined approach to validation qualification.
- Addresses this important activity early in the equipment's design and purchasing process.
- These documents are compiled upon shipment of the equipment.
- Produced in electronic format.

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