

## PROCESS VESSEL SYSTEMS

- ▶ Pressure Vessels from 0.1 to 5000 Liters
- ▶ High Purity, Sanitary, Pharmaceutical Designs & Finishes Available
- ▶ Special Designs for Reactors, Fermenters, Mixers, Homogenizers, Dispensers, Hydrogenators & Other Turnkey Systems
- ▶ Stainless Steel, Hastelloy & Other Alloys  
ASME, CE/PED, & Other Certifications

## NUTSCHE FILTER DRYER SYSTEMS

- ▶ Benchtop Models are the Logical Step Up from Laboratory Buchner Funnels
- ▶ All-in-One Solution for Filtering, Washing, Reslurrying, Mixing & Drying High Purity Solids
- ▶ Lab, Pilot & Production Scale



**pope**  
SCIENTIFIC INC.  
Solution Driven.



APPLICATION-TAILORED SOLUTIONS

Vessels, Reactors & Turnkey  
Processing Systems

# Vessels, Reactors & Turnkey Processing Systems

## OVERVIEW

Pope Scientific offers a wide variety of stainless-steel portable pressure vessels, reactors, blenders, and fully turnkey processing systems. Our portable pressure vessels are all manufactured, certified and permanently stamped according to ASME Section VIII requirements to ensure safety. They are available in a wide array of sizes, finishes and additional customizable options.

For unique applications, traditional and highly customized reactors are offered, as well as fermenters, dispensers, mixing or homogenizing units, hydrogenators, evaporators, distilling boiling pots, and other dedicated or general use vessel systems.

We also offer complete, custom processing systems for clients. These systems often incorporate many items peripheral to a process vessel or reactor, including additional vessels, filter systems, chillers, heaters, pumps, heat exchangers, condensers, load cells, powered lifts, vacuum systems, fractionating columns and other components, as well as recorders, controls or computer/PLC control systems. Skid mounting or portable heavy carts are offered.

Pope's experienced application specialists are available to discuss specific requirements and engineer a total solution for your unique application. Contact us today to discuss your needs and discover what options we can offer.

## CAPABILITIES

- Pressure vessels from 0.2 to 1000 Liters
- Complete custom turnkey processing and liquid handling systems designed to suit client processing applications requirements
- Integrated with valving, mixers, sensors, heaters, condensers, pumps, instrumentation, and control systems, etc.
- High purity chemical, pharmaceutical, food use fabrication and finishes
- Stainless steel, Hastelloy and other materials, ASME standard, TSSA, CE/PED, UN/DOT, etc.



30-L Reaction and Nutsche Filter System with Feed Vessel Lift



Pope Mixing Vessel with Pneumatic Lift and Data Recorder



15-Gallon Portable Vessel with Wheel and Handle Set-Up



Pressure Vessels with Level Indicators



25-L and 100-L Jacketed Sanitary Mixing Vessels with Pope Series 800 Mixers



5-Gallon Vessel System with Pneumatic Mixer, Liquid Pumps, XP Rated.



10-Gallon Dockable Pharmaceutical Dispensing System, Removable Vessel and Precision Pumps & Flow Meters



25-L Sanitary Mixing Reactor with Pope Series 800 Mixer



75-L Reactor with Addition Funnel, Series 800 Mixer and pH Transmitter



140-L Pharma Certified Reactor with Mixer, Load Cells, Cart, and Removable Head



6-L Jacketed Reactor with Pope Series 700 Mixer



25-L Mixing Vessels with Load Cells, Carts



600-L Turnkey Reacting, Blending, Adsorption, and Evaporation System for Pharmaceutical Synthesis Processing



Special Vessel System for Pharma with Cart



Portable Reactor System with Thermal Circulator, Pump, Reflux Collector, Load Cells and Recorder



25-Liter Reaction and Distillation System



Turnkey Isolation System w 30-L Crystallizer & 25-L Nutsche



Mixing Reactors with XP Mixers for Pharmaceutical Use



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**POPEINC.COM**

For 60 years, Pope Scientific Inc. has been at the forefront of manufacturing chemical processing equipment, engineered systems and laboratory apparatus for science and industry. Internationally known, Pope provides specialized technical expertise in the design and manufacturing of chemical processing equipment.

### **SOLUTIONS FOR CHEMICAL PROCESSING EXCELLENCE**

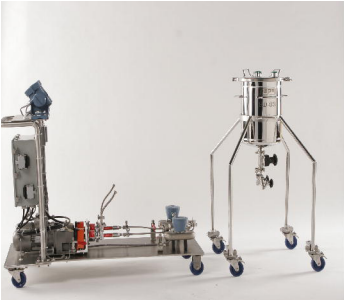
*Lab, Pilot & Large Scale Production Capabilities*

- Wiped-Film Molecular (Short Path) Stills and Evaporators
- Batch and Continuous Fractional Distillation Systems
- Hybrid Wiped-Film / Fractional Distillation Systems
- Pressure Vessels, Reactors, and Process Vessel Systems
- Nutsche Filter – Dryers
- Sanitary / Pressurizable Mixers
- Cannabis Specialties
- Toll (Contract) Distillation, Process Development and Testing Services

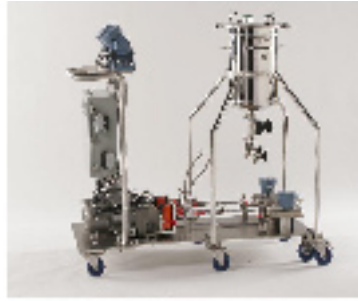
**POPE – WHEN PROCESS EXPERTISE AND SUPPORT MATTER.**



## Portable Pressure Vessel & Vessel Systems



Reagent Delivery System - 30L with 12" Diameter Holding Vessel on Support Stand with sensors on Main Cart-Shown Attached and Detached.



Portable Processing Systems complete with motors, support stands with casters, with mounted load-cells - consists of one 60 liter vessel 12" diameter with removeable head and 140 liter vessel with removeable head.



Portable Pressure Vessel Compounding System, made of stainless steel with a 30 Gallon (100 Liter) vessel with offset homogenizing assembly and variable speed stirrer assembly. Complete with a flanged bottom, load cells, tachometer, the unit sits on a stainless steel cart complete with casters, handle and brakes.

Compounding vessels to consist of 25 liter and 50 liter postable suspension vessels with mixing systems. Mounted on carts with pneumatic device to raise and lower removable heads.

**GO TO PPV IN ACTION:**



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## VERSATILE SKID MOUNTED REACTOR SYSTEMS CUSTOM-BUILT TO CUSTOMER REQUIREMENTS

Pope Scientific's Skid Mounted Reactor Systems can be custom-engineered for a range of specific applications, including pharmaceutical, specialty chemical, cosmeceutical, nutraceutical, and food ingredient. The versatile skid-mounted design is compact and requires minimum hookups, for easy installation. And because each system is modular, it can also be cost-effectively scaled up from pilot plant to production if needs change.

Available in capacities from one to 500 gallons, the reactor system performs a multi-step synthesis of chemical product, including solid mixing, reaction, evaporation, filtration, and filtration storage. Each custom-built system is extremely flexible and robust, capable of handling multiple processes at the same time within a small footprint. The system is readily configurable to perform different reactions using other materials.

Each multistage processing reactor system is manufactured with the highest quality materials and tested to meet all application requirements. A typical system includes storage vessels, reactor, mixer, feed hopper, condenser, vacuum system, absorption column, filter assembly, and other components as required.

A sight glass allows easy viewing of the contents of each storage tank. Solids can be conveniently added through the vibrating feed hopper system, while multiple solvents are precisely metered using a spray ball. A jacketed reactor enables low-pressure vacuum condensation.

Load cells accurately measure the amount of material added at any given time. This data can be captured and trended from a local or remote location using the self-contained control-panel. The system can be easily integrated with a company's existing software.

For each custom-built system, Pope's highly specialized engineers provide guidance throughout the entire project, including process development, engineering, installation, training, and technical support. Applications assistance, feasibility testing, installation assistance, and custom toll processing services are available.

With nearly a half century of technical expertise in designing and manufacturing chemical processing equipment, Pope is internationally known for turning even the most challenging projects into real solutions. For more information, visit [www.popeinc.com](http://www.popeinc.com) or call 1-262-268-9300.

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## VERSATILE SKID MOUNTED REACTOR SYSTEMS CUSTOM-BUILT TO CUSTOMER REQUIREMENTS



Ideal for the pharmaceutical industry, this 100-gallon Skid Mounted Reactor System is manufactured with high-quality hastelloy materials. It contains four vessels, mixer, reactor, feed hopper system, a condenser, vacuum system, absorption column, and filtering assembly.



FOR IMMEDIATE RELEASE



**Pope Mixers:** Powerful, Reliable, Versatile





## Pope Mixers for Demanding Applications

- Pharmaceuticals
- BioTech
- Foods & Flavors
- Cosmetics
- Polymers

- High purity speciality chemicals
- General processing and R&D
- Many others



Interchangeable



Adaptable



Application Optimized

### Pope Mixers – Quality & Versatility

Since 1986, Pope Scientific mixers have been noted for their ruggedness and versatility in a wide range of demanding applications. All feature robust design, top quality materials, precision fabrication, and are fully pretested over their entire operating range. For even greater flexibility, motors, shafts and impellers can be completely interchangeable.

Regardless of the model and configuration you choose, you can be confident your Pope mixer will deliver the performance your application demands – and the reliability you expect.

#### Series 800 Mixer

The high-performance Series 800 mixer is designed for the most demanding applications, such as strict sanitary, temperature and pressure/vacuum extremes, high chemical compatibility and other uses. You may specify the type of motor (electric, air, explosion proof) you want, various optional seals, even your choice of impeller types.

#### Series 600 Mixer

The compact Series 600 mixer is the ideal choice for those less demanding applications and where space is at a premium. As with all Pope mixers, you may select from a wide range of motors, seals, impellers and other options to match your exact application needs.

#### Series 800 Mixer Specifications

<b>Wetted Material</b>	316-L stainless steel, Hastelloy C-276, other alloys – Teflon/other coatings available
<b>Vessel Connection</b>	3" sanitary clamp standard – 150 lb flange mount, others available
<b>Bearings</b>	High temperature, permanently lubricated. Double row lower, single row upper
<b>Shaft</b>	3/4" diameter, standard or detachable "pool cue" styles
<b>Impeller</b>	Marine type standard. Turbine, hydrofoil, Cowles, anchor, paddle, others available per application (mounted with set screws or welded, ground and polished)
<b>Motor Mount</b>	Standard or quick removal type (for autoclaving, etc.)
<b>Motors</b>	<b>Electric:</b> <ul style="list-style-type: none"> <li>• 1/3, 1/2, 3/4 hp DC variable speed</li> <li>• 1/4, 1/3, 1/2, 3/4 hp DC gearmotor (choice of speed ranges)</li> <li>• Others per application (including explosion proof, AC)</li> </ul> <b>Air:</b> <ul style="list-style-type: none"> <li>• 3/4, 1-1/2 hp variable speed (200-800 rpm)</li> <li>• 1/4, 1 hp variable speed gearmotor (30-300 rpm)</li> <li>• Others per application</li> </ul>
<b>Cooling</b>	Teflon lip seal to protect ball bearings. Two coolant side ports.

#### Seal Specifications

<b>Version</b>	Type 8 balanced, single, dry-running mechanical seal (double mechanical and other types available)
<b>Materials</b>	316 stainless standard (Hastelloy available) Viton elastomers (Kalrez, others per application) Carbon primary ring, tungsten carbide mating ring
<b>Max Operating Spd</b>	800 rpm – optional tachometer available (recommended operating speed)
<b>Max Seal Pressure</b>	Full vacuum to 120 psig (dry running), 150 psig (wet running)
<b>Seal Lubrication</b>	Dry (can be wetted - see "Cooling" above)
<b>Operating Temp</b>	-40° F to 300° F
<b>Seal Life</b>	3000 hours minimum (estimated)

#### Series 600 Mixer Specifications

<b>Wetted Material</b>	316-L stainless steel
<b>Vessel Connection</b>	2" sanitary clamp standard, others available
<b>Shaft</b>	1/2 diameter (detachable "pool cue" type available)
<b>Impeller</b>	Marine type standard. Turbine, hydrofoil, Cowles, others available per application (mounted with set screws or welded, ground and polished)
<b>Motor Mount</b>	Standard or quick removal type (for autoclaving, etc.)
<b>Motors</b>	<b>Electric:</b> <ul style="list-style-type: none"> <li>• 1/4, 1/3, 1/2 DC variable speed</li> <li>• 1/8, 1/4, 1/3 hp DC gearmotor (choice of speed ranges)</li> <li>• Others per application (including explosion proof, AC)</li> </ul> <b>Air:</b> <ul style="list-style-type: none"> <li>• 3/4 hp variable speed (200-800 rpm)</li> <li>• 1/4 hp variable speed gearmotor (30-300 rpm)</li> <li>• Others per application</li> </ul>

#### Seal Specifications

<b>Version</b>	Type 6 single, dry-running mechanical seal
<b>Materials</b>	18-8 stainless hardware Viton elastomers (Buna, EPDM available) Carbon primary ring, ceramic mating ring
<b>Max Operating Spd</b>	800 rpm – optional tachometer available (recommended operating speed)
<b>Max Seal Pressure</b>	75 psi (not rated for vacuum use)
<b>Operating Temp</b>	-20° F to 240° F
<b>Seal Life</b>	5,000 hours (estimated)

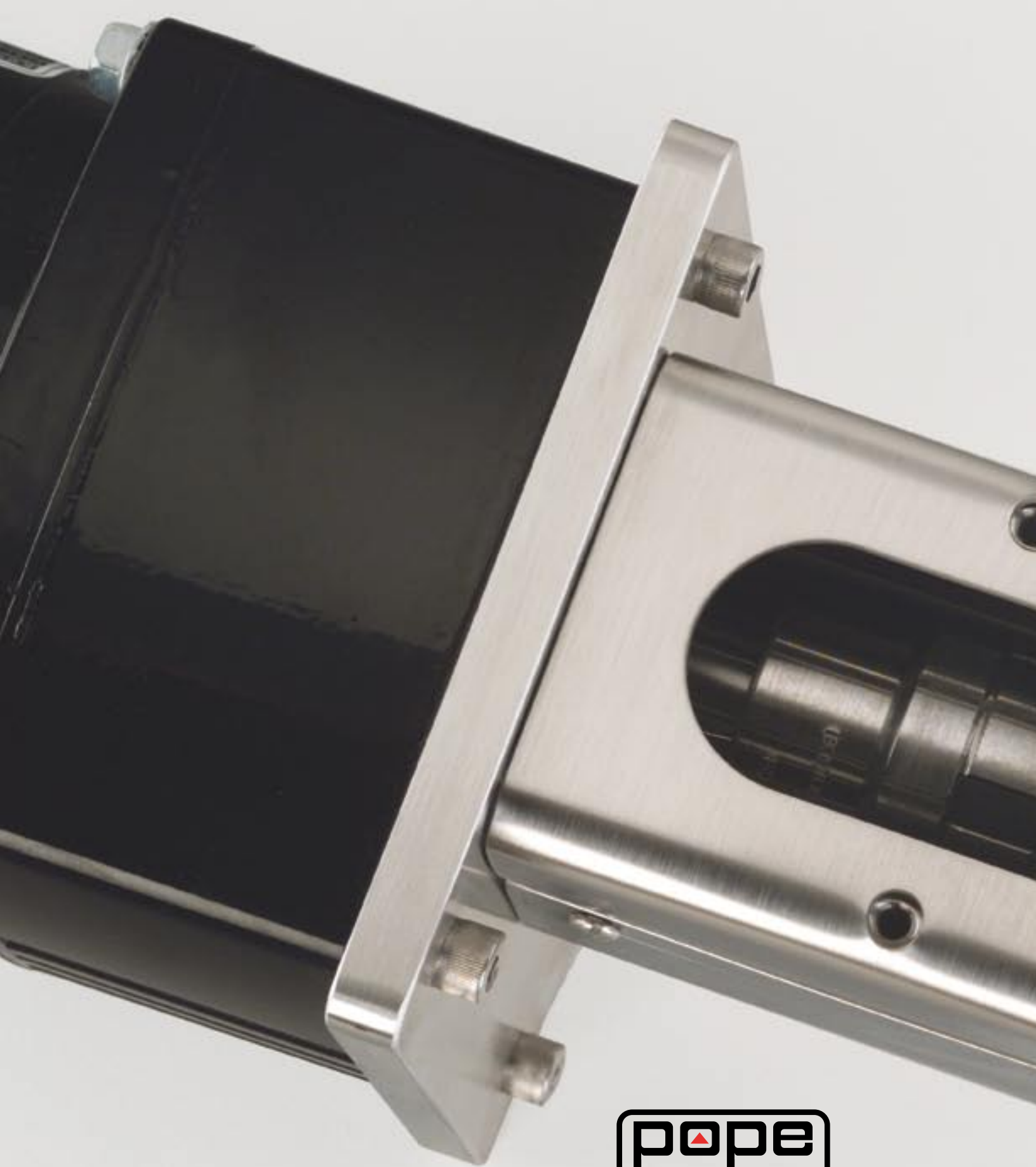


### Pope Scientific – Total Solutions

Pope's Mixers have been proven and utilized in many industries. They were first offered as accessories to Pope's Portable Pressure Vessels and Process Vessel Systems product lines. Now, they are also available as stand alone mixer units for various existing vessels in sizes ranging from 2 to 2000 liters.

We can provide more than a mixer. We offer complete turnkey mixing systems, blenders, dispensers, reactors, fermenters, transfer and process vessels. Additionally, Pope offers skid mounted processing stations with full instrumentation and controls. In such systems, the mixer is optimized and integrated with other system components to allow for greatest efficiency.

Pope Scientific's ability to work with a wide range of customer applications means you get the technology, equipment and services at one source. Consult with our experienced staff about your special application. We will carefully assess your needs to determine the most appropriate solution.



**Pope Scientific, Inc.**

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Interior Mechanical Finish:   Microinch (RA)  Grit

Exterior Mechanical Finish:   Microinch (RA)  Grit

Coating:

**Agitation:**

Mixer:  Yes  No

Mixing Type:  Adding/Dissolving/Suspend Solids  Blending Liquids  
 Heat Transfer  Reacting  
 High Sheer  Gas Dispersion  
 Other Description:

Viscosity:  cp

Specific Gravity:  g/cm

Motor Type:  Electric  XP Electric  Air

**Heating/Cooling:**

Liquid Jacketing:  Yes  No  
 Side  Side and Bottom

Type:  Hot Oil  Steam  Cooling  Other

Pressure Rating:  PSI  Bar

Insulation:  Yes  No

Electric Heating:  Yes  No

**Features/Components:**

Sightglass  Pressure Relief  Pressure/Vacuum Gauge  Temperature Sensor  
 pH Probe  Level Probe/Sensor  Spray/CIP Device  Pressure/Vent Valves  
 Bottom Drain Valve  
 Other - Describe:

Other/Spare Fittings:

**Support:**

Metal Skirt  Legs  Wheels  Cart  Mounting Brackets  
 Fork Channels

**Other Features, Comments on Process, Etc.:**

Optional: Send Sketch or drawing with additional notes separately.



# Pope Process Vessels and Liquid Handling Systems.

Custom engineered for specialized applications in many industries including pharmaceuticals, foods, high purity fine chemicals, and many others. Recent examples appear below.



Pharmaceutical reactor/blender with glass intermediate vessel, automated refilling controls, data recorder and chilling system.



Portable polymer recirculation/dispensing system with heaters and filter vessel.



Portable pharmaceutical 10 gallon reactor with removable head (lift included), automatic heating/cooling system, scale, and discharge pump.



Reactor/Evaporator for foods and flavors processing. Equipped with pH and steam heating/water cooling controls, recorder, condenser, and receiver.



Skid mounted 180 liter reactor/liquid distribution system. Includes automated dosing vessel, load cells, heat exchangers, temperature controls, and filters. Completely stainless steel.



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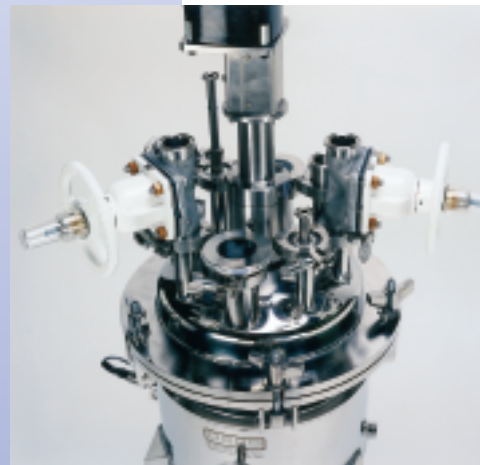
# Examples of Recent Pope Portable Pressure Vessels & Process Vessel Systems



50 and 100 Liter Reactors with programmable steam sterilization and temperature control systems.



37 Gallon Portable Mixing/Filtering/Dispensing System.



6 Gallon Pharmaceutical Vessel with removable head, top view (see p. 2).



150 psi 30 Gallon Mixing Vessel with 6" hinged handhole cover, top view.



Examples of various small sanitary vessels



10 Liter Portable Pharmaceutical Process/Transfer Vessel with sparging control, check valves, quick connections, rupture disk.



Transfer and Dispensing Station System for vaccine media with 100 Gallon vessel, skid mounted, all stainless steel, pharmaceutical finish.



10 Gallon Hydrogenation System for high purity speciality chemical processing.



140 Liter Nutsche Filter/Dryer System for pharmaceutical processing, 3 piece design.



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# Pope Custom Vessels and Systems for many applications



10 Gallon Mixing/Transfer Vessel with 1 1/2" NPT sightglasses, handle/wheel set.



60 Liter Sanitary jacketed Holding Vessel with vertical flushmount sightglass.



20 Liter High Purity Nutsche Filter/Dryer shown apart, 2-piece body design with removable filter basket.



5 Gallon Homogenizer/Blender System for pharmaceuticals, includes instrumentation, scale, and heater/chiller system (not shown).



6 Gallon High Viscosity, S.I.P. Pharmaceutical Process Vessels with removable heads, paddle mixers, and special fittings.



Portable Pharmaceutical 6 Gallon Ultra Low Temperature, Pressure/Vacuum Homogenizing System with recirculation/dispensing pump, load cell scale, and chiller unit.



30 Gallon Portable Pharmaceutical Reactor with jacket and stainless steel clad insulation.



20 Gallon Soy Sauce Inoculant Fermenter with pH and temperature probes, sample port, sparge control, filters and condenser.