

Autoclave Systems

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Production-Size Autoclave Systems

Our Autoclave Systems

Complete, integrated autoclave systems are McGill AirPressure's specialty. We manufacture a wide range of sizes and types of autoclave systems tailored to the customer's specific needs. These range from economical standard units to the largest and most customized in the world. We manufacture systems that handle pressures up to 2,000 psig and temperatures to 1,200°F.

Our autoclave systems apply vacuum, heat, and pressure in a controlled environment to cause physical or chemical changes in the materials being treated in the autoclave. These processes include bonding, laminating, curing, vulcanizing, impregnating, digesting, and sterilizing. Each of these processes requires a specific type of autoclave system. Our experience in engineering and manufacturing capabilities allow us to offer these different systems so the customer receives the best solution possible for the job.

We offer the following types of production-size autoclave systems for these industries. (Please see the descriptive product sheet for each of these product categories for more information.)

Rubber:

Vulcanizers, Devulcanizers, and Tire Curing Presses

Pulp and Paper and Minerals Processing:

Globe Digesters

Medicine:

Medical Waste Sterilizers and Hyperbaric Chambers

Food:

Retorts

Aerospace, Automotive, Glass, and Electronics:

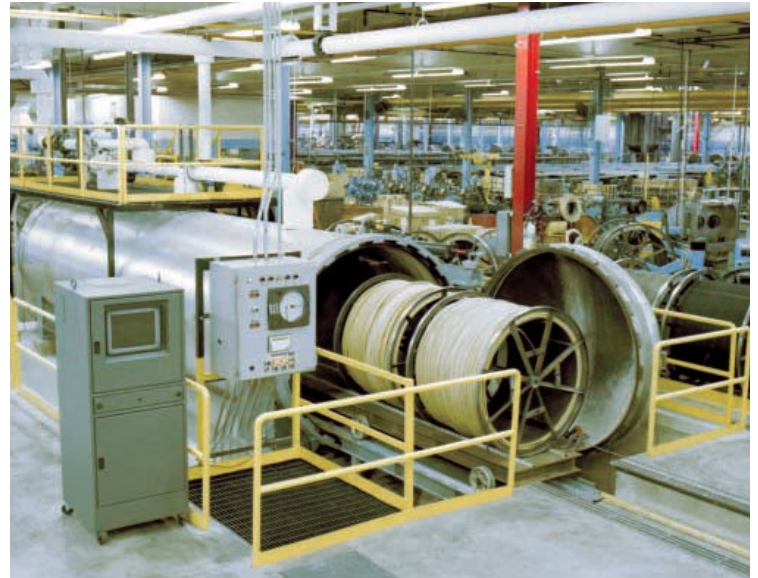
Bonders and Laminators

Electrical and Wood:

Impregnators

Investment Casting:

Dewaxers



McGill AirPressure specializes in providing fully-integrated production-size autoclave systems like this vulcanizer being used to cure rubber hose.



McGill AirPressure's autoclave doors feature rings and lugs machined from solid steel.

McGill AirPressure is an enterprise of United McGill Corporation – Family owned and operated since 1951

McGill AirPressure manufactures four standard-size autoclave systems. The workspace dimensions of the Mini-Bonder 21 + 21HP are 21 x 15 x 36 inches and the Mini-Bonder 36 + 36HP are 36 x 28 x 48 inches. They all operate at pressures up to 270 psig and temperatures to 700°F. All standard systems are supplied with the necessary auxiliary equipment – vacuum pump, valves, piping, wiring, instrumentation, and control system. These standard systems are supplied more quickly and less expensively than custom systems.

We provide custom-designed systems as required. If needed, we can perform pilot testing to determine the optimal vessel size and the best process and control equipment. The autoclave system is then designed and built to fulfill the customer's specific needs in the most cost-effective manner.

Regardless of the type, size, or process requirements of your autoclave system, McGill AirPressure will guarantee that it performs as specified.

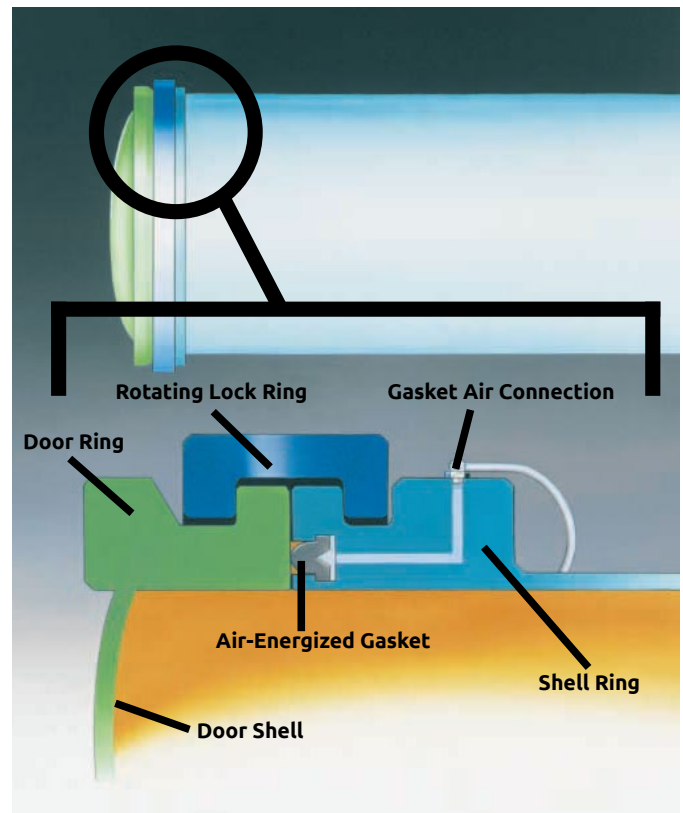
Our Subsystems make the Difference

Like any high quality product, our autoclave systems are only as good as the sum of their parts. That is why we assume the responsibility of designing, fabricating, and integrating the autoclave's primary subsystems. These subsystems consist of the door; heating, cooling, pressure, vacuum, and gas circulation systems; and controls. Almost all production-size autoclaves, regardless of the size or process, make use of all or some of those subsystems.

Doors Built to Last

The door design and construction is crucial to any autoclave system because of the continual need to open and close the door while maintaining an effective seal around its circumference. McGill AirPressure uses a breech-lock design that allows the door to be quickly locked and unlocked. This speeds up loading and unloading and increases productivity.

Our doors are built to last. Each ring, including its lugs, is machined from solid steel. The lugs are not welded, and we never use castings or materials of unproven quality. The door is mounted on heavy-duty roller bearings.



This drawing shows a cross section of a McGill AirPressure three-ring door with an air-energized gasket that helps form a tight seal.

Our standard hydraulic door has redundant safety devices to prevent it from opening when there is pressure in the vessel: manual and electro-pneumatic lock-pin safeties and a dual zero-pressure switch.

Gas Circulation Systems

Each McGill AirPressure autoclave is equipped with a fan drive system designed to supply the airflow needed to provide the temperature uniformities and part heat-up rates required in today's processes and production requirements. Our most economical fan drive design from a maintenance cost, features a fan motor that is encapsulated within the autoclave pressure boundary and provides direct drive for a centrifugal or axial fan. The fan's motor is water cooled to protect it from the high temperatures inside the autoclave. The simple, economical design eliminates the need for a fan shaft seal that would require maintenance.

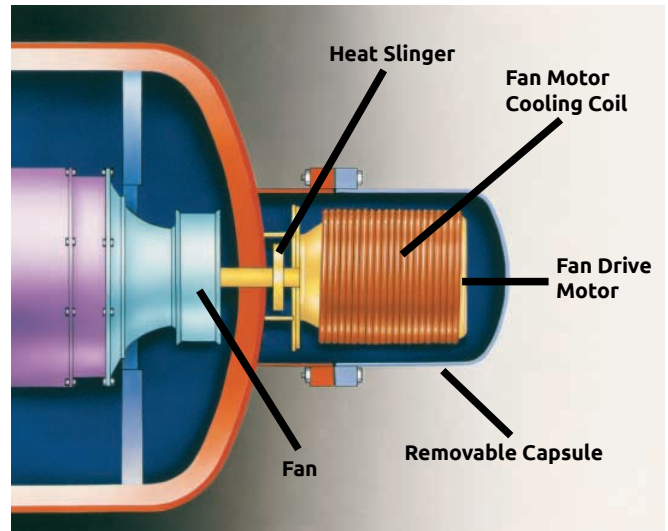
If you prefer, we can supply a fan drive with a motor mounted outside the autoclave. We have designed numerous externally driven fans, and they have provided many of our customers with years of trouble-free operation. Whether the fan drive is encapsulated or externally mounted, we offer adjustable-frequency, variable-speed drive units that can generate lower flow velocities at higher gas densities under autoclave pressure.

Heating Systems

The type of heating system that is best for your autoclave system often depends on what energy source is abundant in your area or used in your facility. Regardless of the source, we can provide a heating system to suit your needs. We have extensive experience with electric-resistance, gas-fired, and fuel-oil-fired systems, and systems that use dry heat generated from steam or hot oil exchangers.

Cooling Systems

If the autoclave's cooling system uses a large amount of water, we can provide a complete water cooling and recirculation system. Such a system typically includes pumps, tanks, valves, and either a cooling tower or aerial cooler. Our closed cooling systems are designed to save you money by reducing water consumption.



An artist's rendering of a typical McGill encapsulated fan drive with a centrifugal fan.



This gas-fired combustion chamber was designed to provide 33 million Btu/hr of heat to a McGill AirPressure autoclave.



An electric heater and cooling coil assembly for a McGill autoclave interior is mounted on a cart for easy installation and maintenance.

Pressure Systems

McGill AirPressure provides the type of pressurization system that you specify. The pressure medium can be compressed air or an inert gas such as nitrogen or carbon dioxide. We supply vaporization systems that use electric-resistance, gas-fired, or steam heating. To prevent possible damage to the autoclave we also provide cryogenic safety valves and instrumentation to keep cryogenic liquid from coming into contact with the autoclave.

Vacuum Systems

Our complete vacuum systems include vacuum pumps, manual or automatic valves, and monitoring equipment. For bonding applications, the system maintains adequate vacuum for each part and vacuum bag, lowering the potential for defects.

Control Systems

To establish and maintain proper quality control of autoclaved parts, a control system with extensive data logging capability is required. Our control systems for nonbonding, small-scale bonding, and full-scale bonding autoclave systems provide all the data and level of control you need. Data recorded and displayed includes part temperature, air temperature, vessel pressure, and vacuum levels in graphic and text formats. (See the Control Systems product sheet for more information.)



This complete nitrogen pressurization system for a McGill autoclave includes two liquid nitrogen tanks and a hot-water-heated nitrogen vaporizer.



Vacuum racks with instrumentation and valving are assembled for a McGill autoclave installation.



Our control systems provide the data and level of control needed to maintain proper quality control of the autoclaved parts.