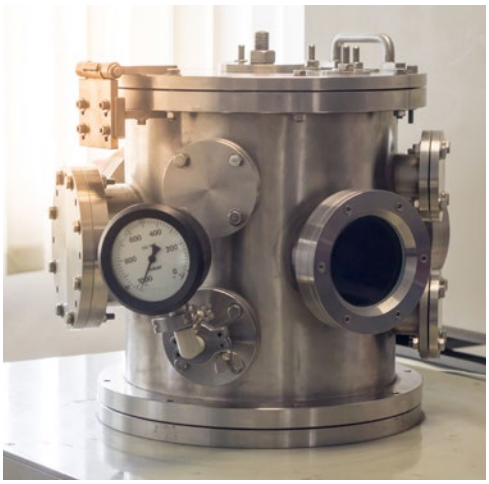
REACTION CHAMBER FLUID PROCESSING

Fluid temperature uniformity within laboratory, research, and manufacturing operations

Application



A reaction chamber requires gases or liquids be maintained at an elevated temperature to facilitate processing. The size and unusual shape does not allow for conventional tapes or insulating heating jackets to be used. Thermowells are built into the chamber to allow for heating and temperature monitoring; however, the size and length of thermowells is limited. Tight specifications for temperature uniformity inside the chamber requires heat to be applied externally in addition to internally. A custom water bladder is developed by the chamber manufacturer with an elastic material on the interior surface, which when filled, will easily conform to the contour of the reaction chamber. The exterior material is a high-temperature, water-resistant material. The bladder will contain heated water, keeping the surfaces of the reaction chamber at a uniform temperature.

Solution

BriskHeat cartridge heaters will be used to heat the water within the bladder. Pockets or "fingers" are built into the exterior material that protrude into the water bladder. Each finger is designed to hold a specific-sized cartridge heater. Once the bladder is filled, the material fits tightly around the cartridge heater to maximize thermal transfer and eliminate air gaps. Cartridge heaters are cycled on and off to promote temperature uniformity of the water within the bladder. The cycling is also used to prevent hot spots within the material. Additional cartridge heaters are inserted into the thermowells built into the chamber to provide heat to fluids inside the chamber that are further from the chamber walls. These heaters are not continually cycled but have built-in thermocouples to control power.

BriskHeat's TB4000 family of high amperage temperature controllers are ideal for use on a single chamber with heaters up to 50 amps. In addition to controlling a single zone of heat, the TB4000 may be ordered with a high-limit switch or with two control zones of up to 50 amps each. This controller can be used in wet areas or where temperatures are subzero with the optional panel heater. An alternative is the MPC2 multipoint control panel. It can be used to control larger systems where multiple chambers/zones require independent control of multiple heaters.

Additional Solutions

BriskHeat offers many options for applying surface heating to chambers of any size and shape. Mica band heaters with nickel-chromium resistance wire maximize surface contact and provide uniform heating along the inside surface of the band when used on cylindrical shapes. Custom cloth heaters can be designed to provide both heat and insulation to your chamber.

Other Applications

BriskHeat cartridge heaters have watt-density capabilities up to 300 W/in^2 (46.5 W/cm^2), standard diameters up to 1 in (2.5 cm) and lengths up to 10 ft (3 m). They are available with curved-design and multi-zone choices, and incoloy sheath option. Application temperatures can be up to 1600°F (871°C). This versatility makes BriskHeat cartridge heaters an attractive solution for many heating applications including injection molding, packaging, mass spectrometry, 3-D printing, diecasting and medical devices.

Products

Cartridge Heaters
Custom Cloth Heaters
TB4000 Controller
MPC2 Temperature Control Panel

Types of Users

Lab Managers
Process Engineers
Scientists
Chemists

Industries

Analytical Instrumentation/Laboratory
Chemical Processing/Extractions
Life Science/Medical/Pharmaceutical
High Vacuum