

Precision Heating Process



SEBRA® Engineering and Research Associates, Inc. (SEBRA), Tucson, Arizona, a company engaged in research, development and manufacture of medical and scientific instruments, has developed an innovative heating process for precision medical equipment plastics manufacture based on technology that originated in work with NASA.

Specifically, SEBRA teamed with Jet Propulsion Lab (JPL) a decade ago on development of a sterile fluid transfer system.

The project involved finding a way to connect and transfer blood and other fluids from one sterile plastic container to another, always maintaining a closed system. The key requirement was a reliable method of heat sealing and connecting various types of plastics to keep contaminants out of the bag and simultaneously to destroy any organisms that might exist in the area of the seal connection.

SEBRA successfully developed such a method and has adapted it — under the trade name PIRF™ Process — to manufacture of medical catheters, such as those shown **below**. The PIRF Process is a precise-

A HEATING PROCESS DEVELOPED FOR SPACE USE IS BEING APPLIED TO MEDICAL EQUIPMENT MANUFACTURE



ly controlled method of heating thermoplastic materials in a mold to form or weld catheters and other products. The process employs a computer-controlled radio frequency generator with temperature feedback connected to one of various welding and forming heads. Due to the mold's low thermal mass, it can be heated to more than 300 degrees Centigrade and cooled to room temperature in less than five seconds. This rapid, efficient heating/cooling permits the use of a low power generator, typically producing 30 to 200 watts. The PIRF generator, attached to one of the forming heads, is shown **above**.

The PIRF Process offers advantages in fast, precise welding or shape forming of catheters; quality and production yield improvements due to accurate temperature control; and elimination of toxic chemicals or fumes.

In addition to its use in medical equipment manufacture, the process has applications in the aerospace, electronics, chemical, food processing and material processing industries. ●

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