Application: Leg Wound Oxygen Treatment

Component: Check Valve/Relief Valve Assembly

Design Requirements:
Topical oxygen therapy is used to treat patients with non-healing wounds. A new topical oxygen system utilizes a unique check valve that stops the flow of oxygen out of the oxygen-enriched container if the patient disconnects it from the oxygen source. The relief valve maintains the inflation pressure inside the container so that it remains inflated and maintains an optimal pressure setting.

Design Approach:
Available in two versions, a boot and sacral model, Minnesota Rubber and Plastics designed a single check valve/relief valve assembly that would serve both models. Since valve integrity is extremely important to correct therapy administration, correct material selection, seal design and precision material processing was essential.

Related Benefits:
Minnesota Rubber and Plastics provided product design and materials engineering in the development and manufacture of this check valve/relief valve assembly. Both the check valve and relief valve functions are controlled by the double silicone diaphragm in the middle of the assembly and the two mating outer components (polycarbonate), which hold and center the diaphragm. The combination valve provides both functions -- stopping the outflow of oxygen and maintaining optimal pressure. Combining these two functions into a single double diaphragm reduced the part count, eliminated separate springs and seals, and simplified assembly.

The three-piece assembly also creates a seal between the bag and check valve/relief valve assembly when snapped together thereby eliminating the need for adhesive or welding operations.

Minnesota Rubber and Plastics operates an ISO 13485:2003 certified quality management system and manufactures medical devices in Class 10,000 and Class 100,000 clean rooms. Providing design assistance and prototype development, the company brings over 60 years experience in custom materials engineering and in sealing difficult applications. This experience, plus its unique ability to offer both rubber and plastic combination components, results in greater engineering design and production efficiencies, thereby reducing costs and decreasing time to market.