Application: Medical Device – Trocars

Component: Pass Through Seals For Trocars

Design Requirements:
Surgical instrument insertion and retraction through a seal must feel smooth and easy. The more the material “grabs” on the shaft of the instrument, the more force it will take to manipulate the instrument. The best seal design and the most appropriate material formulation will minimize this stick/slip phenomena and the frictional forces that are present.

Design Approach:
Material selection and coatings are two important factors to consider in dealing with friction when designing pass through seals for endoscopic trocars. What’s more, specifying the correct material and coating can reduce friction in these applications by as much as 90 percent.

Related Benefits:
Minnesota Rubber and Plastics has over 65 years experience dealing with friction in molded, pass through products. Some of the variables that have a profound impact on friction, and those that the company deals with in designing its pass through seals, include the lubrication state, the material modulus, surface finish, temperature, geometry of the part, and direction of the relative forces.

Surface finishes and coatings on the trocar seal material can substantially reduce the coefficient of friction. The smoother the surface, the greater the coefficient of friction. A matte finish can greatly reduce the amount of friction on a very smooth surface. However, maximum friction reduction is achieved with the correct coatings applied to the material surface. Depending on the substrate and its application, PTFE, parylene, chlorination and Minnesota Rubber and Plastics’ proprietary processes can reduce these frictional forces by as much as 90 percent.

Minnesota Rubber and Plastics operates an ISO 13485:2003 certified quality management system and manufactures these, and a full range of medical sealing devices, in Class 10,000 and Class 100,000 clean rooms. The company’s experience, plus its unique ability to offer both rubber and plastic combination components, results in greater engineering design and production efficiencies. This results in reduced development time, costs and decreased time to market.