

PolyOne Elevates Productivity with Specialized Solutions for Redesigned Medical Pump Valve Insert

PolyOne designs a specialty material and process solution that delivers over \$175,000 to manufacturer's bottom line by boost productivity and process efficiency.

Situation

A global medical device manufacturer was undertaking the redesign of a medical pump valve insert that was originally made from thermoset silicone rubber. The part had not been redesigned in fifteen years and the company was hampered by an inefficient design and a manufacturing process that was time-consuming and costly.

Liquid injection-molded silicone had long been the standard material for these valve inserts, which are used in a wide range of biomedical diagnostic and healthcare devices. But the thermoset process is historically slow and plagued with time and cost penalties.

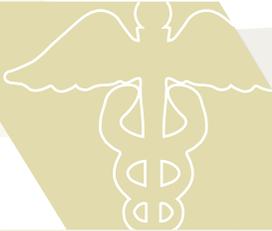
At the same time, the multi-component system required several labor-intensive assembly steps. The medical device manufacturer looked to PolyOne GLS Thermoplastic Elastomers for answers. The PolyOne approach was to develop a more productive material and manufacturing process combination, one that utilized a custom TPE in a two-shot molding process to eliminate assembly operations.

The PolyOne Difference

The PolyOne team collaborated with the manufacturer to define the specific property requirements for the application. Next, formulation experts developed several custom TPE grades that would deliver greater value in terms of overall manufacturing productivity and enhanced performance over the incumbent silicone rubber thermoset part.

The resulting custom-formulated grades of Dynalloy™ OBC and Versaflex™ TPE facilitated two-shot molding, eliminating time-consuming and costly assembly operations. PolyOne conducted extensive compatibility testing to confirm that the new grades would bond chemically with the rigid engineering thermoplastic substrate required in the application.

The custom grades were formulated with multi-functional capabilities, replacing three different hardness grades of silicone rubber. The TPE materials also provided better tension set, improved compression and enhanced permeability compared to silicone rubber. In addition, the new TPE grades boasted lower extractables because, unlike thermoset silicones, they required no crosslinking. These materials also offered quick set-up on standard two-shot molding equipment along with faster cycle times for higher productivity.



Delivering a Value-Added Solution

In helping to redesign the valve insert for two-shot molding, PolyOne eliminated assembly requirements, lowered weight and reduced scrap for the customer. Eliminating a multi-component process cut the need for assembly operations, saving the customer more than \$70,000 annually. Several assembly steps could be removed because the TPE custom formulations delivered multi-functional capabilities.

Secondly, the lower specific gravity of the TPEs cut overall part weight by 20% and reduced associated freight costs for a total overall savings of \$36,000.

In addition, the easy processability of these custom materials resulted in major scrap rate reductions, saving the customer over \$70,000. The regrind also offers recycling benefits that are not available with thermoset silicone rubber.

In total, the PolyOne solution created more than \$175,000 in operational savings by reducing the manufacturer's costs for assembly, freight and scrap. Further, the customer was enjoying these benefits within just a few months, because PolyOne's team helped to accelerate full scale production of the newly designed part.

Product choices often vary by region due to differences in regulatory and agency requirements, availability and other key factors. Please contact your nearest sales office for assistance in choosing the right solution for your locale.

CONTACT INFORMATION

Americas

U.S. - McHenry IL
+1 (815) 385-8500
Argentina - Buenos Aires
+0054 11 4200 5917
Brasil - Piracicaba
+55 19 3206 0561

Asia

China - Guangzhou
+86 (0) 20 8732 7260
India - Mumbai
+91 9820 194 220
China - Suzhou
+86 512 6265 2600
Hong Kong
+852 2690 5332
Taiwan - Taipei
+886 9396 99740

Europe

Germany - Gaggenau
+49 (0) 7225 6802 0
Spain - Barbastro
+34 (0) 9 7431 0314
Turkey - Istanbul
+90 (0) 212 549 2256



*Beyond Polymers.
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www.polyone.com

PolyOne Americas

33587 Walker Road
Avon Lake, Ohio 44012
United States
+1 440 930 1000

PolyOne Asia

Guoshoujing Road No. 88
Z.J Hi-Tech Park, Pudong
Shanghai, 201203, China
+86 (0) 21 5080 1188

PolyOne Europe

6, Giällewee
L-9749 Fischbach
Luxembourg
+32 (0) 83 660 211

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