

Food-Grade Valve Applications



NSF approvals have been received for the Series 15, 20, 30, 50 and Series 70 valves.

Our new NSF approvals allow most of our complete product line to be used in food grade applications, including Series 15, 20, 30, 50 and Series 70 valves. Consult factory.

NSF criteria C-2 covers sanitation requirements for equipment and/or devices used in storing, preparing, or handling foods and beverages. FDA guidelines are for non-metallic material that comes in contact with food-type media. The seal materials that meet FDA's requirements are FLUOREL and SANTOPRENE®. Fluorel is used where higher temperatures exist.

Making Kalrez® Seals Affordable For Volume Valve Applications



We have developed a new and significant cost saving procedure for laser cutting Kalrez® seals from sheet stock for solenoid valve plunger assemblies. Previously (and difficultly) molded seals requiring more than double the amount of Kalrez have now been replaced by a Kalrez seal disc and stainless steel seal cup which are press fit into the plunger. Shown here, clockwise from left, are the new seal cup, seal, and plunger; a Series 52 solenoid valve plunger assembly complete; and a typical molded Kalrez seal from a previous solenoid valve design.

Kalrez® Perfluoroelastomer seals, a product of DuPont Dow Elastomers, are impervious to more than 1,600 chemicals and solvents, inert to most chemically induced swelling, useful in temperatures from -20°F to 600°F, and last much longer than other elastomer seals. Kalrez is also a very expensive design material, even in medical and chemical resistant applications for which no other seal material is nearly as durable.

We have been using Kalrez for solenoid valve plunger seals in applications where nothing else would do. These molded Kalrez seals often more than doubled the price of comparable valves incorporating other elastomer seals.

We have developed a procedure for laser cutting Kalrez seals from 3" square sheet stock. We've now been able to cut the amount of Kalrez used per seal by about half, reducing the cost per seal, even in relatively small quantities, by about 40-60%." Currently limited to 3/32" and smaller orifice sizes, the valve plunger assembly has been slightly modified to use a stainless steel seal cup to attach the Kalrez seal to the plunger. The use of the seal cup actually governs the plunger length better, and two tiny notches on the seal circumference allow the seal to vent gases from within the plunger. The result: A bubble-tight seal for the most difficult chemical applications, without the use of Teflon. "It's an elegant solution to an expensive problem."

Swell-Resistant Printers Gum Seals

We've worked a special elastomer for use with water-based printing inks. We think of ink as being almost benign, but sometimes it can be rather aggressive to certain materials, and swelling of the rubber typically causes a big problem in the dispensing valves for ink.

Peter Paul has worked with our existing rubber supplier on a specific material for ink that was originally developed for the rubber stamp industry and the automatic mailing label industry. If a rubber stamp were to swell up, the lettering and logo would become distorted...so we've come up with a special material: We've developed an elastomer with customized nitrile rubber and very unique for the printing industry. We

started supplying this in conventional plungers and disk compensated plungers, and we're now starting to supply it in media isolation diaphragms for ink dispensing and retrieval systems, some in high-speed ink jet printers.

Commercial ink jet printers do things like posters and large billboards. They fire all the ink jets at one time and deflect them so they have to practically vacuum away the ink that isn't used. Some of these inks are magnetic so the media isolation valve is really the only way to control the flow of these inks. We found that while a number of diaphragm materials are useable, we picked a specific material for the water-based ink printer. It seems to mold well in existing tooling and is relatively



Normal elastomers and printing inks can sometimes combine to cause swell and hence distortions in the printing industry. So we investigated.

economical in cost, seeming to perform fairly well for the water-based inks. This product is currently available in Series 50 and Series 20 size in the diaphragm media isolation valves.



Solenoid Valves For Low Temperature Applications

Our solenoid valves, those precision electro-mechanical "switches" required to perform millions of unattended cycles in applications ranging from coffee vending machines to metal cutting machine tools, are also widely employed at low temperatures to about -40° C involving gaseous and liquid compounds including refrigerants and liquids nitrogen.

For these uses, the full range of our 2- and 3-way valves can be specified with the Teflon® or Kel-F seals required for processing semi corrosives; typically, all valve parts must be oxygen cleaned to remove oils and other surface contaminants. In many such applications, a compressed liquid is metered by the valve. Many of these valves will be UL recognized and CSA listed.

We can provide a wide variety of solenoid valves and manifolds, if required, for low temperature operation involving refrigerants of liquid nitrogen.

EPDM Seals

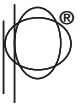
Special EPDM (Ethylene Propylene Diene Monomers) solenoid valve seals are used for applications where high-pressure gases tend to be absorbed in standard rubber seals.

When gas is absorbed into a rubber solenoid valve seal, it doesn't normally cause any physical degrading of properties but will cause the rubber to display a phenomenon called explosive decompression. If the system were to be vented or pressure reduced, gas that is trapped inside the rubber tends to cause the seal to balloon and swell, sometimes actually fracturing. Users in the fire extinguisher field, for instance, find that rubber swelling over a period of time may actually causes the fire extinguisher valve to shut off.

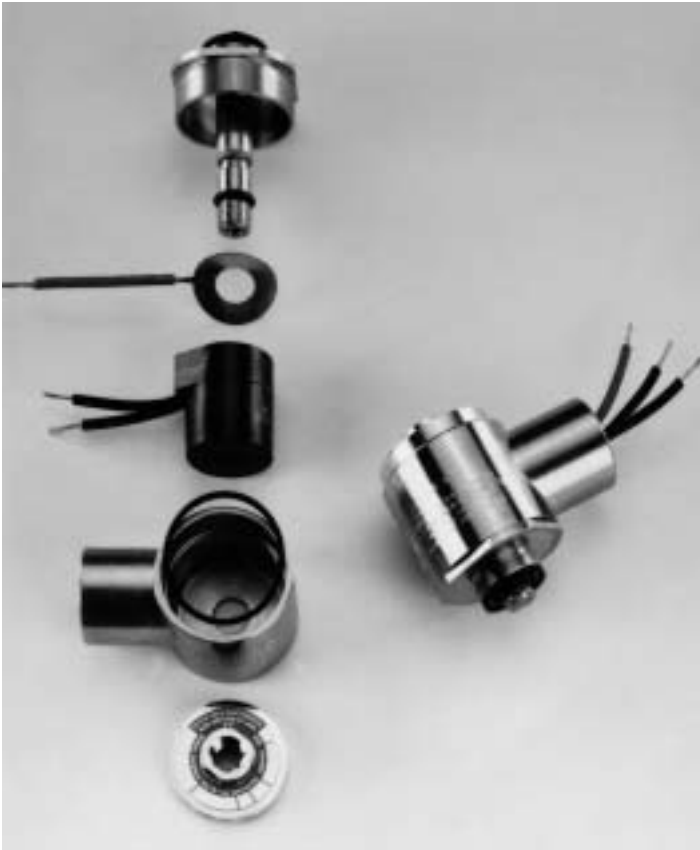
Used in place of conventional seal materials, such as urethanes, EPDM is more suitable for specific, hard-to-fill applications such as high-pressure gases used in aerospace projects.



Solenoid valve plunger travel stroke is typically 0.020 to 0.050 in., depending on orifice size. Choosing the wrong seal material could literally shut off the valve flow. Notice the swelling in the seal at right.



Added Moisture Protection Available For Series 50 Explosion-Proof Solenoid Valves



Our Series 50 Explosion-Proof solenoid valves and operators with molded coils for hazardous locations are now offered with added protection from moisture in the form of new O-ring and flat gasket fluorocarbon elastomer seals. The locations of these new seals are shown in the explode view of a coil for an E50 valve (inset).

Added moisture protection provisions for E50 and low watt EL50 and ELL50 miniature Explosion-Proof solenoid valves are now available for Explosion-Proof valves with molded coils requiring added protection from moisture may now be satisfied with new fluorocarbon elastomer O-ring and flat gasket seal to further protect the coil from any possible moisture contamination. While redundant for all but the most arduous process uses, these added seals will still provide a solenoid valve at somewhat lower cost than one with a fully potted coil, top and bottom seals, and an RTV conduit seal.

Designed to meet today's demands for economy of space and energy consumption in hazardous locations, our E50/EL50/ELL50 miniature Explosion-Proof solenoid valves are offered in seven basic designs, based on maximum operating pressure differential, orifice size, CV factor, and operating media. Built to UL standards for safe and continuous operation at maximum rated pressures, the specifications for these general purpose of safety valves for pneumatic and hydraulic applications are conservatively rated at 85% of rated voltage and maximum pressure. In addition to air and other fluids compatible with standard Buna N seals, these valves operate in hot water, steam, gasoline, oil, refrigerant, hydraulic fluid, and other environments requiring special seal materials. Explosion-Proof design with 1/2 NPT conduit connection and stainless steel construction allows these valves to meet the requirements of hazardous locations Class I, Group C and D, and Class II, Group E, F, and G.



FKM Seals Developed For Gasoline And Propane Valve Applications

Today's alternative powered vehicles and reformulated gasolines are causing increased occurrences of solenoid valve seal swelling and cracking in service. This has created the need to reformulate existing FKM compounds to maximize their properties in reformulated gasolines which have significant amounts of MTBE and alcohol.

Additives also have been causing problems with seal integrity, frequently in propane-powered vehicle applications. These fuel applications involve seal swelling with existing standard fluorocarbon elastomers, generically called FKM, but available with trade names such as FKM and Fluorel. We discovered that, by maximizing the fluorine content of their FKM, the swelling was reduced. Further enhancement of the physical properties was made by removing the traditional colorant and adding carbon black. Therefore, the normal color of this new FKM is black.

We see more and more FKM problems in vehicle applications involving solenoid valves, both gasoline powered and alternative fuels (e.g. propane). In some states, reformulated gasoline can be up to 15% MTBE, causing problems with traditional FKM systems. Swelling and rubber decomposition appear with time. Beyond vehicular applications, other related uses, particularly in the medical field, have shown to be more stable and long-lasting when the new FKM is applied.