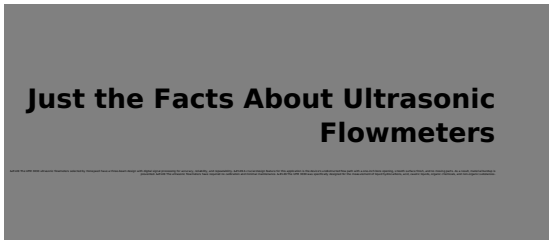
Chemicals & Belts

No Match Made in Heaven



What can be done to prolong the life of a belt drive system? Brent Elliott, senior application engineer with Carlisle Power Transmission, suggests reviewing the basics about oils and chemicals to find an answer to this question. He has found valuable information in Bulletin IP-3-2 from the RMA, the national trade association for the rubber products industry. He shares this data, along with some of his own advice, below. When oil and chemicals come into contact with a belt, they reduce its life span and operational characteristics. But it's even more complicated. The concentration of the chemical or oil, the length and type of exposure, the belt type, and environmental conditions contribute to the degree and speed of the deterioration. There are two consequences that occur when belts are exposed to oil and/or chemicals. The most obvious is the swelling of the belt's cross-section so that it no longer fits the sheave or pulley groove properly. Less apparent is the deterioration of other physical properties including adhesion between belt components. If the degree of swelling and the loss of physical properties are significant, then the effective use and life of the belt are shortened substantially. No single synthetic rubber is resistant to all chemicals. Some compounds are excellent with one chemical but react poorly to another. Because of this fact, all stock belts manufactured by RMA member manufacturers are constructed to be reasonably oil- and chemical-resistant. The nature of the compounds and/or the belt construction may minimize swelling and deterioration so that occasional splattering by oil and grease does not adversely affect standard belts. However, there are many chemicals that swell rubber or extract ingredients from the belt rubber compounds, causing brittleness, cracking, and swelling of the belt. Although belt compounds vary from manufacturer to manufacturer, those that are specified as oil-resistant usually withstand moderate attack from most common oils and solvents. If that is not the case and the drive is subjected to a considerable amount of oil and grease on the belt, the problem may become less of a chemical issue than a physical one. For example, a large accumulation of oil and grease on a V-belt may render the belt useless due to loss of friction. As a result, it's assumed that a V-belt is simply not the right choice where there is a lot of oil. Since synchronous belts are not substantially affected by the loss of friction, they are the better choice. In fact, depending on the drive and the nature of the oil, it may even be possible to use a synchronous belt while it's submerged in oil. In conclusion, there are many variables involved in the seemingly simple question asked at the beginning of this article.

Keep in mind that it's wise to prevent as much accumulation of contaminants on belts and system components as possible. And, if you need a belt with trouble-free operation in an environment with oil, chemicals, or solvents, it's a good idea to consult with an expert. rsurement of liquid hydrocarbons, acid, caustic liquids, organic chemicals, and non-organic substances such as chlorine and sulfur. Perhaps the device's most important feature for Honeywell's sulfur metering application is its unobstructed flow path design with a one-inch bore opening, smooth surface finish, and no moving parts. This design feature means material buildup is prevented and maintenance is minimized. "We currently are working with six of the Krohne ultrasonic flowmeters in our sulfur processing section," says Affalter. "And we've experienced dramatic improvements in accurately reading the flow and reducing downtime. We no longer have to pull the meters to clean or replace them &#151 that's obviously a huge advantage. We're also able to completely control the flow with the meter on automatic control. Prior to using new meters, too much flow could lead to blockages and too little flow could overheat sections of the system." Like a racecar that needs a long idle time before racing, Honeywell's old meters were exceedingly slow at start-up. In fact, the operations people would have to get the flow rate to about 30 percent before the meter would be able to begin reading it. "The UFM 3030's ability to read lower flow rates lets us ease up the control valve right at start-up, so we don't have to worry about excessive sulfur flow leading to problems downstream," explains Affalter. "The control valve itself is a major step up. In the past, we might have control valves sticking, and we couldn't easily diagnose the exact cause of a flow problem." Affalter believes it is the UFM 3030's repeatable performance &#151 not having to pull the flowmeters &#151 that has improved sulfur flow and processing at Honeywell. So far, the ultrasonic meters have required no calibration and minimal maintenance and oversight. "Our operations team has complete trust in the UFM 3030's ability to deliver non-stop operation and accurate results. We're better equipped to diagnose problems now because we know we're getting accurate readings time and time again." What other improvements might the facility see? Affalter says: "We actually have another sulfur flow application with which we are currently not using a flowmeter at all. We're burning sulfur to make sulfuric acid, and we're likely going to incorporate a Krohne ultrasonic flowmeter over there, too. I know that many of our people have been very impressed with the Krohne ultrasonic meters. We work with a lot of liquids that don't have a lot of conductivity, or have no conductivity, and we see this flowmeter as being a great solution for these types of chemicals." *Additional information about ultrasonic flowmeters is available from Krohne Inc., 7 Dearborn Rd., Peabody, MA 01960, by calling 978-535-6060, or visiting www.krohne.com. Krohne is a leader in the development and manufacture of measuring instruments for the process industries.*