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## *Lubricating your capsule filler*

Manufacturers too often use improper, low-quality lubricants to protect capsule filling equipment and then fail to provide regular maintenance. Protecting your expensive equipment really isn't that hard:

- Identify the right lubricant for each area of the machine.
- Develop a schedule for frequent checks, cleaning, and lubricant application.
- Protect lubrication through effective use of seals, dust collection, and other preventive measures.

Two main lubrication zones exist on capsule filling machines, typically separated by a table:

- The product-contact area above the filling table, where the capsules and ingredients are, is where the product may have incidental contact with the lubricant.
- The area below the table is where product contact with the lubricant is impossible.

Understanding regulatory requirements is the first step in identifying appropriate lubricants. First, look at 21 CFR Part 178.3570. It provides the rules for lubricants used in areas where incidental contact may occur, identifies lubricant ingredients that are suitable for use in these areas, and lists the limits on amounts that may be present.

To find lubricants safe for the above-the-table area, begin with lubricants that conform to the H1 category of NSF standards, which derive from standards for food-grade lubricants. Always qualify a lubricant for performance on your equipment. Some manufacturers recommend specific brands of lubricant for their machines, but most don't. Ask the lubricant suppliers for data that demonstrates the effectiveness of their lubricants. One popular method of evaluation is measuring

the size of wear particles extracted from the lubricant at the end of a maintenance cycle. Large wear particles, although still microscopic, can reach 60 microns, indicating rapid component failure.

To get the most from the lubricant that you select, fine-tune the frequency of maintenance to your specific operation, developing a schedule for maintaining your machine and sticking to it. Under good operating conditions, service to the cams, gears, and actuating arms below the table may last several weeks. Above the filling table, cams, linear ball bushings, and shafts have greater exposure to the product and may require more frequent lubrication.

To establish intervals for preventive maintenance for both areas, make routine checks after maintenance, keeping track of operating time. When lubrication starts to darken or dry out, you should clean the parts and re-lubricate. Repeat this routine a few times, and soon you'll know how long each service type will last under your operating conditions. For areas above the table, you need to shorten the maintenance intervals when running sticky or abrasive formulations.

When cleaning parts, inspect cam followers and other bearings for smooth movement; you can check linear ball bushings using a dental pick. When applying new lubricant, do not use more than is necessary, as excess will attract unwanted powder and may contaminate the finished product.

Finally, establish measures to protect areas where you apply lubricant.

- Don't use compressed air to clean the machine table because you may force particles into the lubricant. Dry, sticky, and abrasive particles displace lubricant, allowing friction and heat to accelerate component failure. Opt instead for vacuum cleaning.

- Localize dust collection. Dust becomes airborne when you move products from bulk containers to hoppers and often transfers into lubricated areas. Use wall-mounted dust-collection arms that you can pivot, extend, and retract, pointing them where needed, and halt airborne dust at the source.
- Use high-quality seals to protect ball bushings and shafts. Many companies try to save money on seals without accounting for product quality. Spend a few extra dollars on seals that protect expensive bearings and shafts.

Machine design also plays a role.

In the last decade, suppliers of capsule filling machines have improved the protection of areas above the filling table. Many areas that were exposed, such as the top cam, are now better contained and operate almost free of product. T&C

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