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*Production Tip:*

## Making Single Facer Bearings Last the Life of the Rolls

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With a good Preventive Maintenance program, the bearings in single facers should last the life of the rolls.

The best PM programs for single facers, however, involve more than skilled plant engineers, a proper lube interval, and regular, timely inspections. Because the bearing lubricant is the material that actually guards against bearing wear, the lubricant itself becomes an important part of any PM program. Proper lubricant selection has recently become more critical with the increased use of tungsten carbide as a coating on rolls. Compared to the more traditional chrome coating, tungsten carbide can double the life of the rolls, placing even greater demands on the bearing lubricant.

Traditionally, paperboard manufacturers have relied on petroleum oils to lubricate roll bearings in single facers, first with a drip system and then with a force fed closed loop system introduced in the early 1980s. In fact, for single facers manufactured before 1988, there were few, if any, alternatives to petroleum oils or greases. Petroleum, however, is not the optimal lubricant for high temperature applications. It begins to degrade at or before 210°F, well below the operating conditions of a heated roll bearing, which can easily reach 350°F and higher. To compensate for petroleum's high-temp limitations, single facers lubricated with petroleum require elaborate auxiliary systems to keep the oil circulating and to keep its temperature down.

Though they are maintenance-intensive, these auxiliary systems make petroleum an acceptable lubricant for heated roll bearings, as long as all components of the system are operating properly. When they don't, petroleum-based systems can become quite messy — and create unwanted consequences. For example, a clogged line can cause oil trapped in the bearing to heat up and degrade. Carbon debris, a by-product of burning oil, builds up and will eventually wear out the lip seals. The oil, in turn, runs down the side frames, onto the floor, and eventually into the sewer system — posing in-plant safety hazards and potentially unwanted attention from local environmental authorities. Simply, a circulating oil system is labor-intensive, and because it has several components, the chance of failure multiplies, jeopardizing the life of the bearings.

Current lubricant technology offers an alternative to petroleum that can streamline a PM program and help ensure bearings last the life of the roll. Introduced in 1988, perfluoropolyether (PFPE) oils, thickened into a grease with non-organic polytetrafluoroethylene (PTFE), provide far superior wear protection for heated roll bearings in single facers and 36-inch preheaters. In fact, most OEMs now use PFPE greases in new single facers, and many plants are replacing older petroleum oil-based lubrication systems with a PFPE grease.

Several factors make PFPE superior to hydrocarbon oils for the lubrication of the heated roll bearings. PFPE stands up to high temperatures, hostile chemicals, and volatile atmospheres. Unlike hydrocarbons that begin to degrade at 212°F, PFPE is chemically stable to 650°F. It will not burn. It does not react with oxygen. When it does begin to break down, the byproducts vaporize, leaving no gummy tars or deposits. PFPE grease, which forms its own seal around the bearings, also resists common solvents and long-term contact with steam and boiling water. Another physical property which contributes to PFPE's superiority as a severe service lubricant is its density. About twice as dense as the typical hydrocarbon lubricant, PFPE provides superior load-carrying capability and film forming characteristics, critical factors in extending the operating life of a bearing.

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In addition to being better suited for severe service applications, a PFPE grease brings at least three other benefits to a paperboard manufacturer's PM program. Compared to petroleum oil-based systems, PFPE reduces maintenance. With a PFPE grease, the entire auxiliary system used to keep petroleum cool and flowing freely is no longer needed. Second, PFPE grease improves in-plant safety and housekeeping immediately by eliminating the potential for oil leaks — and the environmental hazards which accompany them. Third, roll changes are quicker, because PFPE leaves no carbon deposits to clean from reusable single facer components.

All PFPE greases are not created equal, however. Different PFPE greases offer varying amounts of anti-corrosion and extreme pressure additives. Evaporation rates and film-forming capabilities can also vary, depending on the actual grease formula. So, careful questioning and product comparisons will likely lead to the best of the best, rather than just a better alternative to hydrocarbon systems.

In any case, PFPE is a direct route to an important PM goal in every paperboard plant: making single facer bearings last the life of the rolls. And the benefits of preventing premature bearing failure are clear: no unscheduled downtime, no unanticipated repair costs, no delayed shipping — and no irate customers.