

Application

Lubrication of a drag chain in meat-processing plant.

Problem

A U.S. manufacturer of smoked meats and sausages was experiencing a high degree of chain rusting and wear. This was related to frequent wash-up. Water emulsified with aromatics in the mineral oil lubricating the chain. This left the chain unprotected from oxidation. In addition, the tackifier in the chain oil blocked oil from the internal surfaces of the chain. The chain oil being used did not meet applicable USDA standards for food contact.

Product Selected

Molykote[®] L-1460FG Synthetic Blend Chain Oil.

Results

A food-grade synthetic product, containing a tackifier that did not thicken the oil, was selected because it kept its desired flowability for the life of the oil. The oil maintained its viscosity and did not degrade to create byproducts that would block the flow of oil to internal chain surfaces. The oil's high film strength held it in place, thus preventing rust and subsequent wear to all components of the chain. This full protection continued for over five years.

***Molykote*[®] L-1460FG Synthetic Blend Chain Oil**

Lubricating your chain drives with *Molykote* L-1460FG Synthetic Blend Chain Oil is a cost-effective way to prevent premature lubricant failure and extend maintenance intervals. Unlike oils made in conventional fractionation processes, the synthetic oil is made by combining smaller molecular "building blocks" to meet targeted performance specifications and to minimize impurities. It is compatible with new-generation additives that enhance lubrication performance. The synthetic oil has an inherent tendency to adhere to chains in frequent washup conditions without emulsifying and blocking penetration of lubricant to internal chain surfaces.

Synthetic Oil Prevents Chain Rust Better than Conventional Oils

A nationally recognized manufacturer of smoked meats and sausages was using a conventional mineral oil product to lubricate the drag chain used in meat processing. For plant sanitation reasons, the chain was exposed to a high level of washing. Washing would remove all chain oil from the metal surface, leaving the chain unprotected from oxidation. The result was excessive chain rusting and wear.

The conventional oil did not meet applicable standards for food contact.

Conventional chain oils have a tackifier additive, which is intended to maintain adherence of the oil to the chain during service. The tackifier acts as a thickening agent, increasing the oil's viscosity and inhibiting flow. As it ages, the oil thickens still more, preventing the flow of chain oil into the internal components of the chain. This blockage was occurring during regular wash-ups. The unprotected internal components of the chain were then exposed to cleaning chemicals that reacted with the metal, resulting in rust.

Aromatic hydrocarbon compounds contained in the conventional mineral oils mix with water, resulting in emulsification of the oil. This emulsification turns the chain oil to a much thicker consistency that further contributes to blockage of oil flow into the internal chain surfaces. Also, the emulsified oil is removed by water, leaving other parts of the chain unprotected from oxidation. The result was rapid chain rusting and subsequent wear.

Tackifying Without Thickening

To improve chain lubrication and simplify maintenance, the plant switched to *Molykote*[®] L-1460FG Synthetic Blend Chain Oil, a Dow Corning product. Unlike oils made in conventional fractionation processes, the synthetic oil is made by combining smaller molecular "building blocks" to meet targeted performance specifications and to minimize impurities.

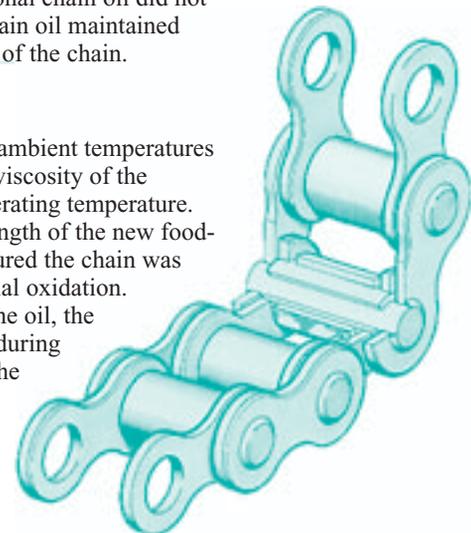
The custom-blended polyalphaolefin (PAO) synthetic oil gives excellent lubrication at high and low temperatures, reduced volatility and compatibility with equipment designed for use with mineral oils. It conforms to USDA listing requirements applicable to meat and poultry plants, and is qualified for direct food contact under FDA regulations.

To ensure the adherence necessary while preventing blockage, a standard chain oil viscosity of ISO 68 was selected for a new synthetic chain oil. The oil is formulated with a new-generation anti-wear (AW) additive to address sliding conditions of the chain side plates. A food-grade tackifying chemical was also added to the chain oil. This particular tackifier does not act as a thickening agent to the oil.

The oil maintains its design viscosity over its service life, ensuring that proper oil films exist at all times. The thickening and subsequent blockage exhibited by the conventional chain oil did not occur. In this way, the new tacky chain oil maintained oxidation protection on all surfaces of the chain.

Long-Lasting Protection

The oil was tested in application at ambient temperatures of 4-38°C (40-100°F). The ISO 68 viscosity of the selected synthetic oil suited this operating temperature. The greater adherence and film strength of the new food-grade chain oil during wash-up ensured the chain was continuously protected from potential oxidation. Since the tackifier did not thicken the oil, the oil maintained its desired viscosity during service. Within 90 days of testing, the meat manufacturer adopted the new food-grade chain oil as its standard chain oil for this application.



Out-performing the previous conventional mineral-based chain oil, this food-grade synthetic oil maintained its film strength during several wash-ups. Reapplied as needed, the new oil provided continuous protection from rust and wear to the chain for over five years.

Benefits to Food Processing Plants

- Adherence to regulatory standards
- More reliable lubrication
- Longer chain life
- Reduce use of lubricant
- Extend interval between application of lubricant
- Simplify record-keeping for Hazard Analysis and Critical Control Point (HACCP)
- Maintain better conveyor performance
- Reduced energy consumption

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