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Preformed Thickeners for Grease Manufacturing

Grease producers have been forming the various soaps and reactive thickeners used to thicken grease in-situ for over 60 years. This approach has been successful in the market but there are multiple instances where it is impractical and an alternative approach is warranted.

The increasing interest in bio-based lubricants is one such scenario. In-situ soap production typically involves the use of a strong base such as lithium hydroxide (LiOH) or calcium oxide (CaO). Vegetable oils are sensitive to the presence of strong bases and care must be taken to avoid saponification. Grease producers often carry out the soap formation in non-reactive mineral oil or PAO, which is then let down with vegetable oil to the desired NLGI grade. In this case, the grease now contains an appreciable proportion of non-biodegradable basestock, thereby partially offsetting the benefit of a bio-based grease. The use of a preformed soap allows for the direct production of bio-based greases in vegetable oils without the need to use a petroleum-derived basestock.

Other commonly used synthetic basestocks are also sensitive to strong alkalais and cannot be used directly as the medium for soap production. These include polyol esters, polyalkylene glycols and silicones. In each case, the use of a preformed soap is a much more efficient and productive method to manufacture high-performance greases in these synthetic basestocks.

Many companies offer a broad line of grease products. Lacking the equipment needed to handle the water of reaction produced during the saponification step, they frequently manufacture non-soap greases in-house and rely on either third-party or private-label producers to provide their soap-thickened products. No water of reaction is formed when using a preformed soap, thereby allowing companies to bring production of their soap-thickened greases back in-house without the need for a significant capital investment and the need for permitting to dispose of the water of reaction. Besides the savings in manufacturing, waste-disposal and freight costs, the producer is better able to manage inventory levels through control of their own production schedule.

Polyurea greases occupy a small but important niche market in the grease industry. While the finished polyurea has a low order of toxicity, the starting isocyanates and amines are highly toxic and require special equipment to handle safely. Most grease suppliers lack this infrastructure and depend on outside manufacturers to produce their polyurea greases. Ezgrea PU is a preformed diurea that is easily incorporated into a variety of base fluids and gives yields comparable to in-situ polyurea formation. In addition to the improved handling and worker safety resulting from the use of the Ezgrea product, the short cycle-time improves plant productivity.

Finally, even grease producers who can make soap-thickened greases in their own equipment frequently have “problem” greases that are only made infrequently and in small volume. Because they are not made on a regular basis, they tend to take a disproportionately long time in the reactor, adding cost and hurting the overall productivity of the plant. Oftentimes, the cycle time can be significantly reduced and the batch-to-batch consistency improved for such greases through the use of a preformed soap. There is also the benefit of eliminating or delaying the need for capital investment in plants that are operating close to capacity.

Preformed thickeners are easily incorporated into any basestock used. As a general procedure, a portion of the basestock is heated to an appropriate temperature based on the melting/softening point of the thickener. The desired charge of thickener is then added with agitation to fully melt and disperse it into the grease. At this point, the mixture is let down with the remaining basestock, additives are incorporated and the grease homogenized, tested and packaged. When using calcium stearate to make a “hydrated” calcium grease, the addition of 1-2% water is necessary to give a quality grease. When using preformed thickeners, good homogenization is needed to ensure dispersion of the thickener and final product quality.

Preformed Thickeners From Ivanhoe Industries

Commercial Products

Lithium 12-Hydroxystearate (CAS# 7620-77-1)

Lithium Stearate (CAS# 68783-37-9)

Calcium 12-Hydroxystearate (CAS# 3159-62-4)

Calcium Stearate – Tallow-Derived (CAS# 68424-16-8)

Calcium Stearate - Vegetable derived (CAS# 1592-23-0) Also available in a Kosher/USP grade.

Aluminum Hydroxy Distearate (CAS# 206-161-8)

Ezgre PU Polyurea Thickener (CAS# Proprietary)

Developmental Products

Lithium Complex Soap (CAS# Proprietary)