Unique Greases Control Free Motion and Noise Cost-Effectively

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Today's consumers demand more than long life from engineered devices. Whether they're fine-tuning the bass on a stereo, turning on headlights in a car, setting the timer on a clothes dryer, or closing the cover on a cell phone, they expect the potentiometer, switch, gear box, and hinge behind these controls to feel and sound good too.

The perceived quality of a mechanical or electromechanical device — which is judged by tactile and acoustic characteristics — can pose a cost-performance dilemma for design engineers. Tight tolerances can be used to design a "quality" feel and sound into a device, but they can also push the cost of the part out of the competitive arena.

A solution to the dilemma for many design engineers is a unique class of lubricants called damping greases. In addition to reducing wear, these greases can "damp" or reduce both noise and free motion, like coasting or backlash. In use for more than 50 years, they were first formulated to build fine tolerances economically into microscopes, telescopes, binoculars, and camera lenses. The "velvet feel," virtually silent operation, and the fact that a lens doesn't coast are all the work of a damping grease on the focusing threads. However, because of their limited functional temperature range, their use didn't extend far beyond optical instruments.

That changed in the mid 1980s when Nye Lubricants introduced the first broad-temperature line of damping greases. Switch manufacturers, especially automotive suppliers, were the first to jump on the damping grease wagon. A small amount of damping grease applied to the detents reduced the annoying click of plastic molded switches and gave them a smooth "Lexus feel" — without the expense of precision engineering and expensive tooling. From there, damping greases found their way into more than 30 automotive parts, including multifunction switches, window visors, lumbar adjustment knobs, sunroof motors, parking brakes, and suspensions systems. Recently, one major OEM specified damping greases to quell steering column squeaks. Another is using them to eliminate CV joint clunking.

How do damping greases work? Formulated with viscous base oils, a damping grease has a high internal shear resistance, so it requires some degree of force (motor or manual) to move an object through it. This shear resistance prevents backlash and coasting and ensures smooth, incremental motion. A damping grease also adheres to moving parts, so mating surfaces don't actually touch. They move within the grease itself, thereby silencing the noise normally associated with metal-on-metal, metal-on-plastic, or plastic-on-plastic contact. Quiet operation is the result. An additional benefit, damping greases, because of their consistency, seal out moisture, dust, and other pollutants, extending component life.

To experiment with damping greases, Nye's Damping Grease Kit is a collection of seven two-ounce samples of damping greases, ranging from very light to ultra heavy. For more information about the kit, call Nye at (508) 996-6721.

To achieve the "right feel" for a component, engineers can choose from a variety of grease consistencies, from very light to ultra heavy. For example, the volume control on a radio would call for a lighter grease; the release mechanism on a parking brake, a heavier grease. In fact, a damping grease can be custom-formulated to achieve the specific feel and sound the engineer wants.

As more engineers realize the cost-performance benefits of damping greases, the applications are multiplying inside and outside the automotive industry. They're used in telescoping and tilting steering columns, in home appliance timer motors, on product-release mechanisms in vending machines, in lift motors on hospital beds and, as a testimony to their low-temp capabilities, on lead screws in surveying equipment used in the Arctic.

Of course, damping greases are not appropriate for every application. While they have been used successfully in many low torque situations, flea-power devices couldn't overcome even the lightest damping grease. And because there is a premium to be paid for a quality damping grease, very low cost devices may have to pass. But when a little bit of damping grease per device can control free motion, achieve a "velvet feel," reduce noise, enable precision settings by hand, or any combination of these — in other words, keep today's demanding consumer happy — that's the ideal application.

To speak with a Nye engineer about damping greases or other synthetic lubricants, call (508) 996-6721.