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The Environmental Advantage of BD 0908 Technology

DRD Additives' BD 0908 is a unique lubricant additive based on the latest available technology. It incorporates unique ester lubricity enhancers with boron nanotechnology taking full advantage of the most recent advances in lubricant additive chemical technology.

The ester lubricity agents used in BD 0908 are based upon naturally occurring raw materials and come from renewable resources. The unique combination of base materials results in some remarkable attributes. In addition to good lubricity typically provided by esters, a very strong affinity for metal surfaces is achieved which allows for enhanced lubricity even under conditions in which traditional esters fail. These conditions include high temperatures and pressures. High performance is achieved using these environmentally benign esters under conditions in which potentially hazardous and environmentally undesirable materials such as chlorinated paraffins are usually used. In addition, because of the high affinity for metal surfaces, lower treat rates can be used. Essentially the lubricant containing BD 0908 is targeted to the site in which it is most needed.

The use of boron in lubricants has been well established over the years. Dr. Ali Erdemir at Argonne National Lab was one of the pioneers who did a tremendous amount of work in determining the mechanism of activity of various boron compounds in lubricant applications. There are numerous commercial products containing boron nitride. However, current boron technology suffers from one significant flaw and that is the particle size. The surfaces that interact between to moving metal objects that require lubrication are not smooth. Magnification of the surfaces reveals that there are peaks and valley similar to a mountain range. The mountain peaks are the actual surfaces that contact each other. The surface are is actually very small, and only very small particles can get between the contact points and provide lubrication. Therein lies the advantage of boron nanoparticles.

The combination of esters and boron nanoparticles leads to unique performance. The boron provides exceptional load carrying capability and the esters provide a delivery system to transport the boron to the active site. The combination leads to very low treat rates and diminished depletion. Many additives will deplete by thermal decomposition or other non-productive mechanisms. BD 0908, however, does not deplete unproductively so less needs to be used in the formulation.

Low treat rates, environmental advantages, and strong performance are compelling arguments in favor of the use of BD 0908. The technology is new but it is not unproven. Independent third-party test results have confirmed the effectiveness of the product. In

addition to the advantages of using BD 0908 there are additional advantages in the environment in using advanced lubricants. Friction is the thief of energy and reducing friction can provide a means of using energy more efficiently. Using energy more efficiently benefits the planet in many ways that have been well documented.