Biodegradable - What does that really mean?

The combination of environmentally responsible and high performance sounds like a great foundation for a lubricant company. The phrase high performance is somewhat self defining. However, the word biodegradable is not as universally defined as one might believe initially.

What might be helpful would be a definition of biodegradation and how it is tested, and the impact of those results on industry and the community within which the biodegradation process takes place.

The term biodegradable actually consists of several sub classifications. According to the American Society of Tests and Measurements (ASTM D02.12) paper on the subject of biodegration, they have produced the following classifications:

PRIMARY BIODEGRADATION is the measure of conversion by biological systems of the original organic into different products. This is the first step in biodegradation.

READILY BIODEGRADABLE occurs when biodegration performance is greater than a certain relative fixed percentage of ultimate biodegradation.

ULTIMATE BIODEGRADATION is the complete conversion of the original substance into carbon dioxide, water, and new microbial biomass. This process is also referred to as mineralization.

ECOTOXICITY is the chemical effect of a product on plants and non-human animals in the natural environment. ENVIRONMENTALLY PREFERABLE products are those, which reduce effects on human health and the environment as defined in Executive Order #12873, and the Great Lakes Water quality Initiative. These products are given preferred status for procurement by all branches of government.

The table below summarizes a number of the test methods that have been developed to assess biodegradation. These are listed for reference purposes. At present there is no one test approved as a standard for biodegration by governmental agencies.

The toughest requirements in the world are those of the "Blue Angel" labeling program in Germany. This program requires greater than 80% biodegradation with only non-toxic ingredients in any additives. The only way to meet the >80% requirement is with very expensive polyol and diester synthetics or vegetable oils. The vegetable oils, in order to perform as well or better than the synthetics, must be high in oleic triglycerides such as found in canola or sunflower oils.

The table below provides a relative comparison of biodegradation of various base oils that are typically incorporated into lubricant formulations. This data is developed using one of the test methods for measuring biodegradation.

The renewable products manufactured by BIOBLEND are produced from 100% biodegradable, high oleic, renewable vegetable oil based stocks and non-toxic additives.