

## **Biodegradation Capabilities**

1010 72 Avenue NE, Calgary, Alberta, Canada T2E 8V9 • Tel: 403-250-8448 / 800-661-6100 • Fax: 403-444-0033 • Email: info@lubecorp.com

### **GreenCut Cutting Fluid biodegrades oils/hydrocarbons fast and reduces change-outs.**

GreenCut<sup>®</sup> Cutting Fluid exhibits an exclusive biodegradation stimulation capability. Extensive lab and field testing indicates that it acts like a synthetic enzyme catalyst, without the limitations of temperature and pH associated with biological enzymes<sup>Δ</sup>. GreenCut quickly catalyzes the degradation of oils and hydrocarbons. This has been validated by fifteen years of successful machine shop operation. GreenCut Cutting Fluid just needs topping up at a recommended 20:1 ratio of water to GreenCut as it is gradually consumed in the machining of all metals. GreenCut Cutting Fluid is certified through the Environment Canada – originally approved under the Environmental Choice Program, as environmentally safe.

#### **GreenCut Cutting Fluid Benefits:**

1. Swift biodegradation of petroleum products, like way oils, within machining fluid systems and reservoirs resulting in fewer fluid change outs and no bacterial odour.
2. Stimulates bacteria to utilize phosphorus from the way oil additive package as a source of energy in aerobic respiration.
3. Non-toxic to wastewater treatment plants.

GreenCut Biodegradable Cutting Fluid has an exclusive flattened matrix molecular arrangement, wherein the various chemical molecules form a covalent bond matrix, laced together. Utilising this monomolecular matrix, sized to less than one micron, we supply continuous cooling and lubrication. This provides full and continuous access to the seizure zone on the tool rake face where all the cutting action takes place, reducing tool wear and improving surface finish while maintaining tight dimensional control of the work piece.

#### **NOTES:**

The major metabolic pathways of hydrocarbon biodegradation are well known. The initial steps in the biodegradation of hydrocarbons by bacteria and fungi involve the oxidation of the substrate by oxygenases<sup>#</sup>, for which molecular oxygen O<sub>2</sub> is required (the substrate being alkanes, oils, fats, and other hydrocarbons; the O<sub>2</sub> is dissolved air in the water or solution). GreenCut enables the combination of oxygen O<sub>2</sub> at the molecular level with the substrate, triggering the subsequent conversion of alkanes to carboxylic acids that are further biodegraded via β-oxidation<sup>◊</sup> to a harmless reduction of carbon dioxide, water, and a tiny amount of cell biomass which is mostly innocuous protein.

<sup>Δ</sup>Biological enzymes are catalysts which act in a narrow operating range of temperature and pH. When these enzymes catalyze a redox reaction they are classified as oxygenases<sup>#</sup>.

<sup>#</sup>Oxygenases: Enzymes that oxidize a substrate by transferring the oxygen from molecular oxygen O<sub>2</sub> to the substrate, that catalyze reactions in which O<sub>2</sub> is introduced into an acceptor molecule.

<sup>◊</sup>β-oxidation is the biochemical process by which alkanes, oils, fats, and other hydrocarbons are broken down and metabolized so that they can be used as a source of energy in aerobic respiration. It is the oxidative degradation of saturated fatty acids in which two-carbon units are sequentially removed from the molecule with each turn of the cycle.

For further information contact:

Benjamin Vroon,  
Chief Chemical Engineer

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Originally Approved by:



**Environment  
Canada**

under the Environmental Choice Program