



## ***WHY BIO BASED OILS MAKE BETTER LUBRICANTS***

<b>Performance Attributes</b>	<b>Why Important</b>
<ul style="list-style-type: none"><li>• Bio based oils have a higher lubricity than petroleum oil.</li></ul>	<ul style="list-style-type: none"><li>• Higher lubricity means machines are able to run faster with less heat and wear. This translates to higher productivity and reduced maintenance cost.</li></ul>
<ul style="list-style-type: none"><li>• Bio based oils have higher thin film strength.</li></ul>	<ul style="list-style-type: none"><li>• Our lubricants can withstand higher pressure.</li></ul>
<ul style="list-style-type: none"><li>• Bio based oils are polar.</li></ul>	<ul style="list-style-type: none"><li>• Bio based naturally adhere to metal.</li></ul>
<ul style="list-style-type: none"><li>• Bio based oils have a higher viscosity index.</li></ul>	<ul style="list-style-type: none"><li>• Our oils are less likely to thin when exposed to heat.</li></ul>
<ul style="list-style-type: none"><li>• Bio based oils have Higher flash and fire.</li></ul>	<ul style="list-style-type: none"><li>• Machines run at higher speeds with no fear of fire.</li></ul>
<ul style="list-style-type: none"><li>• Bio based oils are made up of larger droplets.</li></ul>	<ul style="list-style-type: none"><li>• This reduces the potential for misting.</li></ul>

## ***WHY BIO BASED OILS ARE SAFER***

ELM's metal working fluids are very natural. They are formulated with minimal additive content.

ELM's metal working fluids avoid the use of:

- Sulfur
- Chlorine
- Zinc

The overall benefits are that our products are safer for machine operators, machinery and the environment.

## ***ELM Has Overcome the Historic Problems Associated with Bio Based Oils***

Vegetable oils tend to have poor oxidative stability which results in:

- Thickening.
- Separation and breakdown.
- Rancidity

In contrast, ELM's lubricants have high oxidative stability. We've overcome the above problems by formulating our products around vegetable oils containing very high Oleic acid and low Linoleic and Linolenic acid content. Regular vegetable oils have an Oxidative Stability Index (OSI) of 20 to 30 hours whereas our products have an OSI in excess of 450 hours.