Sustainable Cutting Fluids
Sustainability

❖ Not being harmful to the environment.
❖ Endure the complexities of modern manufacturing.
History

- Most of the cutting fluids on the market today are based on 1970’s technology:
  - Coolants: Boric Acid (Boron), Formaldehyde, and Secondary Amine
  - Cutting Oil: Short Chain Chlorinated Paraffin (SCCP) and Medium Chain Chlorinated Paraffin (MCCP)
Regulatory

- UN
- WTO
- RoHS
- ECHA
- REACh
- CoRAP
- SVHC
- CLP
- EPA (TSCA)
- DEP
- OSHA
- WHMIS
- PRTR
- IARC
- NTP
- SCAQMD
Registration Evaluation Authorization and Restriction of Chemicals (REACH)

- EU since 2007, full implementation 2018
- South Korea
- Japan
- Philippines
- Vietnam
- Thailand
- Taiwan
- China
- Malaysia
- Singapore
- Turkey
Substances of Very High Concern (SVHC)

- Boric acid (Boron)
- Formaldehyde Containing Biocides
- Secondary Amines (DEA, DCHA, DIPA, Morpholine)
- Short Chain Chlorinated Paraffin C13< (SCCP)
- Medium Chain Chlorinated Paraffin C14 to C17 (MCCP)
GHS Labeling Requirements

Best

Worst

None
Tribology, Forms of Wear

- Abrasive
- Adhesive
- Chemical
- Electrical
- Mechanical
- Thermal
Parts
Sustainable Cutting Fluids

- Better Machining Environment
- Easier Parts Cleaning
- Less Material Handling, last longer
- Improve Productivity
Facts

- Lubricants are often the last part of the process to be considered
- Often the process is engineered to the limitations of the lubricant not the limitations of the tools and machine
Comparison of Hangstefers S787 to the other products – Rake wear

Hangstefers exhibited the lowest rake wear throughout the trials until the equivalent of 7 parts were machined.
Comparison of Hangstefers S787 to the other products – Flank wear

Hangstefers exhibited the lowest flank wear throughout the trial.
Comparison of Hangstefers S787 to the other products – Surface Roughness

The surface roughness measurements showed that Hangstefers S787 improved the surface roughness of the test pieces produced compared to the baseline coolant and produced a much more consistent result than any other product.
Thank You For Your Attention