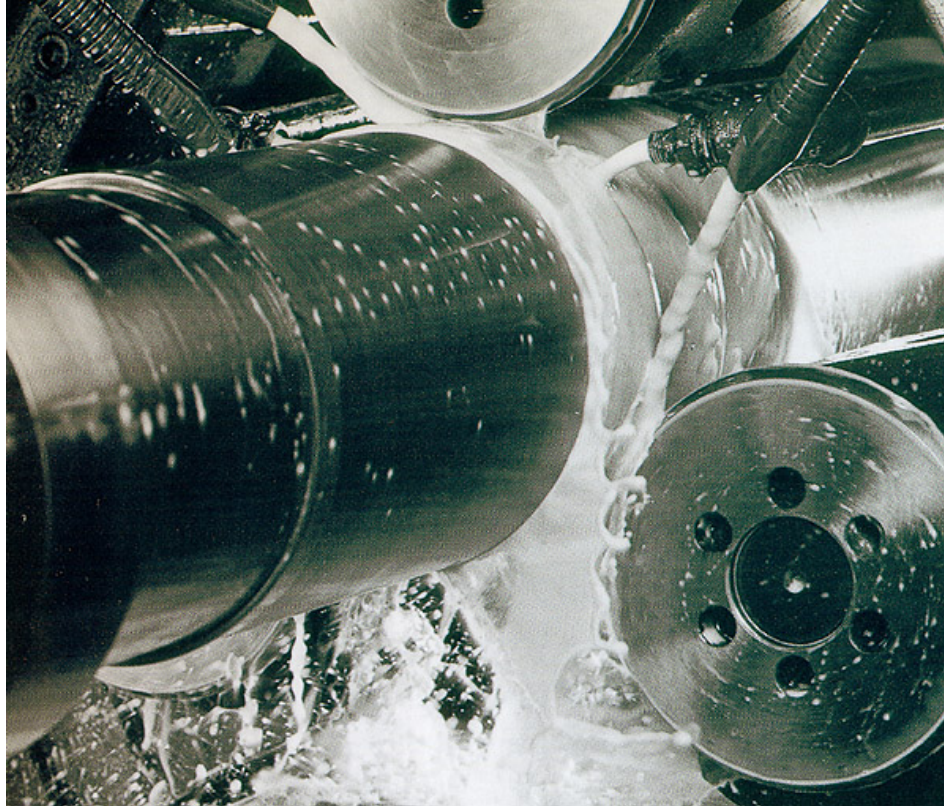




# Metalworking Fluid Training

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24 March 2009





# Metalworking Processes

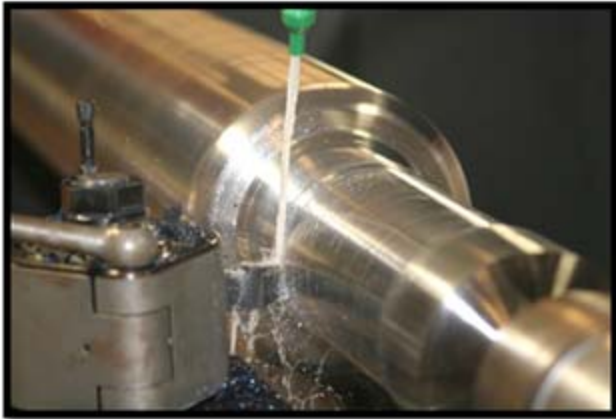
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## Metalworking

- The process or art of shaping things out of metal.
- Divided into two subsets, *metal removal* and *metal forming*.

*We will be focusing on Metal Removal technologies*

## Turning / Milling



- Turning: Stock is turned against a tool to shape the stock.



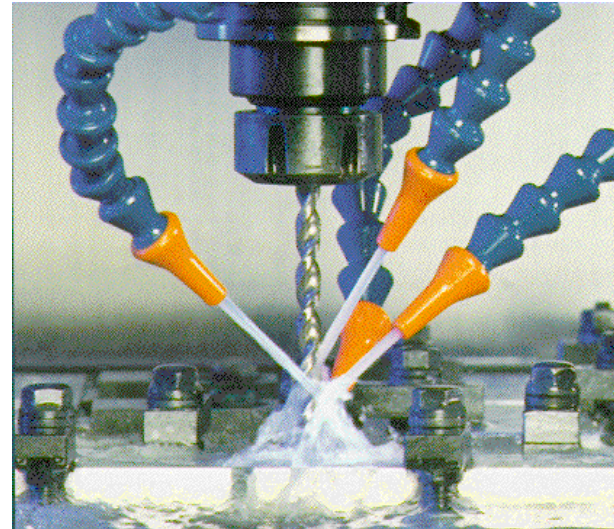
- Milling: Process of cutting away material by feeding a work piece past a rotating multiple tooth cutter.

[V8 engine Block Milling](#)

## Grinding / Drilling



- Grinding: Light metal removal
- Cooling and cleaning
- Grinding wheels are developed for specific MWF
- Produce swarf



- Drilling: cutting a hole
- Drills cut in twisting movement with chips moving upward along flutes of drill.



# Metalworking Fluid Development

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## Metalworking Fluid Development

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2V's approach to supplying valued added technologies is built on a process of extensive evaluation of our customers requirements, as it impacts the following items; environment, health and safety, product performance and over-all operating costs.

Through continuous dialogue with our customers we select our finish fluid candidate that will cover a wide array of applications. This team method has created a pathway that builds customer loyalty and ownership of the process.



## 5 Step Process

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- Bio-Static requirements
  - Stability / emulsion / true solutions
  - System expected “life cycle”
- Environmental Impact (Waste Water Treatment, Permits for operations)
  - State, Federal and Local requirements
- Machining Impact
  - Alloy's (Aluminum, Cast Iron, Steel, Exotics etc...)
    - External machining tests to validate selection
  - Plant conditions
    - Machinery age (along with evaluating PM programs)
  - Geographic Location
  - Water conditions
  - Filtration



## 5 Step Process

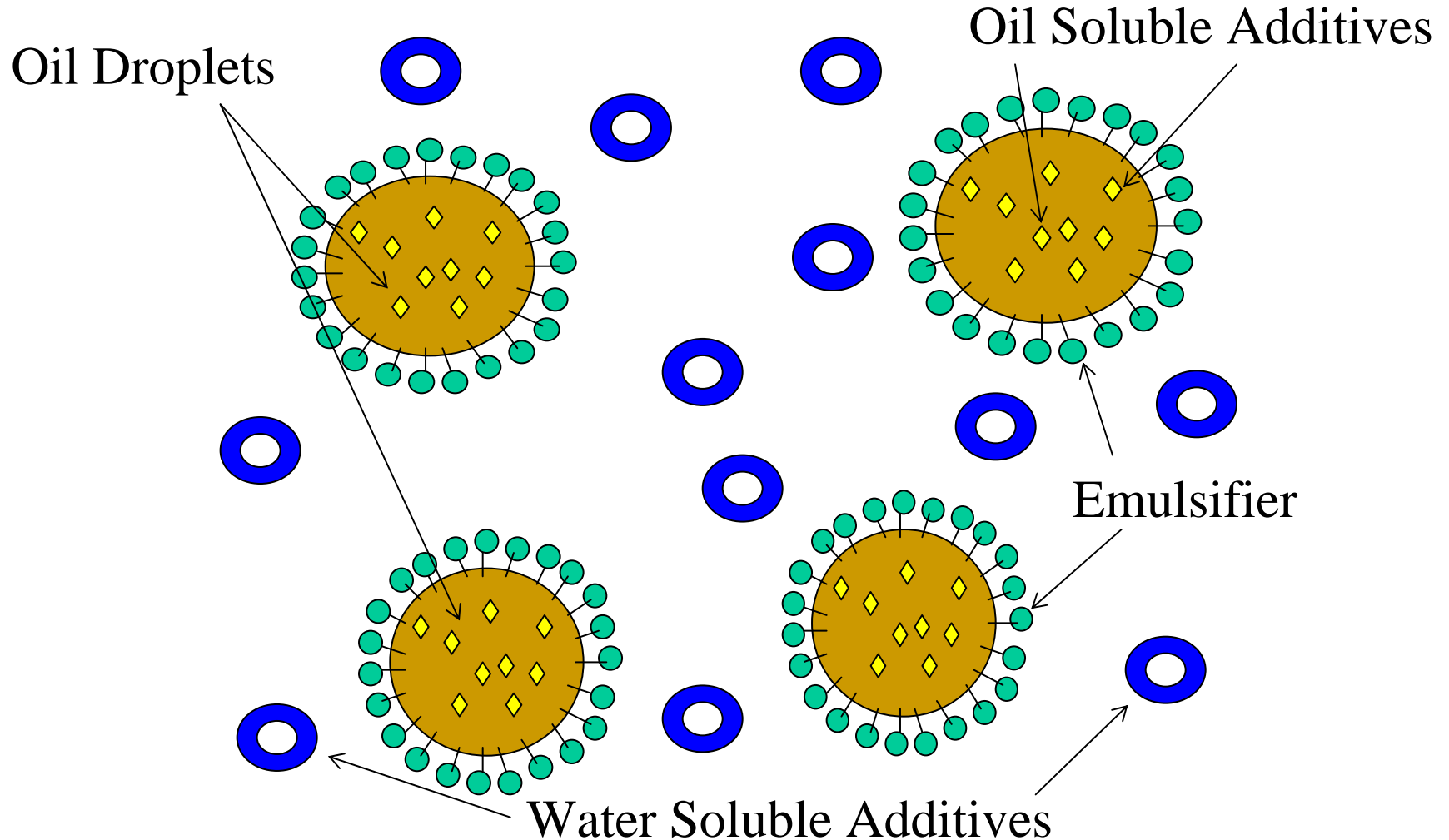
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- Corrosion Protection
  - Climate specific
  - Storage requirements-
    - Time between operations
    - Transportation between intra company or external
  
- Business Case
  - Cost Proforma
  - Raw Material Matrix
  - Profitability ( not a bad word )

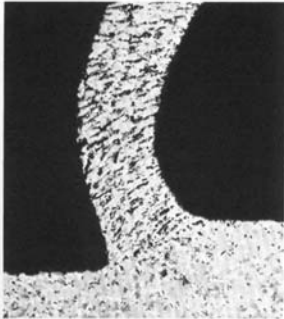


# Emulsions

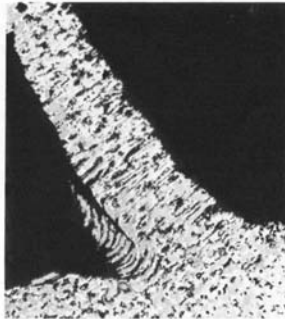
Hydrophilic Ends are polar and repulse one another.  
If emulsifier concentration is weakened, oil droplets  
join, growing larger, and eventually their density drives  
them to the surface.



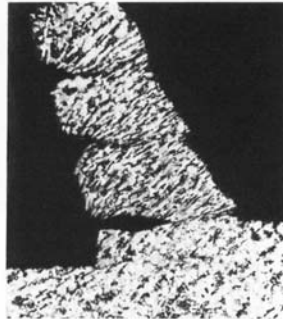
# Chip Formation and Temperature Dynamics



Continuous Chip



Chip with Built Up Edge



Discontinuous Chip

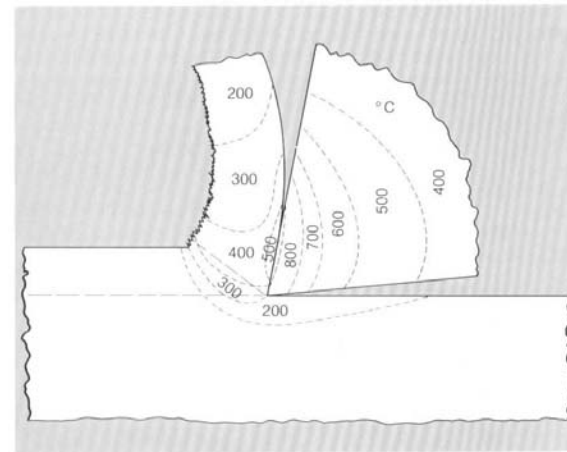
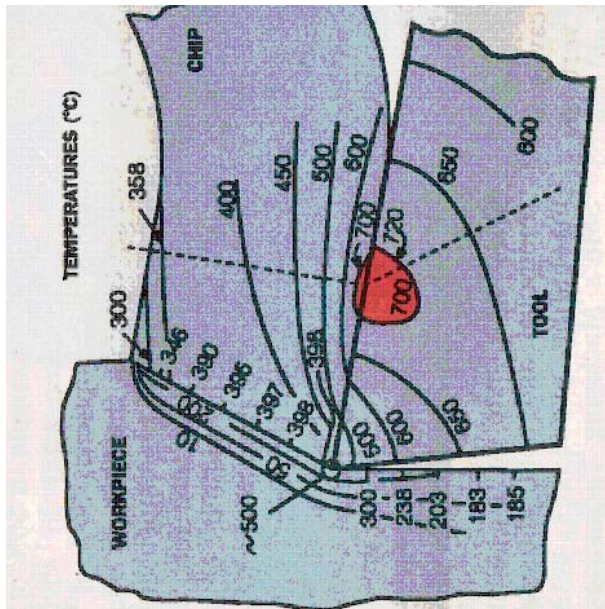
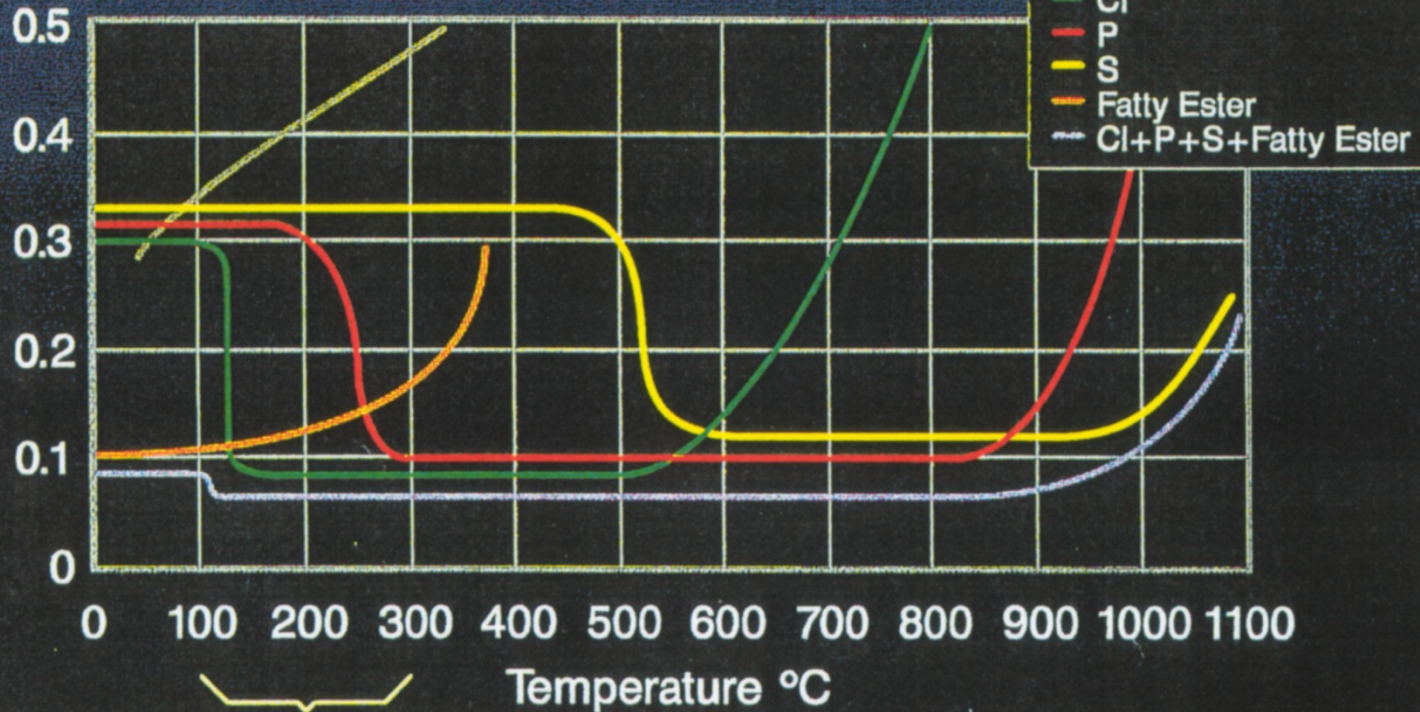


Fig. 8 Relative Temperatures in Turning Operations

# Co-Efficient of Friction

Co-Efficient of Friction



SS-091691-1361



**RHÔNE-POULENC SURFACTANTS & SPECIALTIES**





# Schaeffer MWF - Then and Now

4 Min

10 Sec



511



411



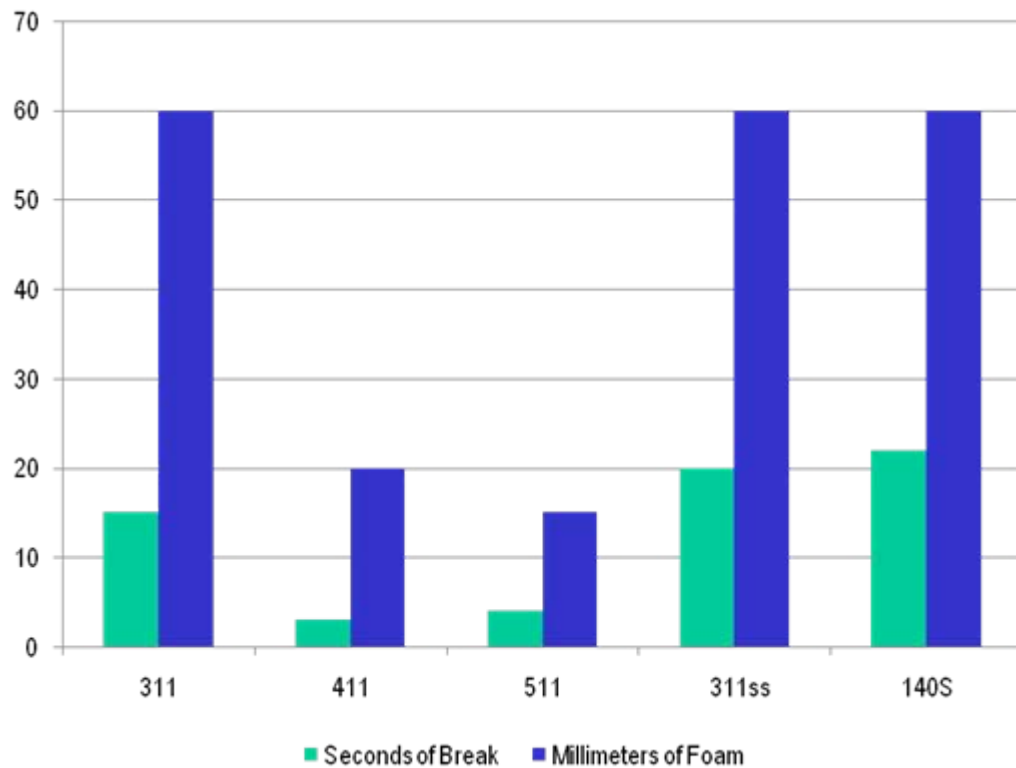
311



140

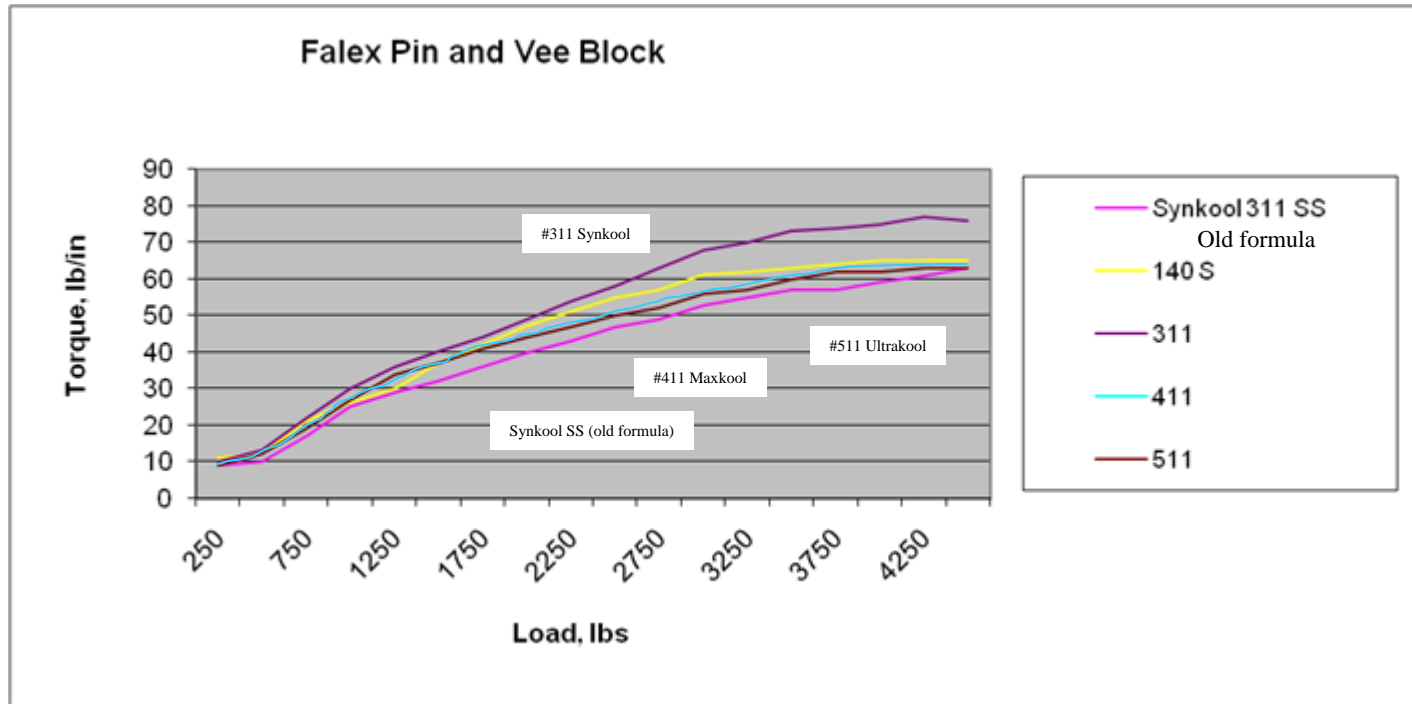


311  
Syn SS  
(old formula)





# Falex – Tap/Torque Test Results



Parameter		Tap / Torque					
Speed, rpm	550						
Depth, mm	15.0						
Torque, Ncm	650						
Material	Steel	Average, Ncm	311	511	411	140 S	311 Synkool SS
Dilution Rate	Diluted 10%	Efficiency, %	208.2	208.2	206.7	210.5	204.9
			100.0	100.0	100.7	98.9	101.6



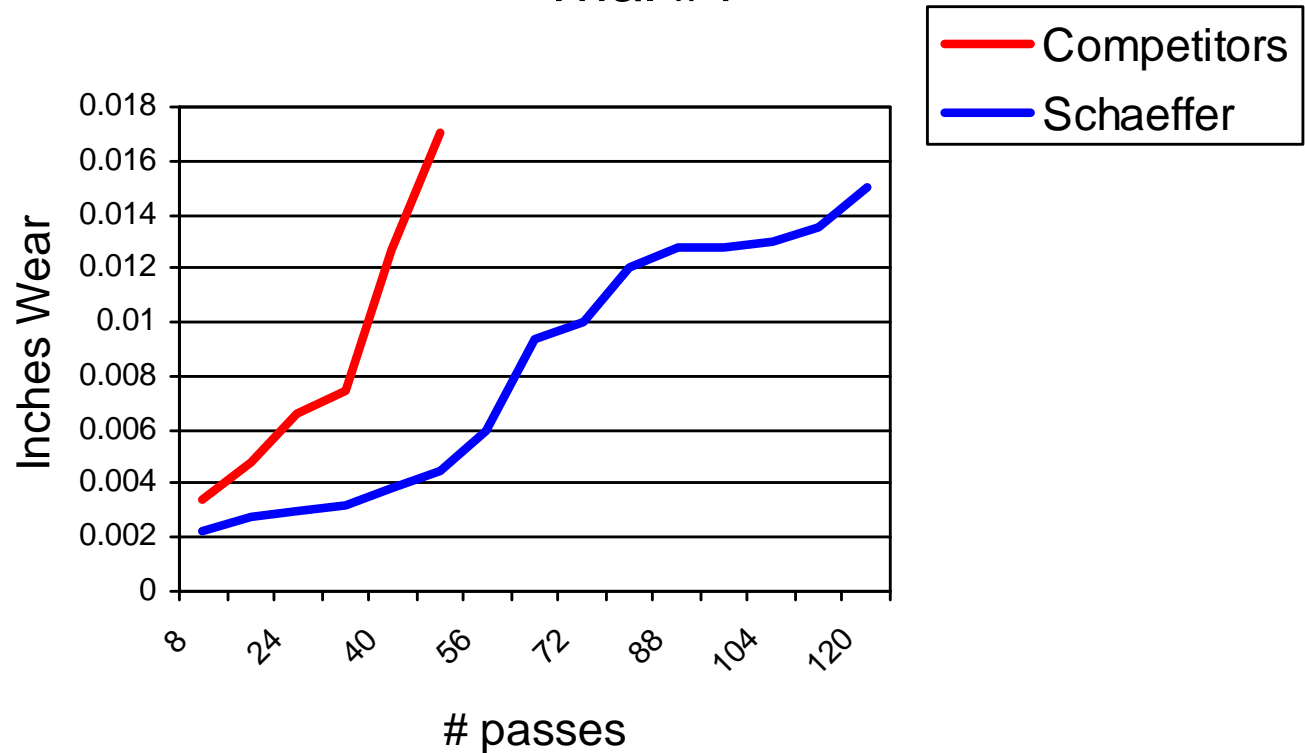
# Insert Wear Test

Competitors Technology = 48 passes

Schaeffer's Technology = 116 passes

**Over 240% increase in tool life**

Trial #1





## What Next?

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Find Opportunities / Develop Opportunities

- Schaeffer Technical Support Staff
- Metalworking Fluid Opportunity Worksheet
- Metalworking Fluids Forum



## Resources

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- [http://www.osha.gov/SLTC/metalworkingfluids/metalworkingfluids\\_manual.html](http://www.osha.gov/SLTC/metalworkingfluids/metalworkingfluids_manual.html)
- [http://www.irma.org/resources/metalworkingfluids\\_quickstart.cfm](http://www.irma.org/resources/metalworkingfluids_quickstart.cfm)
- <http://www.aware-services.com/orc/>
- <http://www.coolantmaintenance.com/>



# Metalworking Fluid Summary

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