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**CITGO ORDNANCE® 1000 SERIES OILS**

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Date 1/09

**DESCRIPTION:** Ordnance 1000 Series Oils are light colored, anti-mist, active sulfur, chlorinated cutting oils designed for use in moderate to severe machining operations. Ordnance 1000 Series Oils are available in different extreme pressure levels and viscosity grades to cover a wide variety of machining operations and metallurgies.

- BENEFITS:**
- Light color / transparency and low odor
  - Excellent lubricity and extreme pressure properties
  - Dissipate excessive frictional heat even in the toughest cutting jobs
  - Chip to tool welding (built-up-edge) minimization
  - Extended tool life through a synergistic use of additive technology
  - Allow for closer machining tolerances
  - Better surface finish
  - Protection of machine and parts against corrosion / rust
  - Low smoke / misting tendencies

**APPLICATIONS:** Ordnance 1200 is a low viscosity cutting oil designed for use in deep hole drilling, grinding, and other operations where a low viscosity cutting oil is best suited. The lower viscosity allows for chips and grinding swarf to readily settle. Oil loss due to drag out with the part and chips will also be low with Ordnance 1200.

Ordnance 1400 is a heavy-duty fluid formulated for use in severe applications with respect to operation and metallurgy. The elevated levels of extreme pressure and lubricity additives provide excellent surface finish on materials with low machineability ratings.

Ordnance 1500 provides the highest level of extreme pressure and lubricity additives of the Ordnance 1000 Series products, allowing it to handle the most difficult operations and metallurgies where other fluids fail.

**Note:** The Ordnance 1000 Series products contain active sulfur. They should not be used with copper or copper alloys, such as brass or bronze, or other soft metals where staining is a concern.

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Date 1/09 - (Continued)

**TYPICAL PROPERTIES:**

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<b>Grade</b>	<b>1200</b>	<b>1400</b>	<b>1500</b>
<b>Material Code</b>	<b>639582001</b>	<b>639584001</b>	<b>639585001</b>
Gravity, ASTM D 4052, °API	29.9	27.3	24.0
Density, lb/gal	7.25	7.42	7.56
Appearance	----- Clear, Pale to Light Amber -----		
Odor	-----Mild Compounded/Slight Sulfur-----		
Flash Point, ASTM D 92, °F (°C)	330 (166)	392 (200)	392 (200)
Pour Point, ASTM D 97, °F (°C)	10 (-12)	10 (-12)	10 (-12)
Viscosity, ASTM D 445, cSt @ 40°C	13.2	35.9	59.2
cSt @ 100°C	3.27	6.01	8.26
Color, ASTM D 1500	L1.0	L1.5	2.5
Sulfur	Present	Present	Present
Chlorine	Present	Present	Present
Phosphorous	None	None	Present
Lubricity Additive	Present	Present	Present
Four Ball EP, ASTM D 2873, kgf	500	620	620
Four Ball Load Wear Index, ASTM D 2873	86.0	112.0	112
Falex Load, ASTM D 3233, lbs	3650	4015	4100
Tapping Torque, % Efficiency	115.6	116.1	117.4