

# MORGOIL<sup>®</sup> Lubricant Specification

## MORGOIL<sup>®</sup> Advanced Lubricant

### New Oil

Revision 2.4

20-Feb-07

#### **1.0 Scope:**

This specification applies to lubricant supplied for service in Advanced MORGOIL<sup>®</sup> bearing lubrication systems. These systems are designed for use with high demulsibility lubricants. The lubricant shall separate from water at normal operating temperatures on return from the bearings (125 F to 140 F). This specification does not supersede the standard MORGOIL<sup>®</sup> Lubricant Specification; rather it is a supplement for this special class of lubricant.

The advanced MORGOIL<sup>®</sup> bearing lubricant must be high grade mineral or synthetic oil, free from acid and other impurities. It must have high resistance to oxidation and formation of sludge when subjected to rolling mill service, and must separate rapidly from water, air, and other contaminants at normal system operating temperatures. The lubricant supplier shall assume responsibility for satisfactory in-service performance, and shall provide assurance that the lubricant will not cause damage to materials commonly used in the bearing assembly or the lubrication system. The formulation shall not contain extreme pressure (EP) lubricant additives. The lubricant supplier shall also assume responsibility for compatibility of the lubricant with any existing lubricant in the system.

#### **2.0 Viscosity:**

ASTM D 445

or

ISO 3448

The viscosity grade of the oil will be specified by the Morgan Construction Company for each application. The following ISO viscosity grades will be used: 100, 150, 220, 320, 460, and 680. As per ISO and ASTM specifications, the Morgan Construction Company recognizes that the required tolerance on viscosity is +/- 10%.

MORGOIL<sup>®</sup> Lubrication Specification - MORGOIL<sup>®</sup> Advanced Lubricant

Revision 2.4, 20-FEB-2007

MORGOIL<sup>®</sup> Bearing Division

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**3.0 Viscosity Index:**

ASTM D 2270 90 minimum for ISO VG 460 or less.  
 Or 85 minimum for ISO VG 680.  
 ISO 2909 No Viscosity Index (VI) improvers for lubricants of ISO viscosity grade VG 460 or less. Morgan Construction Company must be notified if the VI of a proposed lubricant is equal to or in excess of 120.

**4.0 Demulsibility:**

The intent of this requirement is that long term, in-service demulsibility is to be excellent. Note that the demulsibility tests in this specification are to be conducted using reagent grade distilled water that meets the requirements of ASTM D 1193. The Morgan Construction Company recommends that mill operators request that the following tests also be conducted using local roll coolant to confirm that standard test results are valid for a specific installation.

**Exception:** If a candidate lubricant is tested using both reagent grade water and mill coolant, then the results from the tests with mill coolant shall be considered as the results of record for the mill in question.

**Note:** The following demulsibility test(s) are required to prove the viability of a lubricant formulation. It is not the intent that these tests be required for batch quality control.

**4.1 Low Temperature Demulsibility:**

ASTM D 2711 Modified test is conducted at 52 C (125 F) using the non-EP method.  
 (modified) See Supplement 1.0 for the modified test protocol.

<u>Required results:</u>	<u>VG 100-150</u>	<u>VG 220-320</u>	<u>VG 460-680</u>
ml free water (min before centrifuging)	30	30	26
% water in oil	report	report	report
ml emulsion (max)	1.0	1.0	1.0

**4.0 Demulsibility (continued):**

**4.2 Dynamic Demulsibility Endurance:**

Resistance to demulsibility washing out under repeated exposures to large volumes of water is an important quality for MORGOIL<sup>®</sup> lubricants. This test measures the ability of lubricants to dynamically separate from water while under controlled operating conditions of flow rate, residence time, temperature, and water introduction. See Supplement 2.0 for test protocol and information regarding the source of testing. *The candidate lubricants ability to perform well on this test is the most important indication of an oils expected performance in actual use.*

UEC Dynamic Demulsibility Endurance Test	<u>Required Results</u>	<u>ISO VG 100 – 460</u>	<u>ISO VG 680</u>
	Max % water in oil after centrifuging	10	15
	Max % oil in water after centrifuging	1	1

**5.0 Pour Point:**

ASTM D 97 -6 C for ISO VG 320 and lower. 0 C for ISO VG 460 and higher. Note that some European customers may reserve the right to require lubricants with a pour point of -12 to -15 C for use in colder climates.

**6.0 Foaming Characteristics:**

ASTM D 892 Minimal foaming tendency and minimal foam stability. Note that the Morgan Construction Company does not recommend the addition of excess anti-foaming agents, as they tend to interfere with demulsibility and air release.

Requirements: Sequence I 50 ml /0 ml  
 Sequence II 50 ml /0 ml  
 Sequence III 50 ml /0 ml

**7.0 Rust Protection:**

ASTM D 665A Pass  
ASTM D 665B Optional

**8.0 Oxidation Resistance:**

ASTM D 2272 80 minutes, minimum

**9.0 Flash Point:**

ASTM D 92 195 C minimum

**10.0 Yellow Metals Corrosion:**

ASTM D 130 3 hours at 100C. Maximum 1.0.

**11.0 Neutralization Number:**

ASTM D 974 Report only

### **Supplement 1.0: Modified Test Protocol for ASTM D 2711**

For this demulsibility test ASTM D 2711 is to be followed as per the standard test method, except that it is to be conducted at 52 C instead of 82 C.

The Apparatus section is modified as follows:

5.3 *Heating Bath*, ... “The bath shall be capable of maintaining a temperature of 125 +/- 2 F (52 C +/- 1 C)...”

The test procedure differs as follows:

8.1 Heat the bath liquid to 125 F +/- 2 F (52 C +/- 1 C) and maintain this temperature throughout the test.

8.2 ... “Place the separatory funnel and oil in the constant temperature bath and bring to a temperature of 125 F (52 C)...”

### **Supplement 2.0: Test Protocol for UEC Dynamic Demulsibility Endurance Test**

Temperature:	125 F +/- 2 F (52C +/- 1C)
Residence Time:	30 minutes
Water Introduction Rate:	5% of lubricant flow rate
Test Duration:	5 hours

Source for testing:	UEC CMS Labs 4000 Tech Center Drive Pittsburgh, PA 15146 (412) 825-2250 / 2930 (412) 825-2255 (fax)
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