

'Providing Tribological Solutions'

TECHNICAL NOTE MOV LONG LIFE - COMMERCIAL GRADE DEDICATION

1. Background: MOV Long Life grease has been recommended for safety related equipment by MUG (Motor Operated Valve Users' Group), EPRI (Electric Power Research Institute) and COG (Candu Owners Group) well as by MOV actuator suppliers including both Limatorque and Bernard. In the qualification test MOV Long Life exceeded the requirements and has been an improvement on the greases used previously. Although the grease is manufactured in an ISO registered facility, this is not suitable for safety related equipment. The grease manufacturer has audited by Limatorque but not as yet by NUPIC (Nuclear Procurement Issues Committee) so testing of grease orders for safety related MOV's is normally performed for a Commercial Grade Dedication.

2. Testing: The testing for Commercial Grade Dedication varies slightly from station to station. It appears to depend on what was done in the past, what problems they had with other greases plus what tests can be done by the lab they are using. The most common tests include the first three;

2.1 Appearance: Does it appear okay and not too dry or with too much separated oil or any visible debris or free water. Was the pail seal intact?

2.2 Color: MOV Long Life is a tan or light brown color with no dyes. This is because most dyes are cosmetic and might actually degrade performance.

2.3 Penetration: This should be within the NLGI grease grade limits. A Grade 0 is the Limatorque factory fill while stations wanting to use MOV Long Life on the stems and/or the limitswitch gearbox tend to use a Grade 1. For some Bernard actuators and applications including reach rods, bearings and/or shaft coupling a Grade 2 might be used. The preferred test is ASTM D217 but D1403 can be used. The latter takes less grease.

The following additional tests are also performed by some utilities;

2.4 Dropping Point: MOV Long Life uses a calcium sulphonate thickener system that has a high dropping point typical of complex greases and other high performance greases. The dropping point of grease is measured as the temperature at which a drop of grease falls when tested under specified conditions. It is an indication of how well the grease structure retains its fluid components

There are two ASTM methods, D2265 uses an aluminum block for heating and D566 uses an oil bath. D2265 is preferred because the D566 has slightly worse reproducibility and it is not recommended by ASTM for use with bath temperatures above 288°C. This test, along with the above, can help ensure that the grease is as ordered. The preferred test is ASTM D2265.

2.5 FTIR: By comparing the spectrums with previous results and/or with the infrared absorption spectrums given in the EPRI report it can be determined if the grease has a calcium sulphonate thickener and that it is MOV Long Life. Laboratories can compare the overall spectrums and/or look for specific wavenumbers.

2.6 Metal Content: This is apparently not common but the Li/Ca ratio was specified by one utility. Possibly this was the result of contamination of the previous calcium complex grease with a lithium grease. MOV Long Life has a high concentration of calcium. The preferred test is ashing and acid digestion followed by ICP Spectroscopy,

2.7 Rheometry: This uses a device to subject the grease to cyclic stresses to determine the rheological characteristics of the grease. The yield stress can be related to the penetration and it also provides other info. The main advantage is that this test requires a very small grease sample.

3. Reject Limits

3.1 3rd Party Testing

	Appearance	Color	Penetration ASTM D217	Dropping Point ASTM D2265 °F (°C)
Grade 0	not greaselike	not Tan	<355 or >385	<482 (<250)
Grade 1	not greaselike	not Tan	<310 or >340	<482 (<250)
Grade 2	not greaselike	not Tan	<265 or >295	<482 (<250)

The above takes into account test precision statements.

4. Comment: While many labs can do the above tests it is suggested that because of possible variations, that a history be established with one laboratory and that the laboratory selected has suitably calibrated test equipment and qualified personal. It is considered an advantage if the laboratory participates in the ASTM Committee D-2 Interlaboratory Crosscheck Program for Lubricating Grease.

5. Significance: It should be noted that the grease manufacture tests each batch and provides a COA (Certificate of Analysis). Forsythe Lubrication Associates who are the stocking and distribution company also do further tests on each batch including metals and halogens. Before rejecting any batch retests might be appropriate.