

**GREASE, HIGH TEMPERATURE,
LITHIUM COMPLEX SOAP****ESD-M1C220-A****1. SCOPE**

The material defined by this specification is a NLGI Grade 1 high temperature grease consisting of mineral oil and a lithium complex soap thickener with extreme pressure additives and oxidation and corrosion inhibitors.

2. APPLICATION

This specification was released originally for materials used to lubricate the input-shaft spline eliminating shiftability concerns on manual transmissions. This material is also used to lubricate the output shaft bearing (transmission side) on MMT6 transmissions.

3. REQUIREMENTS**3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS**

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2 COLOR Yellowish - Brown
(Visual)

3.3 WORKED PENETRATION, tenths of a millimeter 310 - 340
(ASTM D 217, ISO 2137, 60 strokes, 25°C)

3.4 DROPPING POINT 220 °C min
(ASTM D 566, ASTM D2265, ISO 2176)

3.5 CORROSION PROTECTION

3.5.1 Copper Corrosion (Copper Strip) 1 max
(ASTM D 130, DIN 51811, 24h, 100°C)

3.5.2 Emcor Corrosion 1 max
(ASTM D 6138, DIN 51802, 168hrs)

3.6 4 BALL WELD LOAD 2600 N min
(ASTM D 2596, DIN 51350 Pt 4)

3.7 FUNCTIONAL APPROVAL

GETRAG Ford Transmissions GMBH reserve the right to subject materials submitted against this specification to any additional investigation they consider necessary and use the data derived for qualification and approval.

Date	Action	Revisions	Rev. 2
2011 06 27	Revised	See summary of revisions, paragraph 5	K. Cosgrave, EU
2004 05 28	Revised	Para 3.0 inserted; para 3.1, 3.2, 3.6 & 4 deleted	
1988 01 29	Released	SM/EQ1970 TP	





4. GENERAL INFORMATION

The information given below is provided for clarification and assistance in meeting the requirements of this specification. Grease approved to this specification should have the following typical properties.

4.1 COMPOSITION

4.1.1	Lithium Complex Soap (According to formulation)	5 - 15%
4.1.2	Mineral Oil (According to formulation)	80 - 90%

4.2 MINERAL OIL VISCOSITY

(DIN 51562 T01, ASTM D 445 or ASTM D 7042)

4.2.1	Kinematic Viscosity at 40°C	272 mm ² /s
4.2.2	Kinematic Viscosity at 100°C	20 mm ² /s

4.3 PENETRATION, tenths of a millimeter

(ASTM D 217, ISO 2137)

4.3.1	Worked Penetration, 60 strokes	320
4.3.2	Prolonged Worked Penetration, 100,000 strokes	40% Change from 60 stroke value

4.4 ANTIBRINELLING TEST

(SNR-FEB 2, 8000 N, 25Hz, 50hrs at 25°C, angle +/- 3°)

3.5 mg

4.5 FLOW PRESSURE

(DIN 51805, -30 °C)

1000 mbar

4.6 WATER RESISTANCE, WATER WASHOUT

(ASTM D 1264, DIN 51807 T2)

3.2%

4.7 OIL SEPARATION DURING STORAGE

(DIN 51817, 7 days at 40°C)

5.5%

4.8 OXIDATION STABILITY

(DIN 51808, t=100hr, T=99°C)

25 kPa

4.9 INTERFACE COMPATIBILITY

4.9.1	Chemical Attack to Painted Surfaces (FLTM BJ 126-01)
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Note: Not tested for initial application of this grease. Grease must be tested for chemical attack to painted surfaces for applications that come in contact with paint surfaces, ex. E-coat and powder coat.