



Friction Modified, Synchromesh Transmission Fluid

1 Scope

1.1 Material Description. This specification covers a friction modified, synchromesh transmission fluid (STF). It is intended to lubricate light duty manual transaxles and manual transmissions. The fluid has a working range from -40 °C to 150 °C.

1.2 Symbols. Not applicable.

1.3 Applicability. This lubricant is to be used in GM light duty manual transaxles and manual transmission and other specified applications.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM D92	ASTM D287	ASTM D892	ASTM D1744
ASTM D95	ASTM D445	ASTM D1091	ASTM D2602
ASTM D97	ASTM D811	ASTM D1549	ASTM D2622
ASTM D129	ASTM D874	ASTM D1551	

2.2 GM Standards/Specifications.

GMN11282 (ID)	GMW14444	GMW16439	GMW16831
GMW3059	GMW15636	GMW16612	GMW16853

(ID) = This standard is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Lead Engineer for further instructions.

2.3 Additional References.

TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com).

3 Requirements

3.1 Emissions Testing of Interior Materials and Parts. For all Code E designated parts per GMW14444, reference GMW16853 for emissions testing of interior materials and parts. See Table 1 for composition.

Table 1: Elemental Analysis Properties

Composition	Values	Test Methods
Phosphorus - Mass Percent (%)	0.16 to 0.25	ASTM D1091
Zinc (Mass %)	0.11 to 0.13	ASTM D811, ASTM D1549
Sulfur (Mass %)	0.55 to 0.88	ASTM D129, ASTM D1551, ASTM D2622
Magnesium (Mass %)	0.43 to 0.53	ASTM D811
Sulfated Ash (Mass %)	3.0 Maximum	ASTM D874
Water Mass (%)	0.3 Maximum	ASTM D95, ASTM D1744

3.2 Properties. See Table 2.**Table 2: Chemical and Physical Properties**

Properties	Values	Test Methods
Gravity, American Petroleum Institute (API)	24.0 to 31.0	ASTM D287
Flash, Finished Oil	150 °C	ASTM D92
Kinematic Viscosity, at 100 °C	8.0 cSt Minimum	ASTM D445
Kinematic Viscosity at 40 °C	35 cSt Minimum	ASTM D445
Viscosity at 100 °C after GMN11282 Test	6.0 cSt Minimum	ASTM D445
Viscosity at -20 °C	1600 cP Maximum	ASTM D2602
Viscosity at -30 °C	3800 cP Maximum	ASTM D2602
Viscosity at -40 °C	50 000 cP Maximum	ASTM D2602
Pour Point	-45 °C Maximum	ASTM D97
Foaming Tendency at 24 °C after Blowing (Sequence I)	20 mL	ASTM D892
Foaming Tendency at 93.5 °C after Blowing (Sequence II)	50 mL Maximum	ASTM D892
Foaming Tendency at 24 °C after Blowing (Sequence III)	20 mL	ASTM D892

3.3 Performance Tests. See Table 3.**Table 3: Performance Properties**

Performance Test	Values	Test Methods
Lubricant Friction	Same as reference	GMW16612
Synchronizer Durability	Same or better than reference	GMW16439
Dynamometer Durability	Same or better than reference	GMW15636
Shift Effort	Same or better than reference	GMW16831
Vehicle Durability	Same or better than reference	GMN11282

3.4 Storage Stability. Material shall be free of suspended matter and shall not exhibit any change in properties for periods up to six (6) months storage. Material must be protected from freezing.

4 Manufacturing Process

Not applicable.

5 Rules and Regulations

5.1 Legal Regulations. All materials must satisfy applicable laws, rules, regulations and recommendations valid in the country of usage.

5.2 Language. In the event of conflict between the English and domestic language, the English language shall take precedence.

5.3 Inspection and Rejection. All shipments of material or parts under contract or purchase order manufactured to this specification shall be equivalent in every respect to the initial samples approved by Engineering. There shall be no changes in either formulation or manufacturing processes permitted without prior notification and approval by Engineering. Lack of notification by the supplier constitutes grounds for rejection of any shipment.