



Fluid, Cold Climate Power Steering

1 Scope

1.1 Material Description. This specification details the requirements of a fluid intended primarily for use for lubrication and hydraulic actuation purposes in power steering systems over an extended temperature range.

1.1.1 Fluid shall be free from water sediment, acid, particulates, or other substances detrimental to proper function and performance of the system in which it is used.

1.2 Symbols. Not applicable.

1.3 Applicability. Power steering application.

1.4 Remarks.

1.4.1 Safety. This specification may involve hazardous materials, operations, and equipment. This specification does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this specification to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

2 References

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

2.1 External Standards/Specifications.

ASTM D92	ASTM D445	ASTM D892	ASTM D2983
ASTM D97	ASTM D611	ASTM D2270	ASTM D3945
ASTM D130	ASTM D665	ASTM D2272	ASTM E168

2.2 GM Standards/Specifications.

GMW3059

2.3 Additional References.

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

3 Requirements

3.1 Physical Properties. See Table 1.

3.2 Performance Properties.

3.2.1 All materials approved against this specification must pass all steering system and/or component performance and durability testing as specified by the control division.

3.2.2 All material approved against this specification must pass all steering system and/or component elastomer compatibility testing as specified by the control system.

3.3 All ASTM specified tests shall be performed according to the latest published version unless otherwise required by this specification.

Table 1: Physical Properties

Properties	Test Values	Test Methods
Flash Point	175 °C minimum	ASTM D92
Fire Point	190 °C minimum	ASTM D92
Viscosity at: -40 °C +40 °C +100 °C +150 °C	5000 cP maximum 40.0 cSt maximum (KV) 6.1 cSt minimum (KV) 2.8 cSt minimum (KV)	ASTM D2983 ASTM D445 ASTM D445 ASTM D445
Shear Stability Kinematic Viscosity (KV) at: +100 °C +150 °C	4.9 cSt minimum (KV) 2.25 cSt minimum (KV)	ASTM D3945 (Procedure A – 20 passes)
Viscosity Index	190 minimum	ASTM D2270
Aniline Point	86.0 °C to 97.0 °C	ASTM D611
Pour Point	-50 °C maximum	ASTM D97
Corrosion and Rust Prevention Characteristics	No rust	ASTM D665 (Procedure A – 24 h)
Foaming Characteristics Volume Collapse Time Volume After 10 Minutes	60 mL maximum 30 s maximum 0 mL maximum	ASTM D892 – Sequence II
Oxidation Stability	400 minutes minimum	ASTM D2272
Copper Strip Corrosion Resistance	3a rating maximum	ASTM D130, (1 h/150 °C)
Miscibility	No separation or color change	-
IR Spectrum	To match approved reference	ASTM E168

IR = Infrared Region

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. While samples may be taken from incoming shipments and checked for conformance to this specification, the supplier shall accept the responsibility for incoming shipments meeting this specification without dependence upon purchaser's inspection.

The series of tests used to approve each batch of product along with acceptance limits will be agreed upon by the purchaser and seller. The laboratory providing the certificate of analysis must also participate in a proficiency testing program (round robin) that is approved by the Fuels, Fluids, and Lubricants Global Subsystem Leadership