



Fluid, Semi-Synthetic Electro-Hydraulic Steering System

1 Scope

1.1 Material Description. This specification details the requirements of a high viscosity index, semi-synthetic fluid intended primarily for use and hydraulic actuation purposes in electro-hydraulic power steering systems over an extended temperature range.

1.2 Symbols. Not applicable.

1.3 Applicability. For use and hydraulic actuation purposes in electro-hydraulic power steering systems over an extended temperature range.

2 References

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

2.1 External Standards/Specifications.

ASTM D92	ASTM D665	ASTM E168	ISO 4497
ASTM D97	ASTM D892	DIN 51382	ISO 7308
ASTM D130	ASTM D2270	DIN 51581-1	NFE 48651
ASTM D445	ASTM D2983	ISO 4406	NFE 48655
ASTM D611	ASTM D5483		

2.2 GM Standards/Specifications.

B 440 1024	GMW3059
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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.

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

3.2 Performance Requirements. All materials approved against this specification must meet all compatibility and functional performance requirements where applicable as specified by the control division engineering department.

3.3 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.

Table 1: Physical Properties

Properties	Test Values	Test Methods
Flash Point	140 °C minimum	ASTM D92
Fire Point	150 °C minimum	ASTM D92
Viscosity @ -40 °C @ +40 °C @ +100 °C	1200 cP maximum (Bkfld) 18.0 cSt minimum 5.9 cSt minimum	ASTM D2983 ASTM D445 ASTM D445
Shear Stability – Kinematic Viscosity Change @ +40 °C, percent loss	After 30 cycles: 4.0 maximum After 250 cycles: 6.0 maximum	DIN 51382
Viscosity Index	300 minimum	ASTM D2270
Aniline Point	95.0 °C to 102 °C	ASTM D611
Pour Point	-50 °C maximum	ASTM D97
Corrosion and Rust Preventing Characteristics	No rust	ASTM D665 (Procedure A – 24 h)
Foam Characteristics; Tendency: Volume Collapse Time Volume after 10 Minutes	140 mL maximum 60 s maximum Nil	ASTM D892 – Sequence II
Evaporation Properties (Noack test): After 1 h @ 100 °C, percent weight loss After 1 h @ 150 °C, percent weight loss	1.5 maximum 7.3 maximum	DIN 51581-1
Oxidation Stability (HPDSC), @ 210 °C isothermal / 3.45 MPa O ₂ atmosphere, minutes to exotherm onset	30 minimum	ASTM D5483
Copper Strip Corrosion Resistance	1b rating maximum	ASTM D130, (1 h/150 °C)
Compatibility with Other Fluids: After 24 h @ -40 °C After 24 h @ +60 °C	Clear, no sediments or stratification	ISO 7308 with the following fluids: • ISO reference fluid 4926 • Fluid(s) approved against Opel B 440 1024
Fluid Cleanliness (applies to Virgin Fluid as Received from Supplier)	ISO code of 17/14 or cleaner	ISO 4497 (test method) ISO 4406 (reporting method) or NFE 48651 (test method) NFE 48655 (reporting method)
Appearance	Green in color; clear and bright in clarity	Visual
IR Spectrum	To match approved reference	ASTM E168

Bkfld = Brookfield

HPDSC = High Pressure Differential Scanning Calorimetry

IR = Infrared Region