



Standard Practice for Evaluating Compatibility of Mixtures of Hydraulic Fluids¹

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1. Scope

1.1 This practice covers the compatibility of mixtures of hydraulic fluids as defined by Specifications **D6158**, DIN 51524, ISO 11158, and ISO 15380.

1.2 This practice can be used to evaluate new (unused) lubricant compatibility or the effects of combining new (replacement) lubricant with in-service (original) lubricant in the system.

1.3 To evaluate primary compatibility using this method, the replacement fluid must pass the ISO 13357-1 Stage II filterability test. The original fluid is not required to pass ISO 13357-1 filterability test, Stage I or II.

1.4 Primary testing is conducted on fluid mixtures in 2:98, 10:90, and 50:50 ratios using the ISO 13357-1 Filterability Test, Stage II.

1.5 Secondary testing is suggested when circumstances indicate the need for additional testing.

1.6 This practice does not evaluate the wear prevention characteristics, load carrying capacity, or the mechanical shear stability of lubricant mixtures while in service. If anti-wear (AW), extreme pressure (EP), or shear stability are to be evaluated, further testing of these parameters may be required.

1.7 This practice does not purport to cover all test methods that could be employed.

1.8 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.9 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

D130 Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test

D445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)

D664 Test Method for Acid Number of Petroleum Products by Potentiometric Titration

D665 Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water

D892 Test Method for Foaming Characteristics of Lubricating Oils

D974 Test Method for Acid and Base Number by Color-Indicator Titration

D1401 Test Method for Water Separability of Petroleum Oils and Synthetic Fluids

D2270 Practice for Calculating Viscosity Index from Kinematic Viscosity at 40 and 100°C

D3427 Test Method for Air Release Properties of Petroleum Oils

D6158 Specification for Mineral Hydraulic Oils

2.2 ISO Standards:³

11158:1997 Lubricants, industrial oils and related products (class L)—Family H (hydraulic systems)—Specifications for categories HH, HL, HM, HR, HV and HG

13357-1:2002(E) Petroleum Products—Determination of the filterability of lubricating oils—Part 1: Procedure for oils in the presence of water

13357-2:2005(E) Petroleum Products—Determination of the filterability of lubricating oils—Part 2: Procedure for dry oils

15380:2002 Lubricants, industrial oils and related products (class L)—Family H (Hydraulic systems)—Specifications for categories HETG, HEPG, HEES, and HEPR

4788 Laboratory glassware—Graduated measuring cylinders

¹ This practice is under the jurisdiction of ASTM Committee **D02** on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee **D02.N0.09** on Compatibility.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.