



Petroleum Products

GLYCOLS AND ENGINE COOLANTS

Automotive engine coolants for light duty service are based on ethylene glycol or propylene glycol. They are provided either as concentrates (40 to 70% glycol), or as pre-diluted, ready to use glycol base engine coolants (50 vol% minimum) The specification for engine coolant for heavy-duty use is ASTM D 6210.

ASTM D 3306 specification relates to engine coolants made from new or virgin ingredients. It also applies to coolants made from recycled or reprocessed glycol coolant or from reprocessed industrial source glycol. The glycol for the ASTM D 3306 Specification must meet the freezing point requirements of ASTM D 1177.

There are separate specifications in ASTM D 6471 and ASTM D 6472 for engine coolants prepared from reprocessed and recycled glycols which do not meet the freezing point requirements according to ASTM D 1177. These coolants must be further evaluated to identify the trace metals and other chemical compounds that may be present.

Glycol Base Engine Coolants for Automobile Light Duty Service ASTM D 3306

Test Code	Description
ASTM D 5931	Density and Relative Density of Engine Coolants
ASTM D 1177	Freezing Point of Aqueous Engine Coolants
ASTM D 1120	Boiling Point of Engine Coolants
ASTM D 1119	Ash Content of Engine Coolants and Anti-Rusts
ASTM D 1287	pH of Engine Coolants, Antifreezes and Anti-Rusts
ASTM D 3634	Chloride Ion in Engine Coolants
ASTM D 1123	Water Content by Karl Fischer Method, Antifreeze
ASTM D 1121	Reserve Alkalinity of Engine Coolants and Anti-rusts
ASTM D 1384	Corrosion Test for Engine Coolants
ASTM D 1881	Foaming Tendencies of Engine Coolants
ASTM D 2809	Cavitation Corrosion and Erosion Characteristics of New Aluminum Pumps With Engine Coolants

Applications for glycols also include gas dehydration which is a liquid desiccant system for removal of water from Natural Gas Liquids (NGL). The test package for Rich and Lean glycol identifies the water-rich (wet glycol) and the water-lean (dry glycol) in the dehydration process along with other characteristics. Triethylene glycol (TEG) is most common desiccant although other glycols are sometimes used. The Gas Producers Association (GPA) has a specification for pipeline quality gas that sets the allowed moisture from the dehydration process.

Gas Dehydration, Rich and Lean Glycols

Test Code	Description
Visual	Physical Appearance
EPA 160.1.b	Total Suspended Solids, TSS
EPA 6010B	Inorganics by Atomic Emission Spectroscopy (ICP), includes: Iron
EPA 150.1	pH, 50% Aqueous Solution
ASTM E 203	Water Content by Karl Fischer Method, Engine Coolants
ASTM D 512	Chloride, Inorganic, in Water and Wastewater
ASTM D 1979	Salt, Calculated as Na and Cl
ASTM D 2887.b	Composition Breakdown (C1 to C40) by GC, Sludge

ELECTRICAL INSULATING OILS

There are two types of specifications for electrical insulating oils. These two types are specified:

- Type I Mineral Oil for normal oxidation resistance
- Type II Mineral Oil for greater oxidation resistance.

Specification tests for physical and electrical properties are common to both Types. ASTM D 3487 relates to hydrocarbon based mineral oils that are used in new and existing apparatus for power distribution. They serve as an insulating and cooling medium in apparatus such as transformers, regulators, circuit breakers, switch gear, and associated equipment.

All specifications in ASTM D 3487 apply to new oils. Other test packages are available to monitor the quality of in-service Mineral Oils.

Electrical Insulating Oils, ASTM D 3487	
Qualification Tests for Oils Used in Transformers, Circuit Breakers, Switching Gear	
Test Code	Description
ASTM D 611.a	Aniline Point of Petroleum Products
ASTM D 1500	Color, ASTM Color Scale
ASTM D 92.a	Flash Point, Cleveland Open Cup
ASTM D 971	Interfacial Tension of Oil against Water by the Ring Method
ASTM D 97	Pour Point of Petroleum Oils
ASTM D 1298	API Gravity of Petroleum Products, Hydrometer Method (Density, Relative Density, Specific Gravity)
ASTM D 445.a	Viscosity, Kinematic, at 40°C, cSt
ASTM D 445.b	Viscosity, Kinematic, at 100°C, cSt
ASTM D 1816	Dielectric Breakdown Voltage, VDE Electrodes
ASTM D 2300	Gassing Tendency of Insulating Oils under Electrical Stress
ASTM D 924	Dielectric Constant and Power Factor of Electrical Insulating Liquids, 60 Hz, 25°C
ASTM D 1275.b	Corrosive Sulfur in Electrical Insulating Oil - Part B (48 hrs)
ASTM D 1533	Water Content by Karl Fischer Method, Insulating Liquids
ASTM D 974.a	Acid Number, Color-Indicator Titration (TAN)
ASTM D 2440.b	Oxidation Stability, Mineral Insulating Oil, 72 hr
ASTM D 2112	Oxidation Stability, Mineral Insulating Oils, RPVOT (previously RBOT)
ASTM D 4768	Oxidation Inhibitor in Insulating Oil by Gas Chromatography
Additional Tests	
ASTM D 445.c	Viscosity, Kinematic, at other test temperatures
ASTM D 1524	Visual Examination of Electrical Insulating Oils
ASTM D 4059	PCBs in Insulating Oil by Gas Chromatography
ASTM D 877	Dielectric Breakdown Voltage, Disc Electrodes
ASTM D 3300	Dielectric Breakdown Voltage of Insulating Oils under Impulse Conditions
ASTM D 2440.a	Oxidation Stability, Mineral Insulating Oil, 164 hr
ASTM D 1903	Thermal Expansion of Electrical Insulating Liquids of Petroleum Origin and Askarels
ASTM D 2766	Specific Heat of Liquids and Solids
ASTM D 2717	Thermal Conductivity of Liquids (400°F maximum)

SOLVENTS AND CHEMICAL INTERMEDIATES

A large number of Paint Solvents, Chemical Intermediates, and Aromatic Hydrocarbons are produced in the Texas Gulf Coast region. In addition, traders blend composites of odd lots and end-of-run materials into useful products. We can provide sample containers, courtesy sample pickup, and rapid turnaround for quality control testing for such materials in our Houston laboratory. A sampling of typical test packages is given below.

Methyl Ethyl Ketone, ASTM D 790

Test Code	Description
ASTM D 1613	Acidity in Volatile Solvents and Chemical Intermediates
ASTM D 2804	Purity of Methyl Ethyl Ketone by GC, Includes weight percent Alcohol
ASTM D 1209	Color, APHA, Platinum-Cobalt Scale
ASTM D 1078	Distillation Range of Volatile Organic Liquids
ASTM D 1353	Nonvolatile Matter in Volatile Solvents
ASTM D 4052	Density and Relative Density of Liquids by Digital Density Meter
ASTM D 1364	Water Content by Karl Fischer Method, Volatile Solvents

Dibutyl Phthalate, ASTM D 608

Test Code	Description
ASTM D 4052	Density and Relative Density of Liquids by Digital Density Meter
ASTM D 1209	Color, APHA, Platinum-Cobalt Scale
ASTM D 1296	Odor of Volatile Solvents and Diluents
ASTM D 1364	Water Content by Karl Fischer Method, Volatile Solvents
ASTM D 1613	Acidity in Volatile Solvents and Chemical Intermediates

Acetaldehyde, ASTM D 4710

Test Code	Description
ASTM D 2192	Purity of Aldehydes and Ketones
ASTM D 1209	Color, APHA, Platinum-Cobalt Scale
ASTM D 2086	Acidity in Vinyl Acetate and Acetaldehyde
ASTM D 1353	Nonvolatile Matter in Volatile Solvents

Ultra-clean glass bottles and their mailers specially designed for lubrication oil analyses are available to our clients at no charge. These bottles are provided to ensure that the results are not affected by potential contamination present in ordinary sample containers.

ASPHALTS AND BITUMENS

Cutback Asphalts are made from a base asphalt of selected hardness or viscosity which is dissolved in a solvent of high, medium or low volatility to provide distinct differences for construction purposes among the types. ASTM D 2399 is a standard for the selection of cutback asphalts for various paving and related road construction uses. Thirteen different grades are defined based on rate-of-cure and on viscosity.

Asphalts and Bitumens	
Test Code	Description
ASTM D 402	Distillation of Cut-Back Asphaltic Products
ASTM D 113	Ductility of Bituminous Materials
ASTM D 92.a	Flash Point, Cleveland Open Cup
ASTM D 3143	Flash Point, Tag Open Cup, Cutback Asphalt
ASTM D 5	Penetration, Cone, of Bituminous Materials
ASTM D 4124	Separation of Asphalt into Four Generic Fractions
ASTM D 2042	Solubility of Asphalt in Trichloroethylene
ASTM D 36	Softening Point of Bitumen by Ring-and-Ball
ASTM D 70	Specific Gravity and Density of Semi-Solid Bituminous Materials by Pycnometer Method
ASTM D 2171	Viscosity, Capillary, of Asphalts at 140°F, Poise
ASTM D 2170	Viscosity, Kinematic, of Asphalts at 275°F, cP
ASTM D 6	Volatile Matter, Loss on Heating of Oils and Asphaltic Compounds
AASHTO 102	Xylene Equivalent of Asphalt

Cutback Asphalt for Paving Use, ASTM D 2399 Slow Curing Type, ASTM D 2026 Specification Medium Curing Type, ASTM D 2027 Specification Fast Curing Type, ASTM D 2028 Specification	
Test Code	Description
ASTM D 5	Penetration, Cone, of Bituminous Materials
ASTM D 92.a	Flash Point, Cleveland Open Cup
ASTM D 3143	Flash Point, Tag Open Cup, Cutback Asphalt
ASTM D 95	Water by Distillation, Petroleum Products
ASTM D 113	Ductility of Bituminous Materials
ASTM D 243	Asphalt Residue of Specified Penetration
ASTM D 402	Distillation of Cut-Back Asphaltic Products
ASTM D 2042	Solubility of Asphalt in Trichloroethylene
ASTM D 2170	Viscosity, Kinematic, of Asphalts at 275°F, cP

Prices subject to change without notice.

INVESTIGATIVE STUDIES

The various test packages offered by Texas OilTech Laboratories follow the guidelines of ASTM or a manufacturer's specification when appropriate. We will substitute an analytical procedure that is more accurate (has better detection limits) or is more cost effective, or both. Then the ASTM specified test will be given as an option and identified as the "Referee Test."

At times an ASTM test is withdrawn because of the 5-year rule. However, this test may continue to be specified for other products and even by other ASTM groups. TOL may choose to retain such a test if it has no known problems or we may offer a similar test identified with a TOL method number. TOL method numbers also identify test procedures that have not yet been standardized by any technical group.

Clients bring us a variety of samples that can best be classified as Investigative or Exploratory. They are usually beyond the scope of any single test or single test package. A typical case might be, "What caused this filter to fail?" Such questions demand a broad approach and may involve several analytical procedures or tools to reach a conclusion.

Biofuels represent another class of product for which exact specifications may not be standardized. But a reasonable test package can be proposed based on existing protocols for related materials.

Among these analytical techniques that are available are the Scanning Electron Microscope (SEM), Gas Chromatography, Simulated Distillation, and Elemental Analysis for Trace Metals, as discussed in other sections of this catalog.

Texas OilTech Laboratories will undertake investigative studies for clients in the following areas:

- Fuel Filters
- Unknown Composition Breakdown
- Referee Testing
- Failure Analysis
- Advanced Oil Analysis
- High Temperature Gas Chromatography
- Simulated Distillation
- Composition Breakdown by Gas Chromatography/Mass Spectrometer
- Composition Breakdown by Scanning Electron Microscope
- Polynuclear Aromatic Compounds
- Semi-volatiles per EPA 8270-C
- MSDS Testing (Material Safety Data Sheets)

A detailed quotation can be prepared for investigative studies and we invite your inquiry.