

# Aviation Turbine Fuel Specification Summary

Based on ASTM D 1655



		ASTM Units	Alternate Units	ASTM Method	Significance of Test
<b>COMPOSITION</b>					
Acidity (total mg)	max	0.1 KOH/g	NA	D3242	Acids and bases may corrode metals and / or impair water separation
1. Aromatics	max	25 vol %	NA	D1319	Aromatics: burning highly aromatic fuel generally causes smoke & carbon / soot deposits; required for proper seal swelling to prevent leaks
2. Aromatics	max	26.5 vol %	NA	D6379	
Sulfur, Mercaptan	max	0.003 wt %	NA	D3227	Sulfur Mercaptan damages elastomers (seals) in fuel systems
Sulfur (total)	max	0.3 wt %	NA	D1266 • D2622 • D4294 • D5453	Measures sulfur content for processing purposes; formation of sulfur oxides during combustion may damage metal parts in turbines
<b>VOLATILITY</b>					
Distillation Temperature:					
10% Recovered	max	205 C	401 F	D86	Fuel volatility and ease of vaporization at different temperatures are determined by distillation; affects vapor and entrainment losses, vapor lock, flammability hazards and engine-starting characteristics • 10% distilled temperatures are limited to ensure easy starting • 90% limit excludes heavier fractions that would be difficult to vaporize
50% Recovered	report	report C	NA	D86	
90% Recovered	report	report C	NA	D86	
Final Boiling Point ("End Point" & "EP")	max	300 C	572 F	D86	
Distillation Residue	max	1.5 vol %	NA	D86	
Distillation Loss	max	1.5 vol %	NA	D86	
Flash Point	min	38 C	100.4 F	D56 • D3828	Maximum temperature for fuel handling and storage without serious fire hazard
Density at 15 °C	min/max	775/840 kg/m <sup>3</sup>	51.1/37.0 API	D1298 • D4052	Used for calibration of metering equip and to determine aircraft load weight & range
<b>FLUIDITY</b>					
Freezing Point - Jet A (-47 Jet A-1)	max	-40 C	-40 F	D4529 • D3338 • D4809	Temperature at which flow may be restricted through filter screens to the engine, due to the formation of wax crystals
Viscosity @ -20 °C	max	8 mm <sup>2</sup> /s	NA	D445	Viscosity measures the fuel's resistance to flow; lower temps create more resistance
<b>COMBUSTION</b>					
Net Heat of Combustion	min	42.8 MJ/kg	18401 Btu/lb	D4529 • D3338 • D4809	Amount of energy per mass (weight) of fuel
1. Smoke Point or	min	25 mm	NA	D1322	Indication of smoke (carbon / soot) producing properties (see aromatics)
2. Smoke Point and	min	18 mm	NA	D1322	
Naphthalenes	max	3.0 vol %	NA	D1840	Naphthalenes contribute in producing sooty flame, smoke and thermal radiation
<b>CORROSION</b>					
Copper Strip (2 hrs @ 100 °C)	max	No. 1 ASTM Std.	NA	D130	Ensures that the fuel will not corrode copper components in the fuel system
<b>THERMAL STABILITY</b>					
JFTOT (Filter Pressure Drop @ 260 °C)	max	25 mmHg	3.3 kPa		Stability to oxidation and polymerization
Tube Deposits	<	3 scale	NA		
<b>CONTAMINANTS</b>					
Existent Gum	max	7 mg/100 mL	NA	D381	Indication of contamination by higher boiling oils or particulate matter
Microseparator (MSEP) at point of mfg (70 with conductivity additive)	min	85 M Rating	NA	D3948	Measures the fuel's ability to release entrained or emulsified water when filtered through a coalescing material; low MSEP typically indicates surfactant contamination
<b>OTHER</b>					
Electrical Conductivity only if electrical conductivity additive is used	min/max	50/600 pS/m	NA	D2624	Static electricity may create fire hazards when handling aviation fuels; electrical conductivity additives may be added to reduce risk
<b>FUEL PERFORMANCE ENHANCING ADDITIVES</b>					
Antioxidants	max	24 mg/L	NA		Minimizes degradation of fuel stability due to peroxide formation
Metal Deactivator (5.7 after reblend)	max	2.0 mg/L	NA		Minimizes degradation of fuel stability due to soluble metals: Cu, Fe, Zn, Pb, Cd
Fuel System Icing Inhibitor	min/max	.10/.15 vol %	NA	D5006	Lowers freeze point of water therefore lowers risk of ice crystals plugging fuel system
<b>FUEL HANDLING &amp; MAINTENANCE ADDITIVES</b>					
Conductivity Improver (5.0 after reblend)	max	3.0 mg/L	NA		Helps dissipation of static charge; lowers risk of fire hazard
Leak Detection Additive	max	1 mg/kg	NA		
Biocidal Additives (per agreement)		vol %	NA		
Corrosion Inhibitor/Lubricity Improvers	max	23 mg/L	NA		Minimizes metal-to-metal wear rates & scuffing; may be req'd for ultra-low sulfur fuels