

Attachment B – (A1 Jet Fuel) Product Specification – A1 Jet Fuel

Specifications Type JET A1 -		
COMPONENT	UNIT Min/Max	Test Methods ASTM / IP / GOST
COMPOSITION		
Appearance	C&B (1)	Visual
Colour, Saybolt	Report (2)	D156, D6045
Acidity, Total (mg KOH/g)	Max. 0.10	D3242, IP 354
Aromatics (vol %)	Max. 25.0	D1319, IP 156, GOST R 52063
Sulphur, Total (wt %)	Max. 0.25,	D1266, D1552, D2622, D4294, D5453, IP107, IP 243, IP 336, IP 373, IP 447, GOST R 51947, GOST R 51859
Sulphur, Mercaptan (wt %)	Max. 0.0030 (3)	D3227, IP 342, GOST R 52030
OR Doctor Test	Negative (3)	D4952, IP 30
VOLATILITY		
Distillation Temperature:		D86, IP 123
10% Recovery (°C)	Max. 205.0	
50% Recovery (°C)	Report	
90% Recovery (°C)	Report	
Final BP (°C)	Max. 300.0	
Distillation Residue (vol %)	Max. 1.5	
Distillation Loss (vol %)	Max. 1.5	
Flash Point (°C)	Min. 38.0	D56 (4), D3828, IP170
Density @ 15°C (kg/m3)	775.0 - 840.0	D1298, D4052, IP 160, IP 365, GOST R 51069
FLUIDITY		
Freezing Point (°C)	Max. -47.0 (5)	D2386, D5972, D 7153, IP 16, IP 435, IP 529
Viscosity @ -20°C (cSt)	Max. 8	D445, IP 71
COMBUSTION		
Net Heat of Combustion (MJ/kg)	Min. 42.80 (6)	D3338, D4529, D4809, IP 12, IP 355
Smoke Point (mm)	Min. 25	D1322, IP 57
OR Smoke Point (mm)	Min. 19	D1322, IP57
AND Naphthalenes (vol %)	Max. 3	D1840
CORROSION		
Copper Strip (2h @ 100°C)	Max. No.1	D130, IP 154
THERMAL STABILITY		
JFTOT 6P @ 260°C (mm Hg) Tube Rating (Visual)	Max. 25 Max. <3 (7)	D3241, IP 123
CONTAMINANTS		
Existent Gum	Max. 7 (8)	D381, IP 131
Water Reaction Interface Rating	Max. 1b	D1094
MSEP Rating Fuel without SDA	Min. 85	
Fuel with SDA	Min. 70	
Particulates (mg/dm3)	Max. 1.0 (2)	D5452, IP423
OTHER		
Conductivity (pS/m)	50-600	D2624, IP 274, GOST 25950
Without SDA	Max. 10	
BOCLE Wear Scar Diameter (mm)	Max. 0.85 (9)	D5001
ADDITIVES		
Antioxidant	Optional (24 mg/L max)	
Static Dissipator	Optional (10)	
Lubricity Improver	Optional (11)	

(1) Fuel should be clear, bright, and visually free from solid matter & undissolved water at ambient air temperature.

(2) Applies at point of manufacture.

(3) In the event of a conflict between Sulphur Mercaptan and Doctor Test results, Sulphur Mercaptan shall prevail.

(4) When testing by method D 56, a minimum Flash Point of 40°C applies.

(5) Lower freezing point may be agreed between customer & producer.

(6) When determining the Net Heat of Combustion by ASTM D4529, use equation 1 or Table 1, and when using D3338, use equation 2.

(7) No peacock or abnormal colour deposits allowed.

(8) Air can be used instead of steam as the vaporising agent.

(9) Applies at point of manufacture if fuel contains >95% hydroprocessed material of which >20% has been severely hydroprocessed.

(10) Maximum initial doping is 3mg/L. Upon redoping the fuel, the maximum allowed cumulative concentration is 5mg/L.

(11) Hitec 580 may be injected at 15 - 23mg/L.

Attachment C - (JP54 Jet Fuel)

Product Specification - RP54 Jet Fuel

SPECIFICATION OF AVIATION KEROSENE COLONIAL GRADE 54 JET FUEL (JP54)

PROPERTY	UNIT	RESULT	TEST-IP	METHOD	ASTM
ADDITIVES					
Antioxidant in hydro processed fuel	mg/I	min/max	17/24		
Antioxidant non hydro processed fuel	mg/I	min	24		
Static dissipater first doping ASA-3	mg/I	min	1		
Stadis 450	mg/I	min	3		
COMBUSTION PROPERTIES					
Specific energy, net	mJ/kg	min	18.4		D4808
Smoke point	mm	min	19		D1322
Luminometer number		min	45		D1740
Naphthalene's	% vol	max	3		D1840
COMPOSITION					
Total Acidity	mg KOH/g			354	D3242
Aromatics	% vol	max	0.01	158	D1318
Sulphur, Total	%mass	max	22	107	D1266/2
Sulphur, Mercaptan	%mass	max	0.30	342	D3227
Doctor, test		max	0.003	30	D4952
VOLATILITY					
Initial Boiling Point	Centigrade	max	Report	123	D96
10% vol at C			240		
20% vol at C			Report		
50% vol at C	Centigrade		Report		
80% vol at C			Report		
End point		max	300		
Recovered residuals	% vol.	max	1.5		
Loss	% vol.	max	1.5		
Flash Point	Centigrade	max	42	170/303	D56/382
Density at 15 C	kg/m ²	min/max	776/840	180/385	D1298
LOW TEMPERATURE					
Freezing Point	Centigrade	max	-40	15	D2256
CORROSION					
Corrosion, copper (2hrs at 100C)		max	1	154	D130
Corrosion, silver (4hrs at 50C)		max	1	227	
STABILITY					
Thermal stability control, Temp. 280C	mm/Hg				
Filter pressure, differential		max	323		
Tube deposit rating (visual)		max	25	<3	
CONTAMINATIONS					
Existent Gum		max	7		D361
Water reaction, interface rating	mg/100ml	max	16	131	D1084
Fuel with static dissipater additives		min	75	258	D3648
Fuel without static dissipater additive		min	85		
CONDUCTIVITY					
Electrical conductivity	p3/m		Report		

Attachment D- (D6 Marine Virgin Fuel Oil)

GENERAL PRODUCT SPECIFICATIONS OF VIRGIN FUEL OIL D6

MethodUnits	Test	Result	Unit
ASTMD5002	DensityandRelativeDensityof CrudeOils AverageAPIGravity	29.7(29.7)(Min)	API
ASTMD1298-99	Density@15DegC	0.87(0.8775)(Max)	Kg/t
ASTMD97	Pour Pointof PetroleumProducts Pour Point Pour Point	<-33(-36)(BELOWZERO) <-27.4(-32.8)(BELOW ZERO)	°C °F
ASTMD93-IP34	Pensky-MartensClosedCupFlashPoint CorrectedFlashPoint	117(137)(MIN)	°F
ASTMD4294	SulfurContentin Petroleum ProductsbyEDXRF SulfurContent	0.38(0.385)(MAX)	Wt%
ASTMD445	Kinematic/DynamicViscosity KinematicViscosity@122°F/ 50°C	17.83(18.12)(MAX)	Mm2/s
ASTMD6304	WaterContentbyCoulometric KarlFisherTitration WaterContent	0.20(0.7)(MAX)	Wt%
ASTMD482	Ashfrom PetroleumProducts AverageAsh	0.279(1.007)(MAX)	Wt%
ASTMD2161	Conversionof KinematicViscosity To- SUS/SFS1Sayboltfuoi viscosity122°F	10.9SFS	(MAX)
ASTMD5184	AluminumandSiliconin FuelOils byICP-AESor AAS AluminumContent SiliconContent	102(MAX) 93(MAX)	Mg/kg Mg/kg
ASTMD95	WaterbyDistillation, Vol%	0.70(MAX)	Vol%
ASTMD4530.06	CarbonResidue	1.11(MAX)	Wt%
MethodTestResultUnits			
IP143AsphltenessHeptaneInsolubles			
	AsphalteneContent	0.08	Wt%
IP501DeterminationofAL, Si, V, Ni, Fe, Na, Ca, Zn, P inFuelOil-ICPES			
	Aluminium	372	mg/kg
	Silicon	187	mg/kg
	Sodium	117	mg/kg
	Vanadium	1	mg/kg
	Calcium	779	mg/kg
	Zinc	298	mg/kg
	Phosphorus	4176	mg/kg
	Iron	545	mg/kg

Attachment E (D2 305-82)

SPECIFICATION OF DIESEL GAS OIL D2 GOST 305-82
SPECIFICATION -“GAS OIL (D2)”

D2 GAS OIL L0.2-62, GOST 305-82			
COMPONENT	UNIT	MIN.	MAX.
Density@ 20 deg C	Kg/m ³	0	0,870
Colour			2,0
Flash point, PMCC	deg C (°C)	57	62
Kinematic viscosity @20 deg C	CST	3,0	6,0
Pour point	deg C (°C)	(*)	-10,0
Cloud point	deg C (°C)	(*)	-5,0
Mercaptan sulphur			0,004
Acidity, mg / 1000 cm ³			5
Iodine number	g/100g		6
Ash	%wt		0,01
Total Sulphur	%wt	0,005	0,02
Copper corrosion	3hours@ 50 deg C	(typical)	1 A
CCR on 10% Residues	%wt		0.20
Cetane index		45	
Distillation range:			
- 50% Recovered Volume	deg C (°C)		280
- 90% Recovered Volume	deg C (°C)		360
- Bacteria MBC	Fibred / it		500
- Bacteria CFU	Fibred / it		1000

(*) Summer from March to October (PP - 5.0 degrees C)
 Summer from March to October (CP - 0.0 degrees C)
 Winter from November to February (PP - 10.0 degrees C)
 Winter from November to February (CP - 5.0 degrees C)

(1) The product is guaranteed by Seller not to contain bacteria and other living organism contamination above normal level

Attachment F- (EN590 10PPM Diesel)

PRODUCTS SPECIFICATIONS – DIESEL OIL EN590 (10 ppm)

COMPONENT	METHOD OF ANALYSIS	UNIT	RESULT	
			Min.	Max.
Aspect Color	Visual inspection ASTM D 1500		Clear 2,0	
Density @ 15°	EN ISO 3675:98 / EN ISO 12185:96 / C1:2001	Kg/m ³	820,0	845,0
Flash Point	EN ISO 2719:2002	C°	55(1)	
Distillation: - Recovered @ 150 °C - Recovered @ 250 °C - Recovered @ 350 °C - Recovered at 95%	EN ISO 3405:2000	% vol % vol % vol °C	85,0(2)	2,0 65,0(2) 360,0
C.F.P.P. (summer) (3) C.F.P.P. (winter) (3)	EN 116:1997	°C °C	50,0	-2 -12
CLOUD Point (summer) CLOUD Point (winter)	EN 23015:1994	°C °C	Report 0	
Cetane number	EN ISO 5165:1998	n°	51,0	
Cetane index	EN ISO 4264:1996	Index	46,0	
Viscosity @ 40 °C	EN ISO 3104:1996	mm ² /s	2,00	4,50
Water content	EN ISO 12937:2000	mg/kg		200
Total contamination	EN ISO 12662:2002	mg/kg		15
Sulfur content	EN ISO 20884:2004	mg/kg		10,0
Copper strip corrosion (3 hr at 50 °C)	EN ISO 2160: 1998	Indice	1 st Class	
Carbon residue (on 10% distillation residue)	EN ISO 10370:1995	% weight		0,15
Total acidity	ASTM D 974:2002	mgKOH/g		0,3
Ash content	EN ISO 6245:2002	% weight		0,01
Lubricity, correct wear scar	EN ISO 12156-1:2000	µm		460
Oxidation stability	EN ISO 12205:1996	g/m ³	20	
Electrical conductivity (4)	IP 274; ASTM 2624; ISO 6297	pS/m	50	
Polycyclic aromatic hydrocarbons	EN 12916:2001	%m/m		11,0(6)
Biodiesel content (5)	EN 14078:2003	% vol	4,5	7,0