

EASTERN REFINERY LIMITED
P.O. BOX NO. 35, NORTH POTENGA
CHITTAGONG

SPECIFICATION OF
PETROLEUM PRODUCTS
AS APPROVED BY BSTI (REVISED UPTO MARCH, 2002)

-: REPRODUCED BY :-
QUALITY CONTROL DIVISION

Specification of LIQUEFIED PETROLEUM GAS (LPG)

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1657	Min. 0.55 Max. 0.60
2	Vapour Pressure at 40°C, psi	ASTM D 1267	Max. 213
3	Copper Strip Corrosion (1 hour at 37.8°C)	ASTM D 1838	Max. No. 1
4	Volatility: Evaporation temperature for 95% vol., °C(°F)	ASTM D 1837	Max. 2.2 (Max. 36)
5	Composition, % mole Ethane Propane Butane Pentane & Heavier	ASTM D 2163	--- --- --- ---
6	Total Volatile Sulphur, % mass	ASTM D 2784	Max. 0.02
7	Hydrogen Sulphide	ASTM d 2420/ UOP 212	Nil

Specification of SPECIAL BOILING POINT SOLVENT (SBP)

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	Min. 0.67
2	Colour, Saybolt	ASTM D 156	Min. +25
3	Doctor Test	ASTM D 235	Negative
4	Copper Strip Corrosion (3hour at 50°C)	ASTM D 130	Max. No. 1
5	Aromatic content, % vol	ASTM D 1319	Max. 5.0
6	Sulphur content, % wt	ASTM D 1266/ ASTM D 4294	Max. 0.05
7	Distillation: Initial Boiling Point, °C Final Boiling Point, °C Residue, % vol.	ASTM D 86	Min. 30 Max. 115 Max. 1.5

Specification of NAPHTHA

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	Min. 0.67 Max. 0.74
2	Reid Vapour Pressure at 100°F, psi	ASTM D 323	Max. 12
3	Colour, Saybolt	ASTM D 156	Min. +20
4	Doctor Test	ASTM D 235	Positive
5	Sulphur content, % wt	ASTM D 1266/ ASTM D 4294	Max. 0.075
6	Distillation: Final Boiling Point, °C	ASTM D 86	Max. 180
7	Paraffin content, % vol.	ASTM D 1319	Min. 70.0
8	Olefin content, % vol.	ASTM D 1319	Max. 2.0
9	Aromatic content, % vol.	ASTM D 1319	Max. 15.0
10	Naphthene content, % vol.	UOP 273 - 82	Max. 30.0
11	Lead content, ppb	IP 224	Max. 50

Specification of MOTOR GASOLINE - REGULAR

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	To be reported
2	Colour, visual	---	Orange
3	Reid Vapour Pressure at 38°C, psi	ASTM D 323	Max. 10
4	Copper Strip Corrosion (3 hours at 50°C)	ASTM D 130	Max. No. 1
5	Octane Number, Research method	ASTM D 2699	Min. 80
6	Lead content (as Pb), gm/L	ASTM D 3341	Max. 0.013
7	Oxidation Stability, minutes	ASTM D 525	Min. 240
8	Gum Content, mg/100ml	ASTM D 381	Max. 4
9	Sulphur_total, % mass	ASTM D 1266/ ASTM D 4294	Max. 0.1
10	Doctor Test or Sulphur_mercaptan, % mass	ASTM D 4952 ASTM D 3227/ IP 104	Negative Max. 0.001
11	Distillation: Initial Boiling Point, °C 10% vol. recovery, °C 50% vol. recovery, °C 90% vol. recovery, °C Final Boiling Point, °C Residue, % vol.	ASTM D 86	To be reported Max. 75 { Min. 80 - Max. 125 Max. 180 Max. 210 Max. 2.0

Specification of MOTOR GASOLINE - PREMIUM

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	To be reported
2	Colour, visual	---	Red
3	Reid Vapour Pressure at 38°C, psi	ASTM D 323	Max. 10
4	Copper Strip Corrosion (3 hours at 50°C)	ASTM D 130	Max. No. 1
5	Octane Number, Research method	ASTM D 2699	Min. 95
6	Lead content (as Pb), gm/L	ASTM D 3341	Max. 0.013
7	Oxidation Stability, minutes	ASTM D 525	Min. 240
8	Gum Content, mg/100ml	ASTM D 381	Max. 4.0
9	Sulphur_total, % mass	ASTM D 1266/ ASTM D 4294	Max. 0.1
10	Doctor Test or Sulphur_mercaptan, % mass	ASTM D 4952 ASTM D 3227/ IP 104	Negative Max. 0.001
11	Distillation: Initial Boiling Point, °C 10% vol. recovery, °C 50% vol. recovery, °C 90% vol. recovery, °C Final Boiling Point, °C Residue, % vol.	ASTM D 86	To be reported Max. 75 Min. 80 - Max. 125 Max. 180 Max. 210 Max. 2.0

Specification of MINERAL TURPENTINE (MTT)

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	Min. 0.77
2	Colour, Saybolt	ASTM D 156	Min. +18
3	Flash Point(Abel), °F	IP 170	Min. 85
4	Doctor Test	ASTM D 4952	Negative
5	Copper Strip Corrosion (3 hours at 100°C)	ASTM D 130	Max. No. 1
6	Aromatic content, % vol.	ASTM D 1319	Max. 14.0
7	Gum Content, mg/100ml	ASTM D 381	Max. 5.0
8	Distillation: Initial Boiling Point, °C Final Boiling Point, °C Residue, % vol.	ASTM D 86	Min. 135 Max. 210 Max. 1.5

Specification of
SUPERIOR KEROSENE OIL (SKO)

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	To be reported
2	Colour, Saybolt *	ASTM D 156	Min. +10
3	Char value, mg/Kg	IP 10	---
4	Flash Point(Abel), °C	IP 170	Min. 35
5	Smoke Point, mm	ASTM D 1322	Min. 20
6	Copper Strip Corrosion (3 hours at 100°C)	ASTM D 130	Max. No.1
7	Sulphur_total, % mass	ASTM D 1266 / ASTM D 4294	Max. 0.4
8	Doctor Test	ASTM D 235	---
9	Distillation: Recovery at 200°C, % vol. Recovery at 300°C, % vol. Final Boiling Point, °C	ASTM D 86	Min. 20 --- ---

* Not applicable (As per Govt. decision, dying of SKO with Blue Dye at the rate of 10 mg/L is being continued from 1st July, 2003).

Specification of JET-A1(AVIATION FUEL)

Aviation Fuel Quality Requirements for Jointly Operated Systems (AFQRJOS)
issued by Joint Inspection Group (Issue 25, 5 May 2011)

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	PROPERTIES	TEST METHODS	LIMITS
1	<p>Appearance: Visual</p> <p>Colour Particulate contamination, mg/l Particulate, at point of manufacture, cumulative channel particle counts $\geq 4 \mu\text{m(c)}$ $\geq 6 \mu\text{m(c)}$ $\geq 14 \mu\text{m(c)}$ $\geq 21 \mu\text{m(c)}$ $\geq 25 \mu\text{m(c)}$ $\geq 30 \mu\text{m(c)}$</p>	<p>---</p> <p>ASTM D 156/D 6045 ASTM D 5452/IP 423 IP 564/IP 565</p>	<p>Clear bright and visually free from solid matter and un-dissolved water at normal ambient temperature. Report Max. 1.0</p> <p>Report Report Report Report Report Report</p>
2	<p>Composition: Total Acidity, mg KOH/gm Aromatics, % vol. Or Total Aromatics, % vol. Sulphur_total, % mass Sulphur_mercaptan, % mass Or Doctor Test Refinery Components at Point of Manufacture: Non-Hydroprocessed components, % v/v Hydroprocessed components, % v/v Severely Hydroprocessed components, % v/v Synthetic Components, % v/v</p>	<p>ASTM D 3242/IP 354 ASTM D 1319/IP156 ASTM D 6379/IP436 ASTM D 1266/D 4294 ASTM D 3227/IP342 ASTM D 4952/IP30</p>	<p>Max. 0.015 Max. 25 Max. 26.5 Max. 0.30 Max. 0.0030 Negative</p> <p>Report (incl. nil or 100%) Report (incl. nil or 100%) Report (incl. nil or 100%) Report (incl. nil or 100%)</p>
3	<p>Volatility: Distillation: Initial Boiling Point, °C 10% vol. recovered, °C, 50% vol. recovered, °C 90% vol. recovered, °C Final Boiling Point, °C Residue, % vol. Loss, % vol. Flash Point(Abel), °C Density at 15°C, kg/m³</p>	<p>ASTM D 86/IP123</p> <p>ASTM D 56/IP 170 ASTM D 1298/D 4052</p>	<p>Report Max. 205 Report Report Max. 300 Max. 1.5 Max. 1.5 Min. 38 Min. 775.0 to Max. 840.0</p>
4	<p>Fluidity: Freezing Point, °C Viscosity at -20°C, cst(mm²/sec)</p>	<p>ASTM D 2386/IP16 ASTM D 445/IP71</p>	<p>Max. - 47.0 Max. 8.000</p>

	PROPERTIES	TEST METHODS	LIMITS
5	Combustion: Specific Energy, net MJ/Kg Smoke Point, mm Or Smoke Point, mm And Naphthalenes, % vol.	ASTM D 3338/D 4809 ASTM D 1322/IP 57 ASTM D 1322/IP 57 ASTM D 1840	Min. 42.80 Min. 25.0 Min. 19.0 Max. 3.00
6	Corrosion: Corrosion, Copper Strip, classification (2 hours \pm 5 min. at 100°C \pm 1°C)	ASTM D 130/IP154	Max. 1
7	Stability: Thermal Stability(JFTOT) Control temperature, °C Filter Pressure Differential, mm Hg Tube Deposit Rating(visual)	ASTM D 3241/IP323	260 Max. 25 Less than 3, no peacock or abnormal colour deposits
8	Contaminants: Existent Gum, mg/100ml Micro-separometer(MSEP) rating: Fuel with Static Dissipator Additive Or Fuel without Static Dissipator Additive	ASTM D 381/IP540 ASTM D 3948	Max. 7 Min. 70 Min. 85
9	Conductivity: Electrical Conductivity, pS/m	ASTM D 2624/IP 274	Min. 50 to Max. 600
10	Lubricity: BOCLE wear scar diameter, mm	ASTM D 5001	Max. 0.85
11	Additives: Antioxidant(Topanol), mg/l in hydroprocessed and synthetic fuels(mandatory) in non-hydroprocessed fuels(optional) Metal Deactivator, mg/l (optional) First Doping Cumulative concentration after field re-doping Static Dissipator Additive(Stadis-450), mg/l First Doping Cumulative concentration after field re-doping		Min. 17 to Max. 24 Max. 24 Max. 2.0 Max. 5.7 Max. 3.0 Max. 5.0

Note: Please visit the website at www.jointinspectiongroup.org for detail information about Jet A-1 quality/specification.

Specification of LOW SULPHUR HIGH SPEED DIESEL (LSHSD)

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	To be reported
2	Distillation: 50% vol. recovery, °C 96% vol. recovery, °C	ASTM D 86	Max. 280 Max. 340
3	Cetane Index(calculated)	ASTM D 976	Min. 50
4	Viscosity at 40°C: Kinematic, cst Engler, °E	ASTM D 445	{ Min. 2.3 Max. 4.1 Min. 1.18 Max. 1.30
5	Pour Point, °C	ASTM D 97	Max. -10
6	Carbon Residue(Conradson) on 10% bottom, % wt	ASTM D 189	Max. 0.5
7	Ash Content, % wt	ASTM D 482	Max. 0.02
8	Sulphur Content, % wt	ASTM D 1266 / ASTM D 4294	Max. 0.5
9	Mechanical Impurities	Visual	Nil
10	Water Content, % vol.	ASTM D 95	Nil
11	Flash Point PM(cc), °C	ASTM D 93	Min. 80
12	Copper Strip Corrosion (3 hours at 100°C)	ASTM D 130	Max. No. 1
13	Acid Value, mg KOH/100ml	ASTM D 974	Max. 5
14	Water Soluble Acid & Alkali Content	ASTM D 974	Nil

Specification of HIGH SPEED DIESEL (HSD)

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	Min. 0.82 Max. 0.87
2	Colour, ASTM	ASTM D 1500	Max. 3.0
3	Neutralization Value: Strong Acid No., mg KOH/gm Total Acid No., mg KOH/gm	ASTM D 664/ ASTM D 974	Nil Max. 0.2
4	Ash, % mass	ASTM D 482	Max. 0.01
5	Carbon Residue(Conradson) on 10% bottom, % mass	ASTM D 189	Max. 0.2
6	Cetane Number	ASTM D 613	Min. 45
7	Cetane Index(calculated)	ASTM D 976	Min. 45
8	Pour Point, °C	ASTM D 97	Max. 9(Winter*) Max.12(Summer*)
9	Copper Strip Corrosion (3 hours at 100°C)	ASTM D 130	Max. No. 1
10	Flash Point PM(cc)/ Abel, °C	ASTM D 93 / IP 170	Min. 32
11	Kinematic Viscosity at 38°C, cst	ASTM D 445	Max. 9.0
12	Sulphur_total, % mass	ASTM D 4294	Max. 0.5
13	Sediment, % mass	ASTM D 473	Max. 0.01
14	Water Content, % vol.	ASTM D 95	Max. 0.1
15	Distillation: 90% vol. recovery, °C	ASTM D 86	Max. 375
* - Winter shall be the period from November to February (both months inclusive) and rest of the months of the year shall be called as Summer.			

Specification of JUTE BATCHING OIL (JBO)

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	Min. 0.825
2	Colour, ASTM	ASTM D 1500	Max. 7.0
3	Flash Point PM(cc), °C	ASTM D 93	Min. 100
4	Kinematic Viscosity at 37.8°C, cst	ASTM D 445	Max. 15
5	Pour Point, °C	ASTM D 97	Max. 30
6	Emulsification test	BDS 1448	Shall pass the test
7	Distillation: Initial Boiling Point, °C Final Boiling Point, °C Residue, % vol.	ASTM D 86	Min. 265 Max. 365 Max. 2.0
8	UV Absorbance test: a) Pyrene Content, ppm b) Absorbance per cm in the range of wavelength, µm i) 280-299 ii) 300-319 iii) 320-359 iv) 360-400	US FDA 178.3620	Max. 25 Max. 2.3 Max. 1.2 Max. 0.8 Max. 0.3

Specification of LIGHT DIESEL OIL (LDO)

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	Max. 0.89
2	Neutralization Value: Strong Acid No., mg KOH/gm Total Acid No., mg KOH/gm	ASTM D 664	Nil Max. 0.5
3	Ash Content, % mass	ASTM D 482	Max. 0.02
4	Carbon Residue(Conradson), % mass	ASTM D 189	Max. 2.0
5	Pour Point, °C	ASTM D 97	Max. 12(Winter*) Max. 18(Summer)*
6	Flash Point PM(cc), °C	ASTM D 93	Min. 66
7	Kinematic Viscosity at 38°C, cst	ASTM D 445	Max. 16.0
8	Sediment, % mass	ASTM 473	Max. 0.1
9	Water Content, % vol.	ASTM D 95	Max. 0.25
10	Sulphur_total, % mass	ASTM D 1552/D 4294	Max. 1.8
* - Winter shall be the period from November to February(both months inclusive) and rest of the months of the year shall be called as Summer.			

Specification of HIGH SULPHUR FURNACE OIL (HSFO)

	TESTS	METHOD	LIMIT
1	Density at 15°C, Kg/L	ASTM D 1298	Min. 0.89 Max. 0.96
2	Flash Point PM(cc), °C	ASTM D 93	Min. 66
3	Sediment, % mass	ASTM D 473	Max. 0.25
4	Water Content, % vol.	ASTM D 95	Max. 0.5
5	Kinematic Viscosity at 50°C, cst	ASTM D 445	Min. 45 Max. 180
6	Pour Point, °C	ASTM D 97	Max. 33
7	Sulphur Content, % mass	ASTM D 4294	Max. 3.5
8	Carbon Residue(Conradson), % mass	ASTM D 189	Max. 10
9	Calorific Value, KCal/kg	ASTM D 240	Min. 10250

Specification of BITUMEN (GRADE: 80-100)

	TESTS	METHOD	LIMIT
1	Specific Gravity @ 25°C/25°C	ASTM D 70	Min. 1.01 Max.1.06
2	Penetration at 25°C (100gms, 5 sec.), 0.1mm	ASTM D 5	Min. 80 Max.100
3	Softening Point, °C (Ring & Ball)	ASTM D 36	Min. 44 Max. 55
4	Ductility at 25°C (5cm/ min), cm	ASTM D 113	Min. 100
5	Flash Point (open cup), °C	ASTM D 92	Min. 230
6	Loss on Heating, % wt (at 163°C, 5 hours)	ASTM D 6	Max. 0.5
7	Solubility in Trichloroethylene, % wt or Bitumen Content, % wt	ASTM D 2042 ASTM D 4	Min. 99 Min. 99

Specification of BITUMEN (GRADE: 60-70)

	TESTS	METHOD	LIMIT
1	Specific Gravity @ 25°C/25°C	ASTM D 70	Min. 1.01 Max.1.06
2	Penetration at 25°C (100gms, 5 sec.), 0.1mm	ASTM D 5	Min. 60 Max. 70
3	Softening Point, °C (Ring & Ball)	ASTM D 36	Min. 46 Max. 55
4	Ductility at 25°C (5cm/ min), cm	ASTM D 113	Min. 100
5	Flash Point (open cup), °C	ASTM D 92	Min. 250
6	Loss on Heating, % wt (at 163°C, 5 hours)	ASTM D 6	Max. 0.5
7	Solubility in Trichloroethylene, % wt or Bitumen Content, % wt	ASTM D 2042 ASTM D 4	Min. 99 Min. 99

Specification of BITUMEN (GRADE: 20-30)

	TESTS	METHOD	LIMIT
1	Specific Gravity @ 25°C/25°C	ASTM D 70	Min. 1.01 Max.1.06
2	Penetration at 25°C (100gms, 5 sec.), 0.1mm	ASTM D 5	Min. 20 Max. 30
3	Softening Point, °C (Ring & Ball)	ASTM D 36	Min. 70 Max. 90
4	Ductility at 25°C (5cm/min), cm	ASTM D 113	Min. 0
5	Flash Point (open cup), °C	ASTM D 92	Min. 250

Specification of BITUMEN (GRADE: 10-20)

	TESTS	METHOD	LIMIT
1	Specific Gravity @ 25°C/25°C	ASTM D 70	Min. 1.02 Max.1.07
2	Penetration at 25°C (100gms, 5 sec.), 0.1mm	ASTM D 5	Min. 10 Max. 20
3	Softening Point, °C (Ring & Ball)	ASTM D 36	Min. 80 Max. 95
4	Ductility at 25°C (5cm/min), cm	ASTM D 113	Min. 0
5	Flash Point (open cup), °C	ASTM D 92	Min. 250