

SECTION VII
TECHNICAL SPECIFICATIONS

INDUSTRIAL FUEL OIL SPECIFICATIONS

NPC POWER PLANTS

1. Iligan DP 1 and 2
2. Power Barges 101, 102, 103 and 104
3. Bohol DP 1
4. Panay DP I and III

Property	Unit	ASTM Method	NPC Power Plants Standard Specifications		
			Min.	Max.	
1. Density @ 15°C	OR	kg/L	D-1298		0.9855
2. Kinematic Viscosity @ 50°C	OR	cSt	D-445		230
3. Flash Point	OR	°C (°F)	D-93	60 (140)	
4. Pour Point	OR	°C (°F)	D-97		21 (69.8)
5. Ash	OR	% wt.	D-482		0.05
6. Sulfur	OR	% wt.	D-4294 / D-129		3.0
7. Sediment (by extraction)	OR	% wt.	D-473		0.15
8. Water and Sediment	OR	% vol.	D-1796		0.5
9. Calorific Value, HHV	SA	Btu/lb	D-240 / D-4868	18,500	
LHV		Btu/lb		17,400	
	SA	Btu/lb		17,399 - 17,200	
	OR	Btu/lb		below 17,200	
10. Trace Metals		ppm			
a. Vanadium	OR		D-3605 / D-5863		100
b. Sodium	OR		D-1318 / D-5863		33
c. Aluminum *	OR		D-5184		30
11. Others					
a. Carbon Residue	OR	% wt.	D-4530-85 / D-189		12
b. Free Water	OR	% vol.	Refer to SCC 10.1.c for procedure.		1.0

Note:

OR - Outright Rejection

SA - Subject to Price Adjustment per SCC-11 of the Tender Documents.

* Limit shall apply to Iligan DP-1 & 2 and Panay DP III only.

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Property	Unit	ASTM Method	NORTH LUZON	
			Bataan CCPP	
			Min.	Max.
1. Gravity, API @ 60°F		D-287		12
2. Density @ 15°C	kg/L	D-1298		0.9855
3. Kinematic Viscosity @ 50°C	OR cSt	D-445		230
4. Flash Point	OR °C (°F)	D-93	65.5 (150)	
5. Pour Point	OR °C (°F)	D-97		21 (69.8)
6. Ash	% wt	D-482		0.05
7. Sulfur	OR % wt	D-4294/D-129		3.0
8. Sediment (by extraction)	% wt	D-473		0.15
9. Bottom Sediment & Water	OR % vol	D-1796		0.5
10. Calorific Value, HHV	SA Btu/lb	D-240/D-4868	18,500	
LHV			17,400	
11. Trace Metals	ppmw			
a. Vanadium	OR	D-3605 / D-5863		100
b. Sodium	OR	D-1318 / D-5863		33
c. Calcium			To be reported	
d. Potassium		D-5863	To be reported	
e. Lead		D-5863	To be reported	
f. Zinc		D-5863	To be reported	
g. Nickel		D-5863	To be reported	
12. Others				
a. Carbon Residue	OR % wt	D-4530-85/D-189		12
b. Fuel Bound Nitrogen (FBN)	%wt	D-4629		0.245

Note:

OR - Outright Rejection

SA - Subject to Price Adjustment per SCC-11.

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NPC POWER PLANT

Property	Unit	ASTM Method	MINDANAO		
			PB 117 / PB 118		
			Min.	Max.	
1. Density @ 15°C		kg/L	D-1298		0.991
2. Kinematic Viscosity @ 50°C	OR	cSt	D-445		300
3. Flash Point		°C (°F)	D-93	65 (149)	100 (212)
4. Pour Point		°C (°F)	D-97		30 (86)
5. Ash		% wt	D-482		0.2
6. Sulfur	OR	% wt	D-4294/D-129		3.0
7. Bottom Sediment & Water	OR	% vol	D-1796		1.0
8. Calorific Value, HHV	SA	Btu/lb	D-240/D-4868	18,500	
LHV				17,216	
9. Trace Metals	OR	ppmw			
a. Vanadium			D-3605/D-1548/D-5863		300
b. Sodium			D-1318/D-5863		
c. Aluminum			D-5184		30
10. Others					
a. Carbon Residue (CR)	OR	% wt	D-4530-85		18
b. Asphaltene		% wt	IP-143		<2/3 of CR

Note:

OR - Outright Rejection

SA - Subject to Price Adjustment per SCC-11.

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IPP POWER PLANT

Property	Unit	ASTM Method	IPP - NORTH LUZON	
			Bauang DP	
			Min.	Max.
1. Gravity, API @ 60°F		D-287		
2. Density @ 15°C	kg/L	D-1298		0.9855
3. Kinematic Viscosity @ 50°C	OR cSt	D-445		230
4. Flash Point	OR °C (°F)	D-93	65.5 (150)	
5. Pour Point	°C (°F)	D-97		21 (69.8)
6. Ash	OR % wt	D-482		0.2
7. Sulfur	OR % wt	D-4294/D-129		3.0
8. Sediment (by extraction)	OR % wt	D-473		0.15
9. Bottom Sediment & Water	OR % vol	D-1796		1.0
10 Calorific Value, HHV	SA Btu/lb	D-240/D-4868	18,500	
LHV	OR		17,216	
11 Trace Metals	OR ppmw			
a. Vanadium (V)		D-3605/D-1548/D-5863		100
b. Sodium (Na)		D-1318/D-5863-95		33
c. Aluminum (Al)		AAS		30
12 Others				
a. Carbon Residue (CR)	OR % wt	D-4530-85/D-189		16
b. Asphaltene	OR % wt	IP-143/ASTM D-3279		< 2/3 of CR Max

Note:
OR - Outright Rejection
SA - Subject to Price Adjustment per SCC-11.

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IPP POWER PLANT

				IPP - SOUTH LUZON	
				Malaya TP	
Property		Unit	ASTM Method	Min.	Max.
1 Density @ 15°C		kg/L	D-1298	0.9459	
2 Viscosity @ 50°C	OR	cSt	D-445		280
3 Flash Point	OR	°C (°F)	D-93	65 (149)	
4 Pour Point		°C (°F)	D-97		21 (69.8)
5 Ash	OR	% wt	D-482		0.2
6 Sulfur	OR	% wt	D-4294/D-129		3.0
7 Bottom Sediment & Water	OR	% vol	D-1796		1.0
8 Calorific Value, HHV	SA	Btu/lb	D-240/D-4868	18,500	
9 Trace Metals	OR	ppmw			
a. Vanadium			D-3605/D-5863		100
b. Sodium			D-1318/D-5863		33
10 Others					
a. Carbon Residue (CR)	OR	% wt	D-4530-85/D-189		14
b. Free Water	OR	% vol	Refer to SCC 10.1.c. for procedure.		1.0

Note:

OR - Outright Rejection

SA - Subject to Price Adjustment per SCC-11.

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IPP POWER PLANTS

				IPP - VISAYAS	
Property		Unit	ASTM Method	Naga Plant Complex	
				Min.	Max.
1. Gravity, API @ 60°F			D-287	14	
2. Density @ 15°C		kg/L	D-1298		0.9719
3. Kinematic Viscosity @ 50°C	OR	cSt	D-445		230
4. Flash Point	OR	°C (°F)	D-93	65 (149)	
5. Pour Point		°C (°F)	D-97		21 (69.8)
6. Ash	OR	% wt	D-482		0.05
7. Sulfur	OR	% wt	D-4294/D-129		2.66
8. Sediment (by extraction)	OR	% wt	D-473		0.05
9. Bottom Sediment & Water	OR	% vol	D-1796		0.5
10 Calorific Value, HHV	SA	Btu/lb	D-240/D-4868	18,500	
LHV	OR			17,400	
11 Trace Metals	OR	ppmw			
a. Vanadium			D-3605/D-5863		100
b. Sodium			D-1318/D-5863		33
12 Others					
a. Carbon Residue	OR	% wt	D-4530-85		12
b. Water (by distillation)	OR	% vol	D-95		0.2
c. Free Water	OR	% vol	Refer to SCC 10.1.c. for procedure.		1.0

Note:

Naga Plant Complex includes Cebu Thermal I & II and Cebu Diesel I.
OR - Outright Rejection
SA - Subject to Price Adjustment per SCC-11.

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IPP POWER PLANT

				IPP - MINDANAO	
Property		Unit	ASTM Method	SPPC	
				Min.	Max.
1. Density @ 15°C		kg/L	D-1298		0.9855
2. Kinematic Viscosity @ 50°C	OR	cSt	D-445		300
3. Flash Point	OR	°C (°F)	D-93	65 (149)	
4. Pour Point		°C (°F)	D-97		30 (86)
5. Ash	OR	% wt	D-482		0.2
6. Sulfur	OR	% wt	D-4294/D-129		3.0
7. Bottom Sediment & Water	OR	% vol	D-1796		1.0
8. Calorific Value, HHV	SA	Btu/lb	D-240/D-4868	18,814	
LHV				17,216	
9. Trace Metals	OR	ppmw			
a. Vanadium			D-3605/D-5863		100
b. Sodium			D-1318/D-5863		33
10. Others					
a. Carbon Residue	OR	% wt	D-4530-85/D-189		18

Note:

- OR - Outright Rejection
- SA - Subject to Price Adjustment per SCC-11.

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IPP POWER PLANT

				IPP - MINDANAO	
Property		Unit	ASTM Method	WMPC	
				Min.	Max.
1. Density @ 15°C		kg/L	D-1298		0.9855
2. Kinematic Viscosity @ 50°C	OR	cSt	D-445		300
3. Flash Point		°C (°F)	D-93	65 (149)	100 (212)
4. Pour Point		°C (°F)	D-97		30 (86)
5. Ash		% wt	D-482		0.2
6. Sulfur	OR	% wt	D-4294/D-129		3.0
7. Bottom Sediment & Water	OR	% vol	D-1796		1.0
8. Calorific Value, HHV	SA	Btu/lb	D-240/D-4868	18,814	
LHV				17,216	
9. Trace Metals	OR	ppmw			
a. Vanadium			D-3605/D-1548/D-5863		100
b. Sodium			D-1318/D-5863		33
c. Aluminum			D-5184		
10. Others					
a. Carbon Residue (CR)	OR	% wt	D-4530-85		18
b. Asphaltene		% wt	IP-143		

Note:

- OR - Outright Rejection
- SA - Subject to Price Adjustment per SCC-11.

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INDUSTRIAL DIESEL OIL SPECIFICATIONS

NPC POWER PLANTS

1. Iligan DP 1 and 2
2. Power Barges 101, 102, 103 and 104
3. Bohol DP 1
4. Panay DP I and III

Property		Unit	ASTM Method	NPC Power Plants Standard Specifications	
				Min.	Max.
1. Density @ 15°C	OR	kg/L	D-1298	0.82	0.88
2. Kinematic Viscosity @ 40 °C	OR	cSt	D-445	1.7	5.5
3. Flash Point	OR	°C (°F)	D-93	55 (131)	
4. Pour Point	OR	°C (°F)	D-97		10 (50)
5. Cloud Point	OR	°C (°F)	D-2500		16 (60.8)
6. Ash	OR	% wt.	D-482		0.01
7. Sulfur	OR	% wt.	D-4294 / D-129		0.3
8. Water and Sediment	OR	% vol.	D-2709		0.1
9. Water Content (by distillation)	OR	% vol.	D-95		0.1
10. Calorific Value, HHV	SA	Btu/lb	D-240 / D-4868 /	19,600	
LHV		Btu/lb	D-4809	18,400	
	SA	Btu/lb		18,399 - 18,200	
	OR	Btu/lb		below 18,200	
11. Others					
a. Distillation Temperature 90% Recovery	OR	°C	D-86		370
b. Carbon Residue, 10% Bottoms	OR	% wt.	D-4530-85		0.35
c. Cetane Index	OR		D-976	45	
d. ASTM Colour			D-1500		5.0
e. Sediment (by extraction)	OR	% wt.	D-473		0.01
f. Copper strip corrosion, 3 h at 50 °C			ASTM D-130		No. 1
g. FAME content	OR	% vol.	PNS EN 14078 modified	1.7	
h. Methyl laurate (C12 ME)		% wt.	PNS EN 14331 modified	0.8	
i. Free Water	OR	% vol.	Refer to SCC 10.1.c for procedure.		1.0

Note:

OR - Outright Rejection

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NPC POWER PLANT

Property	Unit	ASTM Method	NORTH LUZON		
			Bataan CCPP		
			Min.	Max.	
1. Density @ 15°C	OR	kg/L	D-1298		0.88
2. Viscosity @ 40 °C	OR	cSt	D-445	1.7	5.5
3. Flash Point	OR	°C (°F)	D-93	55 (131)	
4. Pour Point		°C (°F)	D-97		10 (50)
5. Cloud Point	OR	°C (°F)	D-2500		16 (60.8)
6. Ash		% wt	D-482		0.01
7. Sulfur	OR	% wt	D-4294/D-129		0.3
8. Bottom Sediment & Water	OR	% vol	D-2709		0.1
9. Water Content (by distillation)	OR	% vol	D-95		0.1
10. Calorific Value, HHV	SA	Btu/lb	D-240/D-4868	19,600	
11. Trace Metals	OR	ppmw			
a. Sodium + Potassium			D-3605		1.0
b. Lead + Zinc					1.0
c. Vanadium					0.5
d. Calcium					2.0
e. Nickel					1.0
f. V + Pb + Zn + Ni (sum of heavy metals)					1.0
12. Others					
a. Distillation Temperature 90% Recovery		°C	D-86		Report
b. Carbon Residue, 10% Bottoms	OR	% wt	D-4530		0.35
c. Cetane Index	OR		D-976	45	
d. ASTM Colour			D-1500	5.0	

Note:

OR - Outright Rejection

SA - Subject to Price Adjustment per SCC-11.

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IPP POWER PLANT

				IPP NORTH LUZON	
				Bauang DP	
Property		Unit	ASTM Method	Min.	Max.
1. Density @ 15°C	OR	kg/L	D-1298		0.89
2. Kinematic Viscosity @ 37.8°C	OR	cSt	D-445		6.0
3. Flash Point	OR	°C (°F)	D-93	52 (125)	
4. Cloud Point	OR	°C (°F)	D-2500		20 (68)
5. Ash	OR	% wt	D-482		0.01
6. Sulfur	OR	% wt	D-4294/D-129		0.3
7. Sediment & Water	OR	% vol	D-2709		0.1
8. Calorific Value, HHV	SA	Btu/lb	D-240/D-4868	19,600	
LHV	OR			18,400	
9. Others					
a. Carbon Residue, 10% Bottoms	OR	% wt	D-4530/D-189		0.2
b. Cetane Index	OR		D-976/D-633	40	
c. ASTM Colour			D-1500		5.0
d.. Sediment (by extraction)	OR	% wt	D-473		0.01

Note:

- OR - Outright Rejection
- SA - Subject to Price Adjustment per SCC-11.

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IPP POWER PLANT

Property	Unit	ASTM Method	IPP - SOUTH LUZON	
			Malaya TP	
			Min.	Max.
1. Gravity, API @ 60°F		D-287	41	
2. Density @ 15°C	kg/L	D-1298	0.82	
3. Kinematic Viscosity @ 37.8°C	OR cSt	D-445	1.9	5.8
4. Flash Point	OR °C (°F)	D-93	54 (129.2)	
5. Pour Point	°C (°F)	D-97		10 (50)
6. Cloud Point	OR °C (°F)	D-2500		10 (50)
7. Ash	OR % wt	D-482		0.01
8. Sulfur	OR % wt	D-4294/D-129		0.3
9. Bottom Sediment & Water	OR % vol	D-2709		0.1
10. Water Content (by distillation)	OR % vol	D-95		
11. Calorific Value, HHV	SA Btu/lb	D-240/D-4868	19,000	
LHV	OR	D-4809		
12 Others				
a. Carbon Residue, 10% Bottoms	OR % wt	D-4530-85		0.35
b. ASTM Colour		D-1500		5.0
c. Free Water	OR % vol	Refer to SCC 10.1.c. for procedure.		1.0

Note:

- OR - Outright Rejection
- SA - Subject to Price Adjustment per SCC-11.

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IPP POWER PLANT

				IPP - SOUTH LUZON	
				Ilijan NGPP	
Property		Unit	ASTM Method	Min.	Max.
1. Gravity, API @ 60°F			D-287	41	33
2. Density @ 15°C		kg/L	D-1298	0.82	0.86
3. Kinematic Viscosity @ 37.8°C	OR	cSt	D-445	1.9	5.8
4. Flash Point	OR	°C (°F)	D-93	54 (129.2)	
5. Pour Point		°C (°F)	D-97		10 (50)
6. Cloud Point	OR	°C (°F)	D-2500		16 (60.8)
7. Ash	OR	% wt	D-482		0.01
8. Sulfur	OR	% wt	D-4294/D-129		0.3
9. Bottom Sediment & Water	OR	% vol	D-2709		0.1
10 Water Content (by distillation)	OR	% vol	D-95		0.1
11 Calorific Value, HHV	SA	Btu/lb	D-240/D-4868	19,600 (45,568 KJ/Kg.)	
LHV	OR		D-4809	18,000 (42,000 KJ/Kg.)	
12 Trace Metals	OR	ppmw			
a. Sodium + Potassium			D-3605		1.0
b. Lead					1.0
c. Vanadium					0.5
d. Calcium					2.0
e. Nickel					2.0
f. Ba + Mn + Phosporous					
13 Others					
a. Distillation Temperature 90% Recovery		°C	D-86		360
b. Carbon Residue, 10% Bottoms	OR	% wt	D-4530-85		0.08
c. Cetane Index	OR		D-976	45	
d. ASTM Colour			D-1500		5.0
f. Sediment (by extraction)	OR	% wt	D-473		0.01
g. Free Water	OR	% vol.	Refer to SCC 10.1.c. for procedure.		1.0

Note:

OR - Outright Rejection

SA - Subject to Price Adjustment per SCC-11.

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IPP POWER PLANTS

Property	Unit	ASTM Method	IPP - VISAYAS	
			Naga Plant Complex	
			Min.	Max.
1. Gravity, API @ 60°F		D-287		
2. Density @ 15°C	kg/L	D-1298	0.83	
3. Kinematic Viscosity @ 37.8°C	OR SSU	D-445		40.0
4. Flash Point	OR °C (°F)	D-93	54 (129.2)	
5. Pour Point	°C (°F)	D-97		10 (50)
6. Cloud Point	OR °C (°F)	D-2500		10 (50)
7. Ash	OR % wt	D-482		0.01
8. Sulfur	OR % wt	D-4294/D-129		0.3
9. Bottom Sediment & Water	OR % vol	D-2709		0.1
10. Water Content (by distillation)	OR % vol	D-95		0.1
11. Calorific Value, HHV	SA Btu/lb	D-240/D-4868	19,600	
LHV			19,200	
12. Trace Metals	OR ppm	D-3605		
a. Sodium + Potassium				1.0
b. Lead + Zinc				1.0
c. Vanadium				0.5
d. Calcium				2.0
e. Nickel				1.0
13. Others				
a. Distillation Temperature 90% Recovery	°C	D-86		360
b. Carbon Residue, 10% Bottoms	OR % wt	D-4530		0.1
c. Cetane Index	OR	D-976	45	

Note:

Naga Plant Complex includes Cebu Thermal I & II, Cebu Diesel I and Cebu LBGT 1 & 2.

OR - Outright Rejection

SA - Subject to Price Adjustment per SCC-11.

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INDUSTRIAL DIESEL OIL SPECIFICATIONS

IPP POWER PLANTS

Property	Unit	ASTM Method	IPP MINDANAO			
			SPPC		WMPC	
			Min.	Max.	Min.	Max.
1. Specific Gravity, API @ 60°F		D-287		36		36
2. Density @ 15°C	kg/L	D-1298		0.8448		0.8448
3. Kinematic Viscosity @ 37.8°C	OR cSt	D-445	1.9	5.8	1.9	
4. Flash Point	OR °C (°F)	D-93	54.4 (130)		54.4 (130)	
5. Pour Point	°C (°F)	D-97		10 (50)		10 (50)
6. Cloud Point	OR °C (°F)	D-2500		20 (68)		20 (68)
7. Ash	OR % wt	D-482		0.01		0.01
8. Sulfur	OR % wt	D-4294		0.3		0.3
9. Bottom Sediment & Water	OR % vol	D-2709		0.1		0.1
10. Water Content (by distillation)	OR % vol	D-95		0.1		0.1
11. Calorific Value, HHV	SA Btu/lb	D-240/D-4868	19,532		19,532	
LHV	OR		18,400		18,400	
12. Others						
a. Carbon Residue, 10% Bottoms	OR % wt	D-4530-85		0.1		0.1

Note:

OR - Outright Rejection

SA - Subject to Price Adjustment per SCC-11.