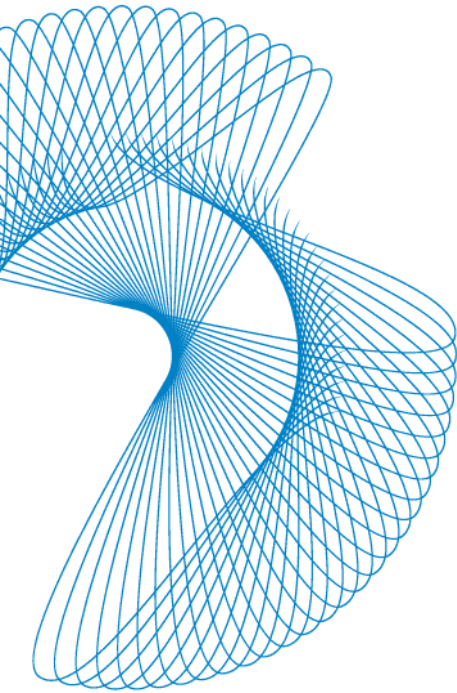


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National Oil Spill Contingency Plan

Chapter 4 – Oil Types and
Characteristics in New Zealand



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Introduction

When oil is spilled at sea it undergoes a number of physical and chemical changes, some of which lead to its disappearance from the sea surface, whilst others cause it to persist. Although spilled oil is eventually assimilated by the marine environment, the time involved depends upon such factors as the amount of oil spilled, its initial physical and chemical characteristics, the prevailing climatic and sea conditions and whether the oil is washed ashore or remains at sea.

This section of the plan outlines the physical and chemical characteristics of the various types of crude and refined oils that are transported around New Zealand either in tankers or in ships' bunkers. It also outlines the computer system that estimates how the characteristics of the spilled oil may change due to weathering and how to identify the window of opportunity for dispersant application.

Types of oil and their characteristics

A number of crude oils enter New Zealand waters to be refined at Marsden Point. Several types of crude oil are extracted from the oil fields onshore and offshore from Taranaki, some of which are transported to Marsden Point for refining and some of which are exported.

Generally, the refined product from Marsden Point is then shipped to the various ports around New Zealand for offloading to tank farms. However, in Whangarei, product is distributed via a Truck Loading Facility which has been established adjacent to the Refinery. Hence, no refined product is offloaded from ships in Whangarei Port. Refined product is also transported indirectly as ships' bunkers.

The general characteristics of the types of crude and refined oils that are a threat to New Zealand waters are outlined in the tables following this page.

Changes in spilled oil characteristics due to weathering

The American National Oceanic and Atmospheric Administration Office of Response and Restoration (NOAA OR&R) has developed an Automated Data Inquiry for Oil Spills (ADIOS). This model is used by the Maritime NZ to predict changes in spilled oil characteristics such as evaporation, dispersion and mousse formation.

The ADIOS system is an initial oil spill response tool for emergency spill responders and contingency planners which is able to be used on a Windows compatible computer. ADIOS integrates a library of approximately one thousand oils with a short-term oil fate model to estimate the amount of time that spilled oil will remain in the marine environment. It predicts changes over time in the density, viscosity, and water content of a specific oil or product, the rate at which it evaporates from the sea surface, and the rate at which an oil-in-water emulsion may form. Hence the package also estimates when the effectiveness of dispersants will be reduced.

The oil types transported around New Zealand waters are registered in the ADIOS library. Therefore, persistence predictions are now able to be made with respect to these oils using the ADIOS system.

The ADIOS package is installed on all of the NOSSC laptops, and is also available on the N.O.A.A. website, www.response.restoration.noaa.gov. ADIOS will be utilised during an oil spill event to estimate the changes in spilled oil characteristics over time, using real time environmental data such as wind speed and wave height.

Port storage of oil

Information regarding oil leaving and entering the ports may be obtained from the resident oil company terminal offices.

General Crude Oil Characteristics

Crude	Country	S.G.	Density API	Pour Point (°C)	Bubble Point (°C)	Viscosity Temp (°C)	Viscosity CST	Flash Point API Method
A960		0.96	16.05	12		0	247.2	148.8
Abu Safah	Saudi Arabia	0.88	28.89		85.2			15.4
Airlie	Australia	0.81	43.41	-18	67	20	2.5	3.4
Al Rayyon	Qatar	0.91	24.85	-9	69	20	55.2	27.3
Al Shaheen	Qatar	0.88	29.09	-42	86	27	13.6	13.3
Alaska North slope	Alaska	0.89	27.47	-24	72	10	40.8	13.5
Anoa	Indonesia	0.80	45.57	16	107	40	2.1	35.3
Arab Extra Light	Saudi Arabia	0.83	38.76	-20.3	75	20	4.5	3.7
Arab Heavy	Saudi Arabia	0.89	27.67	-45	49	10	83.7	6.5
Arab Light	Saudi Arabia	0.86	32.94	<-30	71	10	18.1	6.1
Arab Medium (Banam)	Saudi Arabia	0.88	29.57	-30	55	10	35.2	3.3
Ardjuna	Indonesia	0.85	35.56	24	61	40	3.5	-3.1
Arun	Indonesia	0.76	54.44	-30	43	10	1.2	< -18
Attaka	Indonesia	0.81	43.19	-30		20	1.8	-25.3
Azerbaijan	ColS	0.85	34.68	-3	75	20	15.6	30.5
Bach Ho	Vietnam	0.82	42.12	31	55	20	7904.0	7.0
Badak	Indonesia	0.82	41.42	-12	71	20	2.0	-6.5
Barrow Island	Australia	0.84	37.70	-55	104	10	3.4	1.7
Basrah Light	Iraq	0.85	34.58	-30	59	20	10.7	3.7
Bekapai	Indonesia	0.83	40.02	-12	110	10	3.9	0.0
Belida	Indonesia	0.80	45.15	16	79	27	5.6	5.1
Benchamas Blend	Thailand	0.84	37.19	33	58	40	6.9	-0.4
Bintulu	Malaysia	0.89	28.21	-6	73	40	5.2	11.2
Bolivian Blend	Bolivia	0.76	55.55	-42	55	40	1.1	-42.0
Bontang Exp	Indonesia	0.78	50.80	-23	57	40	0.9	-44.0
Bonny Light (Nigerian Light)	Nigeria	0.85	35.38	9	69	40	3.5	25.2
Bonny Medium (Nigerian Medium)	Nigeria	0.89	26.69	-30	130	20	19.4	53.6
Brass River	Nigeria	0.81	42.98	9	54	40	1.8	-30.0
Brazilian Mix	Brazil	0.84	36.45	-6				
Brent Blend	United Kingdom	0.83	38.98	6	39	20	4.8	-7.1
Brunei Lt	Brunei	0.82	40.41	12	30	40	2.0	-2.6
Buffalo	Australia ?	0.77	52.34	-21	88	40	1.2	-5.3
Bunga Kekwa	Malaysia	0.84	36.55			0	0.0	0.0
Cabinda	Angola	0.86	32.46	15	50	40	68.8	0.8
Canadon Seco	Argentina	0.90	26.60	-6		40	73.0	48.1

Crude	Country	S.G.	Density	Pour Point	Bubble Point	Viscosity Temp	Viscosity	Flash Point
			API	(°C)	(°C)	(°C)	CST	API Method
Challis	Australia	0.83	39.60	-9	71	20	3.0	9.5
Champion	Brunei	0.90	25.37	-51	115	40	6.8	50.0
Cinta	Indonesia	0.86	32.65	39	104	60	18.6	59.4
Clyde Residue		0.91	23.65			0	0.0	0.0
Cooper Basin	Australia	0.78	49.65	9	96	20	2.4	16.0
Cossack	Australia	0.79	47.34	-18	45	20	2.0	-39.4
Dubai	Dubai	0.87	31.14	-21	57	10	17.4	2.1
East Spar	Unknown	0.75	57.80	-55	51	40	0.7	-43.9
Elang	Timor Sea	0.76	53.81	-51	57	20	1.3	-40.9
Enhanced Maui	New Zealand	0.77	52.22	<-24	55	20	0.7	-43.4
Erawan	Thailand	0.75	55.99	-37.2	49	21	0.9	-45.5
Escalante (Cerro Dragon)	Argentina	0.91	23.65	3	135	40	331.0	60.6
Fletcher Blend (Petrocorp)	New Zealand	0.83	38.98	15	38	50	3.3	-30.5
Forcados	Nigeria	0.88	28.69	-6	94	20	13.9	40.8
Forozan Blend	Iran	0.87	30.99	-30	71	30	10.8	4.7
Generic Crude 1 (Low Cloud)	Blend of MIRI, BARR, THEV, CHAM (25%)			30				
Generic Crude 2 (High Cloud)	Blend of LABU, MASA, CHAL, WALI (25%)			37				
Geragai-Makur	Indonesia	0.80	46.49	-33	78			-15.1
Gippsland	Australia	0.79	47.00	9	67	40	2.8	-35.6
Girassol	Angola	0.87	31.71	0	74	50	5.9	18.5
Griffin	Australia	0.76	55.18	-48	53	20	1.2	-40.0
Gulf of Suez	Egypt	0.87	31.71	3	53	20	8.8	6.0
Gullfaks	Norway	0.85	34.77	-18	50	20	4.4	10.0
Handil	Indonesia	0.86	33.42	27	78	40	3.5	0.0
Hydra	Argentina	0.83	38.98	3	61	20	7.4	20.3
Iranian Light	Iran	0.86	33.23	-9	65	10	16.5	3.7
Jabiru	Australia	0.81	42.35	18	73	20	3.7	6.4
Kaji	Indonesia	0.83	39.29		83	38	3.4	-0.8
Kapuni	New Zealand	0.73	61.10	12	37	21	1.2	-59.5
Kerapu	Indonesia	0.80	45.24	30	85	40	3.7	9.5
Khafji	Neutral Zone	0.89	27.26	-22	30.89 or 46.9	10	80.0	-28.9
Khafji Long Res		0.98	12.74	23		60	991.0	0.0

Crude	Country	S.G.	Density	Pour Point	Bubble Point	Viscosity Temp	Viscosity	Flash Point
			API	(°C)	(°C)	(°C)	CST	API Method
Kitina Blend	Congo	0.84	37.27	13	78	40	5.4	14.2
Koch Alberta	Canada	0.86	32.67		56			-3.5
Kutubu	Papua New Guinea	0.81	44.06	2	36	25	1.9	-36.9
Kuwait	Kuwait	0.87	31.31	-21	49	10	23.9	10.6
Labuan	Malaysia	0.87	31.14	15	128	40	2.8	32.4
Lalang	Indonesia	0.83	39.29	33	94	50	6.9	25.5
Laminaria	Australia	0.74	59.90	-54	56	20	0.9	-44.3
Langsa	Indonesia	0.79	46.71	<-45	100			-0.4
Lavan Blend	Iran	0.85	34.02	-12	42	10	14.2	-1.4
Lavan Residue	Unknown	0.96	16.67	46	394			
Legendre	Australia	0.81	43.93	9	58	40	1.7	-14.8
Lower Zakum	Abu Dhabi	0.82	40.43	-21	65	40	2.7	-2.6
Lufeng	China	0.87	31.46	40	227	50	20.2	95.2
Madura Ayu Blend	Indonesia	0.80	46.04	<-36	81			-18.0
Malampaya Condensate	Philippines	0.77	52.51	-36	45	40	0.7	-43.7
Margham	Sharjah	0.77	52.65	-9	42	20	1.2	-46.6
Marib	Yemen	0.82	40.85	-12	50	25	1.7	-10.3
Marib Light	Yemen	0.79	47.61	-48	47	40	1.4	-43.2
Masa	Indonesia	0.82	40.52	-13	131	21	4.8	39.4
Masila	Yemen	0.87	30.58	-33	105	27	16.5	27.5
Maui B	New Zealand	0.74	58.48	-45	34	20	0.7	-61.6
Maui F Sand	New Zealand	0.81	43.19	30	59	30	2.6	-3.5
McKee Blend	New Zealand	0.81	43.56	15	76	40	1.6	-31.1
Medanitos (Rio Negro)	Argentina	0.86	33.73	-3	101	20	15.8	21.9
Mesa	Venezuela	0.88	30.09	-36	100	38	8.3	25.6
Minas	Indonesia	0.85	35.96	36	88	60	8.2	39.9
Miri Lt	Malaysia	0.88	30.21	-12	76	10	10.5	4.0
Mubarras Blend		0.82	40.98	-30	50	30	3.5	-0.5
Mudi Blend	Indonesia	0.84	37.29	27	147	38	5.6	63.6
Murban	Abu Dhabi	0.83	39.81	-9	83	20	4.3	-1.6
Murban Residue		0.92	22.30		383			144.0
Nan Hai Light	China	0.83	39.08	28	96	40	12.2	29.5
Ngatoro Blend	New Zealand	0.84	37.21	24	77			
Ngatoro2	New Zealand	0.87	30.90	27	150			
Nkossa	Congo	0.79	46.60	-9	29	10	9.6	-38.0
NW Shelf	Australia	0.74	59.72	-48	50	20	0.8	-46.5

Crude	Country	S.G.	Density	Pour Point	Bubble Point	Viscosity Temp	Viscosity	Flash Point
			API	(°C)	(°C)	(°C)	CST	API Method
Oman	Oman	0.86	33.61	-30	73	10	31.8	8.3
Oman Residue	Oman	0.93	20.81	6		60	206.9	148.0
Oriente	Equador	0.88	28.93	-3	71	40	13.5	29.8
Oseberg	Norway	0.84	36.07	-3	43	20	7.5	0.5
Oso Condensate	Nigeria	0.79	46.89	18	52	20	2.0	-36.7
Qatar Land	Qatar	0.82	41.27	-9	31	20	4.3	-21.2
Qatar Marine	Halul Island	0.85	35.96	-15	48	40	5.0	-1.6
Qua Iboe (Nig.Lt (Mobil))	Nigeria	0.84	36.21	15	65	40	3.4	-4.0
Pagerungan	Indonesia	0.73	61.41	-54	45			-46.7
Pattani	Thailand	0.82	41.21	24	98	40	4.8	15.9
Pohokura Condensate	New Zealand	0.79	46.71	21	50	40	1.3	-33.9
Rabi	Gabon	0.84	36.63	24	95	40	13.9	47.2
Rang Dong	Unknown	0.84	37.76	30	72	40	9.0	5.5
Rainbow	Canada	0.83	40.02	-17	40	16	8.1	-3.1
Ras Laffan (Summer)	Unknown	0.75	57.19	-35	43	40	0.9	-46.6
Ras Laffan (Winter)	Unknown	0.75	57.80	-35	45	40	0.9	-47.6
Ratawi	Neutral Zone	0.91	24.29	-33	56	50	22.8	25.0
Rincon	Argentina	0.84	36.19	-3	67	38	4.9	18.2
Ruby	Vitenam	0.84	37.39	24	101	40	8.7	7.5
San Sebastian	Argentina	0.82	40.43	-60	37	40	3.4	-46.3
Santa Cruz	Argentina	0.79	48.18	-21	47	10	3.0	-44.9
Sepinggan	Unknown	0.87	30.77	-7	103	21	4.6	20.1
Shaybah Blend	Saudi Arabia	0.83	38.20	-25	84	20	5.3	5.9
Saharan Blend	Algeria	0.80	45.75	-15		10	4.0	
Sirri	Iran	0.87	30.77	-12	42	15	18.0	3.8
SLEB	Brunei	0.85	35.36	9	93	40	2.5	5.1
Stag	Australia	0.94	18.30	-30	286	20	124.0	107.1
Sudanese Blend	Egypt	0.85	34.46	33	151	40	32.8	72.4
Swift	New Zealand	0.80	44.36	27	54			-29.6
Tantawan	Thailand	0.79	47.64	6	53	40	2.2	-3.2
Tapis (Pulai)	Malaysia	0.80	45.82	6	70	40	2.0	0.8
Tapis LSWR		0.88	30.03	45		60	17.8	148.4
Tchatamba Blend	Gabon	0.81	44.08	2	49	16	4.6	-43.2
Tengiz	Kazakhstan	0.79	46.71	-15	65	20	2.1	-19.6
Thevenard	Australia	0.83	39.77	-24	76	20	3.8	3.7
Ukpokiti	Nigeria	0.82	41.89	2	82	16	5.8	1.1

Crude	Country	S.G.	Density API	Pour Point (°C)	Bubble Point (°C)	Viscosity Temp (°C)	Viscosity CST	Flash Point API Method
Umm Shaif	Abu Dhabi	0.84	36.85	-18	60	10	8.1	-2.6
Upper Zakum	Abu Dhabi	0.85	34.37	-30	36	10	15.0	-8.2
Varanus	Australia	0.80	46.04	9	5	38	2.8	-45.3
Vityaz	Sakhalin	0.85	34.58	<-45	85	40	2.4	3.6
Walio	Indonesia	0.85	35.17	0	77	10	32.5	0.5
Widuri Blend	Indonesia	0.86	32.88	42	157	60	19.0	89.9
Wollybutt	Australia	0.78	49.12	-45	97	40	1.2	-0.6
Xi-Jiang	China	0.85	35.23	36	192	50	10.8	73.5
Yetagun	Australia ?	0.75	56.64	<-30	38	40	0.7	-43.6
Yoho	Nigeria	0.83	39.60	18	67	40	3.0	-3.5

Table 1 General Crude Oil Characteristics

NZ Offshore Crude Oil Characteristics

Crude	SOURCE	Age (Hours)	Specific Gravity	Density API	Pour Point (°C)	Wax	Viscosity Temp (°C)	Viscosity CST	Flash Point API Method
Kupe Condensate	Kupe Gas Field	0	0.7821@15°C	49.4	+18.0		18	2	
		1 – 24	0.7890@15°C	47.8	-		-	-	
		24 - 48	0.8404@15°C	36.8	-		-	-	
		Residue	0.8657@15°C	22.2	+48		18	31	
Maari Crude	Maari Field	0	0.838 to 0.855		27	30	30	9.07	
Maui Condensate	Maui A and B Field	0	0.7413 @ 15.5C	59.4 @ 15.5C	< - 51 ^o		38	0.6502	
Pohokura Condensate	Pohokur a Field	0	0.79	46.71	21		30	1.492	-33.9
Tui	Tui Field	0	0.798 @ 15°C	42.9	24		50	2.46	
		14	0.849 @ 15°C		33		50	7.46	
		24	0.857 @ 15°C		36		50	10.2	
		48	0.863 @ 15°C		39		50	15.8	
		96	0.868 @ 15°C		42		50	22.6	

Table 2 New Zealand Off Shore Crude Characteristics

Refined Product Characteristics

Jet A1

Property		Weighted Average	Range Min - Max	Specification
Appearance at 20°C		Passes test		Clear, bright with no visual contamination
Colour, Saybolt		30	30 -- 30	
Total Acidity	mgKOH/g	0.0031	0.0012 -- 0.0062	max. 0.015
Aromatics	% Vol.	17.1	15.3 -- 18.2	8.0 -22.0
Olefins	% Vol.	0.8	0.4 --- 1.2	max. 5.0
Total Sulphur	% mass	0.03	0.00 -- 0.05	max. 0.30
Doctor test				negative
or Mercaptan, Sulphur	% mass	0.0006	0.0001 -- 0.0007	max. 0.002
Flash Point	°C	40.5	39.0 -- 44.5	min. 38
Density @ 15°C	kg/l	0.8003	0.7990 -- 0.8033	0.775 - 0.840
Freezing Point	°C	-58.2	-63.0 -- -56.5	max. -47
Viscosity @ -20°C	cS(mm ² /s)	3.519	3.339 -- 3.606	max. 8.0
Smoke Point	mm	25	23 -- 25	min. 19
Napthalenes	% Vol.	0.04	0.00 -- 1.31	max. 3.0
Water reaction	(interface)			max. 1b
(MSEP) with static dissap.		86	74 -- 99	min 70
Electrical conduct. @26°C	pS/m	253	200 -- 310	50 -450

Table 3 Jet A1

Dual Purpose Kerosene

Property		Weighted Average	Range Min - Max	Specification
Appearance at 20°C		Passes test		Clear, bright with no visual contamination
Colour, Saybolt		30	30 -- 30	min. 23
Total Acidity	mgKOH/g	0.0024	0.0024 -- 0.0024	max. 0.015
Aromatics	% Vol.	19.4	19.4 -- 19.4	8.0 -22.0
Olefins	% Vol.	0.6	0.6 -- 0.6	max. 5.0
Total Sulphur	% mass	0.00	0.00 -- 0.00	max. 0.02
Doctor test				negative
or Mercaptan, Sulphur	% mass	0.0000	0.0000 -- 0.0000	max. 0.002
Flash Point	°C	44.5	44.5 -- 44.5	min. 43
Density @ 15°C	kg/l	0.8023	0.8023 -- 0.8023	0.775 - 0.840
Freezing Point	°C	-51.5	-51.5 -- -51.5	max. -47
Viscosity @ -20°C	cS(mm ² /s)	3.989	3.989 -- 3.989	max. 8.0
Smoke Point	mm	24	24 -- 24	min. 25
Napthalenes	% Vol.	0.04	0.00 -- 1.31	max. 3.0
Water reaction	(interface)			max. 1b
(WSIM) with static dissap.		75	75 -- 75	min 70
Electrical conduct. @26°C	pS/m	380	380 -- 380	50 -450

Table 4 Dual Purpose Kerosene

Heavy Fuel Oil (HFO, Number 6 Fuel Oil, Bunker C)

Property		Weighted Average	Range Min - Max	Specification
Density @ 15°C	kg/l	0.9489	0.947 -- 0.952	max. 0.991
Flash Point	°C	109	107 -- 111	min. 63
Calorific Value, Gross	MJ/kg	43.22	43.1 -- 43.3	min. 41.9
Total Sulphur	% mass	2.25	2.16 -- 2.48	max. 3.5
Kinematic viscosity @ 50°C	cSt	171.4	154 -- 176	90 - 180
Pour Point	°C	1	-3 -- 3	max. 24
Micro Carbon Residue	% mass	15.1	14.3 -- 15.9	max. 18.0
Vanadium Content	mg/kg	80	63 -- 102	max. 150
Sodium Content	mg/kg	28	22 -- 34	max. 70
Ash	% mass	0.03		max. 0.01
Water by Distillation	% Vol.	<0.05		max. 0.75
Sediment by Extraction	% mass	0.01		max. 0.15

Table 5 Heavy Fuel Oil

Automotive Gas Oil (Diesel)

Property		Weighted Average	Range Min - Max	Specification
Density @ 15°C	kg/l	0.8428	0.834 -- 0.854	0.810 - 0.860
85% Recovery @	°C	319.4	309 -- 330	max. 350
Barometer	mm Hg	755.5	736 -- 766	
Colour		L 0.5		max. 3.0
Flash point Pensky Martens	°C	79	71 -- 87	min. 63
Total Sulphur	% mass	0.20	0.09 -- 0.29	max. 0.30
Kinematic viscosity @ 20°C	cSt	-	7 - 13	-
Specific Gravity @ 15°C	°C	-	0.855 - 0.865	-
Cold Filter Plugging Point	°C	-6.1	-7 -- -6	max. -6
Cold Filter Plugging Point	°C	-9.0	-9 -- -9	max. -9
Cloud Point	°C		0 -- 0	max. 4
Cloud Point	°C		0 -- 0	max. 0
Cetane Index		50.7	48.6 -- 52.4	min. 47
Appearance @ 8°C		Passes test		Clear and bright
Corrosion Copper Strip	3h @ 100°C			max. No. 1 strip
Total Acid No.	mg KOH/g			max. 0.5
Ash	% mass			max. 0.01
Water by Distillation	% Vol.			max. 0.05
Sediment by Extraction	% mass			max. 0.01
Ramsbottom carbon on 10% Residuum	% mass	0.00		max. 0.20
Stability test	mg/100ml			max. 1.5

Table 6 Automotive Gas Oil (Diesel)

Light Fuel Oil (LFO)

Property		Weighted Average	Range Min - Max	Specification
Density @ 15°C	kg/l	0.9101	0.908 -- 0.911	max. 0.974
Flash Point	°C	113	107 -- 117	min. 63
Total Sulphur	% mass	1.47	1.41 -- 1.66	max. 2.0
Kinematic viscosity @ 50°C	cSt	30.5	29.8 -- 32.2	14 -- 33
Pour Point	°C	-13	-18 -- -12	max. -6
Micro Carbon Residue	% mass	10.7	10.1 -- 11.6	max. 12.0
Vanadium Content	mg/kg	69	51 -- 103	max. 150
Sodium Content	mg/kg	19	17 -- 22	max. 50
Ash	% mass			max. 0.01
Water by Distillation	% Vol.			max. 0.5
Sediment by Extraction	% mass			max. 0.12

Table 7 Light Fuel Oil

Marine Gas Oil (Diesel)

Property		Weighted Average	Range Min - Max	Specification
Density @ 15°C	kg/l	0.8472	0.845 -- 0.852	0.810 - 0.860
85% Recovery @	°C	340.2	335 -- 345	max. 370
Barometer	mm Hg	753.5	743 -- 761	
Colour		L 0.5		max. 3.0
Flash point Pensky Martens	°C	92	74 -- 107	min. 63
Total Sulphur	% mass	0.26	0.22 -- 0.30	max. 0.30
Kinematic viscosity @ 20°C	cSt	13	-	-
Specific Gravity @ 15°C	°C	0.854	-	-
Cloud Point	°C	-1.2	-2 -- 0	max. 0
Cloud Point	°C			max. 6
Pour Point	°C	0.00	0 -- 0	
Cetane Index		51.9	48.6 -- 53.0	min. 40
Appearance @ 8°C		Passes test		Clear and bright
Corrosion Copper Strip	3h @ 100°C			max. No. 1 strip
Total Acid No.	mg KOH/g			max. 0.5
Ash	% mass			max. 0.01
Water by Distillation	% Vol.			max. 0.05
Sediment by Extraction	% mass			max. 0.01
Ramsbottom carbon on 10% Residuum	% mass	0.00		max. 0.20
Stability test	mg/100ml			max. 1.5

Table 8 Marine Gas Oil (Diesel)

Miscellaneous Products

Premium Unleaded Petrol

Property	Value
Density @ 15°C	0.735
Specific Gravity @ 15°C	0.750 approx.
Pour Point °C	-29 approx.
Viscosity @ 20°C cSt	1.0 approx.

Table 9 Premium Unleaded Petrol

Regular Unleaded Petrol

Property	Value
Density @ 15°C	0.756
Specific Gravity @ 15°C	0.739 approx.
Pour Point °C	-18 approx.
Viscosity @ 20°C cSt	3.0 approx.

Table 10 Regular Unleaded Petrol

Bitumen (no solvent) a.k.a. Asphalt

Property	Value
Kinematic viscosity @ 20°C	solid
Kinematic viscosity @ 70°C	21,000 cSt approx.
Kinematic viscosity @ 130°C	236 cSt
Specific Gravity @ 15°C	0.99 – 1.2
Pour Point °C	+40 – +80

Table 11 Bitumen (no solvent) a.k.a Asphalt

Relationship between temperature and oil viscosity for representative crude and fuel oils

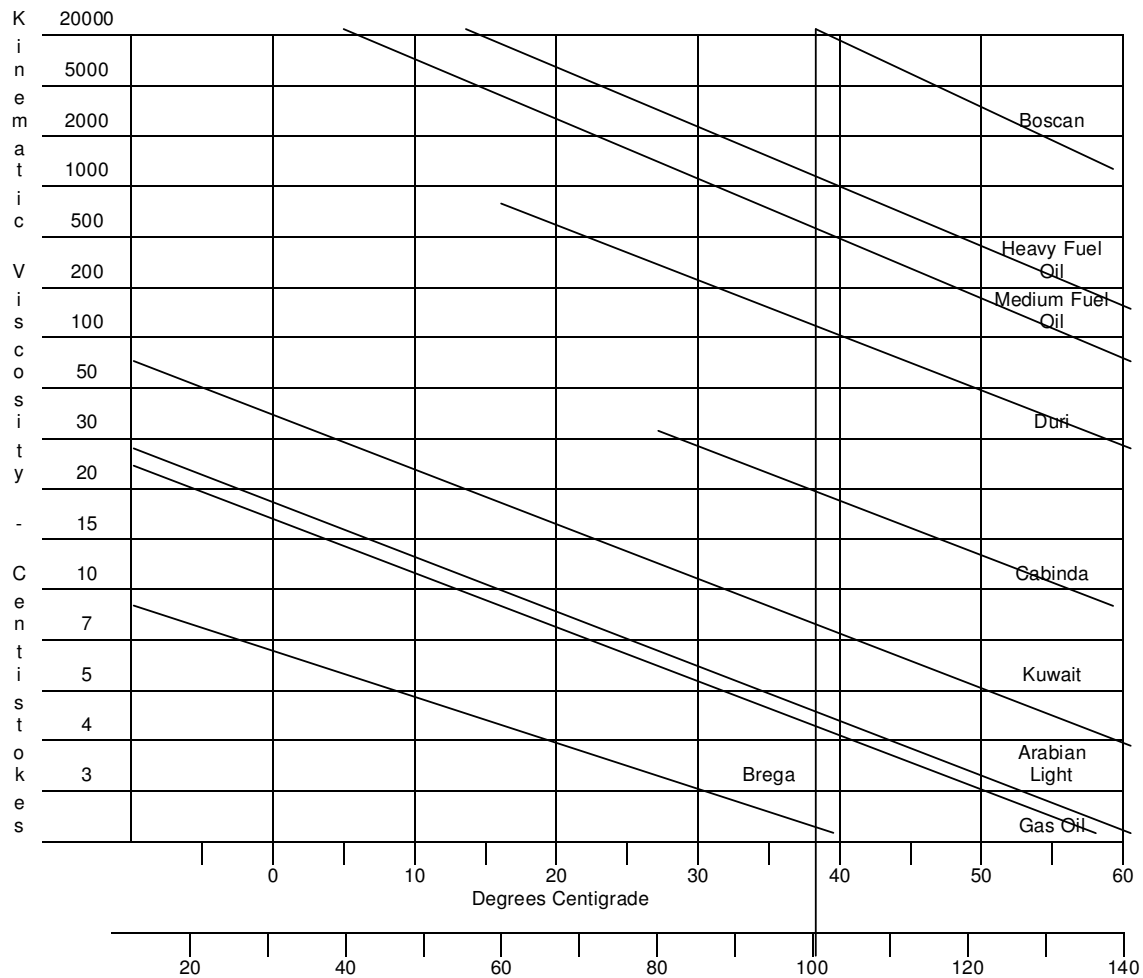


Figure 1 Relationship Between Temperature and oil for representative crude oils and fuel oils

Notes

1. Other oils can be plotted by entering a known viscosity value at the relevant temperature and drawing a line parallel to existing ones.
2. Oils with viscosities exceeding 2000 centistokes at ambient temperature (for example Medium Fuel Oil colder than 20 °C) are unlikely to be amenable to dispersants, except when Corexit 9500 (or higher than normal doses of other dispersants) is to be used.
3. Gas oil is also known as Light Diesel or No. 2 Fuel Oil (ASTM nomenclature) and ranges from 7-9 Centistokes at 38 °C.
4. Medium Fuel Oil is also known as No. 4 Fuel Oil (ASTM nomenclature) and ranges from 225-400 Centistokes at 38 °C.
5. Heavy Fuel Oil is also known as Bunker C or No. 6 Fuel Oil (ASTM nomenclature) and ranges from 900-2500 Centistokes at 38 °C.