

		Data	Notes	Reference ID
High density refinery product which consists of approximately 35% gas oils and 65% Bunker C.				Daling 91
API Gravity				
		19.7		Daling 91
Flash Point (°C)				
<u>Evaporation (weight %)</u>				
0		84		Daling 91
2		99		Daling 91
9		130		Daling 91
Density (g/mL)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	15	0.9350		Daling 91
2		0.9400		Daling 91
9		0.9540		Daling 91
Pour Point (°C)				
<u>Evaporation (weight %)</u>				
0		6		Daling 91
2		0		Daling 91
9		6		Daling 91
Dynamic Viscosity (mPa·s or cP)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	13	236		Daling 91
2		314		Daling 91
9		966		Daling 91
Chemical Dispersibility				
High chemical dispersibility.				Daling 91
Hydrocarbon Groups (weight %)				
<u>Evaporation (weight %)</u>				
9	Saturates	19		Daling 91
	Aromatics	63		Daling 91
	Resins	12		Daling 91
	Asphaltenes	6		Daling 91
	Waxes	3		Daling 91
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	13	26.0		Daling 91
2		26.0		Daling 91
9		30.0		Daling 91

IF-30 Fuel Oil

		Data	Notes	Reference ID
Distillation (°C)	<u>Total Distillate (volume %)</u>			
	3	200		Daling 91
	12	250		Daling 91

IF-30 Fuel Oil (Svalbard)

	Data	Notes	Reference ID
This oil was used for the Svalbard Shoreline Project done in the summer of 1996 at Svalbard, Norway.			
API Gravity	18.3		ESD 96
Equation(s) for Predicting Evaporation			
%Ev = (-0.04 + 0.045T)ln(t) Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)			ESD 98
Sulphur (weight %)	0.61		ESD 97
Flash Point (°C)	87		ESD 96
Density (g/mL)	Temperature (°C)		
	0	0.9555	ESD 96
	15	0.9437	ESD 96
Pour Point (°C)	-12		ESD 96
Dynamic Viscosity (mPa·s or cP)	Temperature (°C)		
	0	3,510	(a) ESD 96
	15	760	ESD 96
(a) slightly non-newtonian			
Adhesion (g/m²)	34	SD = 5	ESD 96
Volatile Organic Compounds (ppm)			
	Benzene	88	ESD 98
	Toluene	163	ESD 98
	Ethylbenzene	114	ESD 98
	Xylenes	599	ESD 98
	C3-benzenes	1,917	ESD 98
	Total BTEX	965	ESD 98
	Total VOCs	2,882	ESD 98
Surface Tension (mN/m or dynes/cm)			
	Temperature (°C)		
	0	32.6	ESD 96
	15	31.6	ESD 96
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)			
	Temperature (°C)		
	0	NM	ESD 96
	15	28.7	ESD 96

IF-30 Fuel Oil (Svalbard)

	Data	Notes	Reference ID
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)			
0	NM		ESD 96
15	30.8		ESD 96
Boiling Point Distribution (weight %)			
<u>Boiling Point (°C)</u>			
160	1		ESD 96
180	2		ESD 96
200	3		ESD 96
250	9		ESD 96
300	15		ESD 96
350	23		ESD 96
400	33		ESD 96
450	48		ESD 96
500	62		ESD 96
550	76		ESD 96
600	86		ESD 96
650	93		ESD 96
700	97		ESD 96

	Data	Notes	Reference ID
Synonyms: IFO 180			
This oil is the same as IFO 180 (SOCSEX), except that the evaporated oils were produced by ESD using rotary evaporation.			
API Gravity			
	14.7		ESD 95
Equation(s) for Predicting Evaporation			
%Ev = $(-0.12 + 0.013T)\sqrt{t}$ Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)			
			ESD 98
Sulphur (weight %)			
<u>Evaporation (weight %)</u>			
0	1.54		ESD 97
8	1.64		ESD 97
Water Content (weight %)			
<u>Evaporation (weight %)</u>			
0	0.1		ESD 98
8	< 0.1		ESD 98
Flash Point (°C)			
<u>Evaporation (weight %)</u>			
0	91		ESD 95
8	> 95		ESD 95
Density (g/mL)			
<u>Evaporation (weight %)</u> <u>Temperature (°C)</u>			
0	0	0.9778	ESD 94
	15	0.9670	ESD 94
8	0	0.9938	ESD 95
	15	0.9840	ESD 95
Pour Point (°C)			
<u>Evaporation (weight %)</u>			
0	-10		ESD 95
8	6		ESD 95
Dynamic Viscosity (mPa·s or cP)			
<u>Evaporation (weight %)</u> <u>Temperature (°C)</u>			
0	0	12,310	ESD 94
	5	6,650	ESD 94
	10	3,647	ESD 94
	15	2,324	ESD 94
8	0	218,000	ESD 95
	15	27,280	ESD 95

Intermediate Fuel Oil 180

		Data	Notes	Reference ID
Emulsion Formation				
<u>Evaporation (weight%)</u>				
0	Visual stability	entrained		ESD 98
	Viscosity (mPa·s)	53,000		ESD 98
	Complex modulus (mPa)	240,000		ESD 98
	Water content (wt %)	69		ESD 98
8	Visual stability	entrained		ESD 98
	Viscosity (mPa·s)	150,000		ESD 98
	Complex modulus (mPa)	610,000		ESD 98
	Water content (wt %)	58		ESD 98
Chemical Dispersibility (volume %)				
<u>Evaporation (weight %)</u>				
0	Corexit 9500	0		ESD 99
8		0	(a)	ESD 99
(a) inferred				
Hydrocarbon Groups (weight %)				
<u>Evaporation (weight %)</u>				
0	Saturates	29		ESD 95
	Aromatics	51		ESD 95
	Resins	11		ESD 95
	Asphaltenes	10		ESD 97
	Waxes	2		ESD 98
8	Saturates	28		ESD 96
	Aromatics	39		ESD 96
	Resins	17		ESD 96
	Asphaltenes	15		ESD 96
	Waxes	2		ESD 98
Adhesion (g/m²)				
<u>Evaporation (weight %)</u>				
0		49	SD = 8	ESD 95
8		129	SD = 13	ESD 96

		Data	Notes	Reference ID
Volatile Organic Compounds (ppm)				
<u>Evaporation (weight %)</u>				
0	Benzene	80		ESD 95
	Toluene	120		ESD 95
	Ethylbenzene	80		ESD 95
	Xylenes	330		ESD 95
	C3-benzenes	1,000		ESD 95
	Total BTEX	620		ESD 95
	Total VOCs	1,620		ESD 95
8	Benzene	0		ESD 96
	Toluene	0		ESD 96
	Ethylbenzene	0		ESD 96
	Xylenes	0		ESD 96
	C3-benzenes	0		ESD 96
	Total BTEX	0		ESD 96
	Total VOCs	0		ESD 96
Surface Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>		<u>Temperature (°C)</u>		
0		0	32.8	ESD 95
		15	31.4	ESD 95
8		0	NM	ESD 95
		15	33.1	ESD 95
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>		<u>Temperature (°C)</u>		
0		0	NM	ESD 95
		15	30.7	ESD 95
8		0	NM	ESD 95
		15	NM	ESD 95
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>		<u>Temperature (°C)</u>		
0		0	NM	ESD 95
		15	37.2	ESD 95
8		0	NM	ESD 95
		15	NM	ESD 95

Intermediate Fuel Oil 180

		Data	Notes	Reference ID
Boiling Point Distribution (weight %)				
<u>Evaporation (weight %)</u>	<u>Boiling Point (°C)</u>			
0	160	1		ESD 94
	180	1		ESD 94
	200	2		ESD 94
	250	12		ESD 94
	300	24		ESD 94
	350	32		ESD 94
	400	39		ESD 94
	450	44		ESD 94
	500	48		ESD 94
	550	52		ESD 94
	600	62		ESD 94
	650	75		ESD 94
	700	86		ESD 94
8	120	1		ESD 95
	140	1		ESD 95
	160	1		ESD 95
	180	1		ESD 95
	200	1		ESD 95
	250	6		ESD 95
	300	18		ESD 95
	350	27		ESD 95
	400	34		ESD 95
	450	39		ESD 95
	500	43		ESD 95
	550	47		ESD 95
	600	56		ESD 95
	650	68		ESD 95
	700	77		ESD 95

Intermediate Fuel Oil 180 (SOCSEX)

		Data	Notes	Reference ID
Synonyms: IFO 180				
This oil was used in the 1994/95 Subsurface Oil in Coarse Sediments Experiment (SOCSEX). The evaporated oils were produced by Coastal and Ocean Resources, using air stripping.				Harper 95
API Gravity		14.7		ESD 94
Density				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	0.9778		ESD 94
	15	0.9670		ESD 94
2	0	0.9795		ESD 95
	15	0.9685		ESD 95
Dynamic Viscosity				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	12,310		ESD 94
	5	6,650		ESD 94
	10	3,647		ESD 94
	15	2,324		ESD 94
2	0	18,820		ESD 95
	5	9,532		ESD 95
	10	5,259		ESD 95
	15	3,232		ESD 95
Hydrocarbon Groups				
<u>Evaporation (volume %)</u>				
0	Saturates	29		ESD 95
	Aromatics	51		ESD 95
	Resins	11		ESD 95
	Asphaltenes	10		ESD 95
2	Saturates	32		ESD 95
	Aromatics	45		ESD 95
	Resins	12		ESD 95
	Asphaltenes	11		ESD 95

Intermediate Fuel Oil 180 (SOCSEX)

		Data	Notes	Reference ID
Volatile Organic Compounds (ppm)				
<u>Evaporation (volume %)</u>				
0	Benzene	70		ESD 94
	Toluene	220		ESD 94
	Ethylbenzene	150		ESD 94
	Xylenes	630		ESD 94
	C3-benzenes	1,630		ESD 94
	Total BTEX	1,070		ESD 94
	Total VOCs	2,700		ESD 94
2	Benzene	50		ESD 94
	Toluene	50		ESD 94
	Ethylbenzene	50		ESD 94
	Xylenes	400		ESD 94
	C3-benzenes	1,450		ESD 94
	Total BTEX	550		ESD 94
	Total VOCs	2,000		ESD 94

Intermediate Fuel Oil 180 (SOCSEX)

		Data	Notes	Reference ID
Boiling Point Distribution (weight %)				
<u>Evaporation (volume %)</u>	<u>Boiling Point (°C)</u>			
0	160	1		ESD 94
	180	1		ESD 94
	200	2		ESD 94
	250	12		ESD 94
	300	24		ESD 94
	350	32		ESD 94
	400	39		ESD 94
	450	44		ESD 94
	500	48		ESD 94
	550	52		ESD 94
	600	62		ESD 94
	650	75		ESD 94
	700	86		ESD 94
2	180	1		ESD 95
	200	2		ESD 95
	250	12		ESD 95
	300	23		ESD 95
	350	31		ESD 95
	400	38		ESD 95
	450	43		ESD 95
	500	46		ESD 95
	550	51		ESD 95
	600	60		ESD 95
	650	73		ESD 95
	700	82		ESD 95

Intermediate Fuel Oil 300

	Data	Notes	Reference ID
Synonyms: IFO 300			
This oil is the same as IFO 300 (SOCSEX), except that the evaporated oils were produced by ESD using rotary evaporation.			
API Gravity			
	11.9		ESD 95
Equation(s) for Predicting Evaporation			
%Ev = $(-0.15 + 0.013T)\sqrt{t}$ Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)			ESD 98
Sulphur (weight %)			
<u>Evaporation (weight %)</u>			
0	1.72		ESD 97
5	1.80		ESD 97
Water Content (weight %)			
<u>Evaporation (weight %)</u>			
0	< 0.1		ESD 98
5	< 0.1		ESD 98
Flash Point (°C)			
<u>Evaporation (weight %)</u>			
0	> 100		ESD 95
5	> 100		ESD 95
Density (g/mL)			
<u>Evaporation (weight %)</u>		<u>Temperature (°C)</u>	
0	0	0.9964	ESD 94
	15	0.9859	ESD 94
5	0	1.0104	ESD 95
	15	0.9996	ESD 95
Pour Point (°C)			
<u>Evaporation (weight %)</u>			
0	-6		ESD 95
5	12		ESD 95
Dynamic Viscosity (mPa·s or cP)			
<u>Evaporation (weight %)</u>		<u>Temperature (°C)</u>	
0	0	128,600	ESD 94
	5	53,770	ESD 94
	10	25,790	ESD 94
	15	14,470	ESD 94
5	0	3,350,000	ESD 95
	15	220,000	ESD 95

Intermediate Fuel Oil 300

		Data	Notes	Reference ID
Emulsion Formation				
<u>Evaporation (weight%)</u>				
0	Visual stability	entrained		ESD 98
	Viscosity (mPa·s)	97,000		ESD 98
	Complex modulus (mPa)	390,000		ESD 98
	Water content (wt %)	52		ESD 98
5	Visual stability	none		ESD 98
Chemical Dispersibility (volume %)				
<u>Evaporation (weight %)</u>				
0	Corexit 9500	0	(a)	ESD 99
5		0	(b)	ESD 99
<i>(a) visual, (b) inferred</i>				
Hydrocarbon Groups (weight %)				
<u>Evaporation (volume %)</u>				
0	Saturates	26		ESD 95
	Aromatics	52		ESD 95
	Resins	12		ESD 95
	Asphaltenes	10		ESD 95
	Waxes	2		ESD 98
5	Saturates	24		ESD 95
	Aromatics	28		ESD 95
	Resins	30		ESD 95
	Asphaltenes	17		ESD 95
	Waxes	2		ESD 98
Adhesion (g/m²)				
<u>Evaporation (weight %)</u>				
0		91	<i>SD = 21</i>	ESD 95
5		358	<i>SD = 35</i>	ESD 95

Intermediate Fuel Oil 300

		Data	Notes	Reference ID
Volatile Organic Compounds (ppm)				
<u>Evaporation (weight %)</u>				
0	Benzene	10		ESD 96
	Toluene	140		ESD 96
	Ethylbenzene	50		ESD 96
	Xylenes	300		ESD 96
	C3-benzenes	780		ESD 96
	Total BTEX	500		ESD 96
	Total VOCs	1,290		ESD 96
5	Benzene	0		ESD 96
	Toluene	10		ESD 96
	Ethylbenzene	0		ESD 96
	Xylenes	0		ESD 96
	C3-benzenes	0		ESD 96
	Total BTEX	10		ESD 96
	Total VOCs	10		ESD 96
Surface Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	72.9		ESD 95
	15	32.6		ESD 95
5	0	NM		ESD 95
	15	NM		ESD 95
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	NM		ESD 95
	15	37.3		ESD 95
5	0	NM		ESD 95
	15	NM		ESD 95
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	NM		ESD 95
	15	NM		ESD 95
5	0	NM		ESD 95
	15	NM		ESD 95

		Data	Notes	Reference ID
Boiling Point Distribution (weight %)				
<u>Evaporation (weight %)</u>	<u>Boiling Point (°C)</u>			
0	180	1		ESD 94
	200	2		ESD 94
	250	8		ESD 94
	300	17		ESD 94
	350	24		ESD 94
	400	32		ESD 94
	450	38		ESD 94
	500	41		ESD 94
	550	46		ESD 94
	600	56		ESD 94
	650	71		ESD 94
	700	82		ESD 94
5	180	1		ESD 95
	200	1		ESD 95
	250	4		ESD 95
	300	13		ESD 95
	350	20		ESD 95
	400	28		ESD 95
	450	34		ESD 95
	500	37		ESD 95
	550	41		ESD 95
	600	50		ESD 95
	650	63		ESD 95
	700	73		ESD 95

Intermediate Fuel Oil 300 (SOCSEX)

		Data	Notes	Reference ID
Synonyms: IFO 300				
This oil was used in the 1994/95 Subsurface Oil in Coarse Sediments Experiment (SOCSEX). The evaporated oils were produced by Coastal and Ocean Resources, using air stripping.				Harper 95
API Gravity				
		11.9		ESD 95
Density				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	0.9964		ESD 94
	15	0.9859		ESD 94
6	0	0.9983		ESD 95
	15	0.9871		ESD 95
Dynamic Viscosity				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	128,600		ESD 94
	5	53,765		ESD 94
	10	25,790		ESD 94
	15	14,470		ESD 94
6	0	227,050		ESD 95
	5	94,770		ESD 95
	10	40,990		ESD 95
	15	22,135		ESD 95
Hydrocarbon Groups				
<u>Evaporation (volume %)</u>				
0	Saturates	26		ESD 95
	Aromatics	52		ESD 95
	Resins	12		ESD 95
	Asphaltenes	10		ESD 95
6	Saturates	27		ESD 95
	Aromatics	47		ESD 95
	Resins	12		ESD 95
	Asphaltenes	14		ESD 95

Intermediate Fuel Oil 300 (SOCSEX)

		Data	Notes	Reference ID
Volatile Organic Compounds (ppm)				
<u>Evaporation (volume %)</u>				
0	Benzene	50		ESD 94
	Toluene	100		ESD 94
	Ethylbenzene	100		ESD 94
	Xylenes	430		ESD 94
	C3-benzenes	1,250		ESD 94
	Total BTEX	670		ESD 94
	Total VOCs	1,920		ESD 94
6	Benzene	0		ESD 94
	Toluene	0		ESD 94
	Ethylbenzene	50		ESD 94
	Xylenes	280		ESD 94
	C3-benzenes	1,000		ESD 94
	Total BTEX	330		ESD 94
	Total VOCs	1,330		ESD 94
Boiling Point Distribution (weight %)				
<u>Evaporation (volume %)</u>	<u>Boiling Point (°C)</u>			
0	180	1		ESD 94
	200	2		ESD 94
	250	8		ESD 94
	300	17		ESD 94
	350	24		ESD 94
	400	32		ESD 94
	450	38		ESD 94
	500	41		ESD 94
	550	46		ESD 94
	600	56		ESD 94
	650	71		ESD 94
	700	82		ESD 94
6	180	1		ESD 95
	200	1		ESD 95
	250	8		ESD 95
	300	17		ESD 95
	350	24		ESD 95
	400	32		ESD 95
	450	38		ESD 95
	500	41		ESD 95
	550	45		ESD 95
	600	56		ESD 95
	650	70		ESD 95
	700	81		ESD 95

IPAR 3

	Data	Notes	Reference ID
IPAR 3 is a synthetic isoparaffin used in drilling muds, compounding, and other materials processing. It is composed of hydrocracked, hydroisomerized, and hydrotreated hydrocarbons, C10-C25.			PetroCan 98
API Gravity	22.2		ESD 98
Sulphur (weight %)	0.00		ESD 99
Flash Point (°C)	> 100		ESD 98
	> 130	(a)	PetroCan 98
(a) open cup			
Ignition Temperature (°C)	235		PetroCan 98
Density (g/mL)	<u>Temperature (°C)</u>		
	0	0.8301	ESD 98
	15	0.8198	ESD 98
	25	0.8130	ESD 98
Pour Point (°C)	-56		ESD 98
Dynamic Viscosity (mPa s or cP)	<u>Temperature (°C)</u>		
	0	11	ESD 98
	15	6	ESD 98
	25	5	ESD 98
Kinematic Viscosity (mm²/s or cSt)	<u>Temperature (°C)</u>		
	40	80 to 120	PetroCan 98
Adhesion (g/m²)	8	SD = 3	ESD 98
Volatile Organic Compounds (ppm)			
	Benzene	7	ESD 99
	Toluene	2	ESD 99
	Ethylbenzene	0	ESD 99
	Xylenes	1	ESD 99
	C3-benzenes	2	ESD 99
	Total BTEX	10	ESD 99
	Total VOCs	13	ESD 99

	Data	Notes	Reference ID
Surface Tension (mN/m or dynes/cm)			
<u>Temperature (°C)</u>			
0	28.5		ESD 00
15	27.9		ESD 98
25	27.1		ESD 00
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)			
<u>Temperature (°C)</u>			
0	26.8		ESD 00
15	27.2		ESD 98
25	28.4		ESD 00
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)			
<u>Temperature (°C)</u>			
0	26.9		ESD 00
15	28.3		ESD 98
25	30.0		ESD 00

Iranian Heavy

		Data	Notes	Reference ID
Origin: Iran				
Data from OGJ 99 were originally published in 1983 as part of a series entitled "Guide to Export Crudes for the '80s".				
API Gravity				
		30.0		ESD 92
		31.0		OGJ 99
Equation(s) for Predicting Evaporation				
%Ev = (2.27 + 0.045T)ln(t) Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)				ESD 96
Sulphur (weight %)				
<u>Evaporation (volume %)</u>				
0		1.20		ESD 93
		1.65		OGJ 99
14		1.88		ESD 93
25		2.22		ESD 93
Flash Point (°C)				
<u>Evaporation (volume %)</u>				
0		-15		ESD 92
14		43		ESD 92
25		> 90		ESD 92
Density (g/mL)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	0.8883		ESD 92
	15	0.8756		ESD 92
14	0	0.9168		ESD 92
	15	0.9046		ESD 92
25	0	0.9372		ESD 92
	15	0.9247		ESD 92
Pour Point (°C)				
<u>Evaporation (volume %)</u>				
0		-22		ESD 92
		-21		OGJ 99
14		-2		ESD 92
25		1		ESD 92

		Data	Notes	Reference ID
Dynamic Viscosity (mPa·s or cP)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	43		ESD 92
	15	20		ESD 92
14	0	274		ESD 92
	15	70		ESD 92
25	0	5,579	(a)	ESD 92
		15,960	(b)	ESD 92
	15	255		ESD 92
<i>Shear rate = (a) 10/s; (b) 1/s</i>				
Kinematic Viscosity (mm²/s or cSt)				
	<u>Temperature (°C)</u>			
	21	17		OGJ 99
	38	9		OGJ 99
Chemical Dispersibility (volume %)				
	Corexit 9500	14		ESD 95
	Corexit 9527	10		ESD 91
	Dasic LTS	5		ESD 91
	Enersperse 700	10		ESD 91
Hydrocarbon Groups (weight %)				
<u>Evaporation (weight %)</u>				
0	Saturates	53		ESD 95
	Aromatics	30		ESD 95
	Resins	11		ESD 95
	Asphaltenes	6		ESD 95
	Waxes	5		ESD 98
14	Saturates	46		ESD 97
	Aromatics	35		ESD 97
	Resins	12		ESD 97
	Asphaltenes	7		ESD 97
	Waxes	5		ESD 98
25	Saturates	44		ESD 97
	Aromatics	36		ESD 97
	Resins	13		ESD 97
	Asphaltenes	7		ESD 97
	Waxes	5		ESD 98
Adhesion (g/m²)				
<u>Evaporation (volume %)</u>				
0		17	SD = 2	ESD 96
14		20	SD = 2	ESD 96
25		23	SD = 3	ESD 96

Iranian Heavy

		Data	Notes	Reference ID
Volatile Organic Compounds (ppm)				
Evaporation (volume %)				
0	Benzene	830		ESD 94
	Toluene	2,520		ESD 94
	Ethylbenzene	1,310		ESD 94
	Xylenes	5,100		ESD 94
	C3-benzenes	7,570		ESD 94
	Total BTEX	9,760		ESD 94
	Total VOCs	17,330		ESD 94
14	Benzene	150		ESD 94
	Toluene	1,750		ESD 94
	Ethylbenzene	900		ESD 94
	Xylenes	3,550		ESD 94
	C3-benzenes	5,550		ESD 94
	Total BTEX	6,350		ESD 94
	Total VOCs	11,900		ESD 94
25	Benzene	0		ESD 94
	Toluene	50		ESD 94
	Ethylbenzene	0		ESD 94
	Xylenes	100		ESD 94
	C3-benzenes	1,480		ESD 94
	Total BTEX	150		ESD 94
	Total VOCs	1,630		ESD 94
Surface Tension (mN/m or dynes/cm)				
Evaporation (volume %)		Temperature (°C)		
0	0	26.4		ESD 92
	15	26.1		ESD 92
14	0	29.9		ESD 92
	15	28.0		ESD 92
25	0	NM		ESD 92
	15	29.5		ESD 92
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
Evaporation (volume %)		Temperature (°C)		
0	0	18.3		ESD 92
	15	22.5		ESD 92
14	0	14.1		ESD 92
	15	20.8		ESD 92
25	0	NM		ESD 92
	15	23.2		ESD 92

		Data	Notes	Reference ID
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	19.0		ESD 92
	15	22.5		ESD 92
14	0	13.5		ESD 92
	15	23.3		ESD 92
25	0	NM		ESD 92
	15	24.7		ESD 92

Iranian Heavy

		Data	Notes	Reference ID
Boiling Point Distribution (weight %)				
<u>Evaporation (volume %)</u>	<u>Boiling Point (°C)</u>			
0	40	2		ESD 94
	60	2		ESD 94
	80	4		ESD 94
	100	6		ESD 94
	120	9		ESD 94
	140	11		ESD 94
	160	15		ESD 94
	180	18		ESD 94
	200	21		ESD 94
	250	28		ESD 94
	300	36		ESD 94
	350	45		ESD 94
	400	53		ESD 94
	450	61		ESD 94
	500	69		ESD 94
	550	76		ESD 94
	600	82		ESD 94
	650	87		ESD 94
	700	91		ESD 94
14	60	1		ESD 96
	80	1		ESD 96
	100	2		ESD 96
	120	3		ESD 96
	140	4		ESD 96
	160	7		ESD 96
	180	11		ESD 96
	200	14		ESD 96
	250	23		ESD 96
	300	33		ESD 96
	350	43		ESD 96
	400	53		ESD 96
	450	63		ESD 96
	500	72		ESD 96
	550	80		ESD 96
	600	87		ESD 96
	650	93		ESD 96
	700	97		ESD 96
25	180	2		ESD 96
	200	4		ESD 96
	250	12		ESD 96
	300	22		ESD 96

		Data	Notes	Reference ID
Boiling Point Distribution (weight %)				
<u>Evaporation (volume %)</u>	<u>Boiling Point (°C)</u>			
25	350	33		ESD 96
	400	43		ESD 96
	450	53		ESD 96
	500	62		ESD 96
	550	70		ESD 96
	600	76		ESD 96
	650	82		ESD 96
	700	87		ESD 96
Yield on Crude (volume %)				
	<u>Boiling Range (°C)</u>			
	C1-C4	2		OGJ 99
	Gasoline (C5-65)	3		OGJ 99
	Light naphtha (65-149)	15		OGJ 99
	Heavy naphtha (149-262)	18		OGJ 99
	Gas oil (262-352)	15		OGJ 99
	Residue (>352)	47		OGJ 99
Metals (ppm)				
	Aluminum	5		Cao 92
	Barium	< 0.3		Cao 92
	Cadmium	< 0.5		Cao 92
	Calcium	83		Cao 92
	Chromium	< 2		Cao 92
	Cobalt	< 1		Cao 92
	Copper	0.6		Cao 92
	Iron	6		Cao 92
	Lead	< 3		Cao 92
	Magnesium	9		Cao 92
	Manganese	< 0.3		Cao 92
	Mercury	< 15		Cao 92
	Molybdenum	< 0.6		Cao 92
	Nickel	23		Cao 92
	Selenium	< 15		Cao 92
	Strontium	< 0.2		Cao 92
	Tin	< 15		Cao 92
	Titanium	< 0.6		Cao 92
	Vanadium	81		Cao 92
	Zinc	< 0.6		Cao 92
Aqueous Solubility (mg/L)				
	<u>Temperature (°C)</u>			
	Room temperature	25	(a)	ESD 92
(a) fresh water				

Iranian Heavy

		Data	Notes	Reference ID
Acute Toxicity of Water Soluble Fraction (mg/L)				
	<u>Test Organism</u>			
48h LC50	Daphnia magna	12	(a)	Harris 94
<i>(a) results based on GC headspace analysis</i>				

	Data	Notes	Reference ID
Origin: Iran			
Data from OGJ 99 were originally published in 1983 as part of a series entitled "Guide to Export Crudes for the '80s".			
API Gravity	33.8		OGJ 99
Sulphur (weight %)	1.35		OGJ 99
Pour Point (°C)	-29		OGJ 99
Kinematic Viscosity (mm²/s or cSt)			
	<u>Temperature (°C)</u>		
	21	11	OGJ 99
	54	4	OGJ 99
Yield on Crude (volume %)			
	<u>Boiling Range (°C)</u>		
	Gasoline (C5-65)	4	OGJ 99
	Light naphtha (65-149)	14	OGJ 99
	Heavy naphtha (149-262)	20	OGJ 99
	Gas oil (262-352)	15	OGJ 99
	Residue (>352)	43	OGJ 99

Issungnak

		Data	Notes	Reference ID
Origin: Beaufort Sea, Canada				
API Gravity		35.0		EETD 86
Equation(s) for Predicting Evaporation				
%Ev = (1.56 + 0.045T)ln(t)				ESD 96
Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)				
Sulphur (weight %)				
<u>Evaporation (volume %)</u>				
0		0.08		EETD 86
15		0.07		EETD 86
25		0.10		EETD 86
Density (g/mL)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	0.8636		EETD 85
	15	0.8490		EETD 84
15	0	0.8806		EETD 85
	15	0.8682		EETD 85
25	0	0.8897		EETD 85
	15	0.8773		EETD 85
Pour Point (°C)				
<u>Evaporation (volume %)</u>				
15		11		EETD 85
25		13		EETD 85
Chemical Dispersibility (volume %)				
Enersperse 700		50		EETD 89
Hydrocarbon Groups (weight %)				
Saturates		92		EETD 86
Aromatics		3		EETD 86
Resins		0		EETD 86
Asphaltenes		0		EETD 89
Volatile Organic Compounds (ppm)				
Benzene		390		ESD 94
Toluene		1,460		ESD 94
Ethylbenzene		730		ESD 94
Xylenes		3,930		ESD 94
C3-benzenes		6,650		ESD 94
Total BTEX		6,500		ESD 94
Total VOCs		13,160		ESD 94

		Data	Notes	Reference ID
Surface Tension (mN/m or dynes/cm)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	31.3		EETD 85
	15	26.2		EETD 85
15	0	NM		EETD 85
	15	27.7		EETD 85
25	0	NM		EETD 85
	15	28.5		EETD 85
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	28.2		EETD 85
	15	16.8		EETD 85
15	0	NM		EETD 85
	15	17.0		EETD 85
25	0	NM		EETD 85
	15	12.5		EETD 85
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	30.7		EETD 85
	15	16.7		EETD 85
15	0	NM		EETD 85
	15	23.4		EETD 85
25	0	NM		EETD 85
	15	21.5		EETD 85
Boiling Point Distribution (weight %)				
	<u>Boiling Point (°C)</u>			
	80	5		ESD 94
	100	7		ESD 94
	120	10		ESD 94
	140	11		ESD 94
	160	12		ESD 94
	180	16		ESD 94
	200	20		ESD 94
	250	35		ESD 94
	300	54		ESD 94
	350	71		ESD 94
	400	82		ESD 94
	450	92		ESD 94
	500	96		ESD 94
	550	98		ESD 94
	600	99		ESD 94

Isthmus

		Data	Notes	Reference ID
Origin: Mexico				
API Gravity		32.0		ESD 97
		32.9		OGJ 00
Equation(s) for Predicting Evaporation				
%Ev = (2.48 + 0.045T)ln(t) Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)				ESD 98
Sulphur (weight %)				
<u>Evaporation (weight %)</u>				
0		1.40		OGJ 00
		1.37		ESD 97
29		1.75		ESD 99
Flash Point (°C)				
<u>Evaporation (weight %)</u>				
0		-13		ESD 97
29		> 95		ESD 98
Reid Vapour Pressure (kPa)				
		46		OGJ 00
Density (g/mL)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	0.8761		ESD 97
	15	0.8602		OGJ 00
		0.8645		ESD 97
	25	0.8601		ESD 98
29	0	0.9352		ESD 98
	15	0.9228		ESD 98
	25	0.9160		ESD 98
Pour Point (°C)				
<u>Evaporation (weight %)</u>				
0		-36		OGJ 00
		-32		ESD 97
29		-3		ESD 98
Dynamic Viscosity (mPa s or cP)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	33		ESD 97
	15	13		ESD 97
	25	10		ESD 98
29	0	1,388	(a)	ESD 98
	15	324		ESD 98
	25	128		ESD 98

(a) slightly non-newtonian

		Data	Notes	Reference ID
Kinematic Viscosity (mm²/s or cSt)				
<u>Temperature (°C)</u>				
	25	9		OGJ 00
Hydrocarbon Groups (weight %)				
<u>Evaporation (weight %)</u>				
0	Saturates	60		ESD 98
	Aromatics	28		ESD 98
	Resins	6		ESD 98
	Asphaltenes	5		ESD 98
		2		OGJ 00
29	Saturates	48		ESD 98
	Aromatics	36		ESD 98
	Resins	9		ESD 98
	Asphaltenes	7		ESD 98
Adhesion (g/m²)				
<u>Evaporation (weight %)</u>				
0		23	<i>SD = 2</i>	ESD 98
29		23	<i>SD = 1</i>	ESD 98
Volatile Organic Compounds (ppm)				
<u>Evaporation (weight %)</u>				
0	Benzene	380		ESD 97
	Toluene	8,541		ESD 97
	Ethylbenzene	1,505		ESD 97
	Xylenes	5,986		ESD 97
	C3-benzenes	8,425		ESD 97
	Total BTEX	16,412		ESD 97
	Total VOCs	24,837		ESD 97
29	Benzene	0		ESD 98
	Toluene	1		ESD 98
	Ethylbenzene	0		ESD 98
	Xylenes	1		ESD 98
	C3-benzenes	26		ESD 98
	Total BTEX	3		ESD 98
	Total VOCs	29		ESD 98
Surface Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	27.5		ESD 97
	15	26.7		ESD 97
	25	26.2		ESD 00
29	0	DNF		ESD 98
	15	30.7		ESD 98
	25	29.9		ESD 00

Isthmus

		Data	Notes	Reference ID
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	23.7		ESD 97
	15	23.0		ESD 97
	25	16.2		ESD 00
29	0	DNF		ESD 98
	15	18.5		ESD 98
	25	15.4		ESD 00
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	22.7		ESD 97
	15	22.1		ESD 97
	25	17.6		ESD 00
29	0	DNF		ESD 98
	15	20.1		ESD 98
	25	16.7		ESD 00

		Data	Notes	Reference ID
Boiling Point Distribution (weight %)				
<u>Evaporation (weight %)</u>	<u>Boiling Point (°C)</u>			
0	40	5		ESD 97
	60	7		ESD 97
	80	10		ESD 97
	100	12		ESD 97
	120	13		ESD 97
	140	16		ESD 97
	160	19		ESD 97
	180	23		ESD 97
	200	27		ESD 97
	250	36		ESD 97
	300	46		ESD 97
	350	56		ESD 97
	400	65		ESD 97
	450	73		ESD 97
	500	81		ESD 97
	550	87		ESD 97
	600	92		ESD 97
	650	96		ESD 97
	700	99		ESD 97
29	250	7		ESD 99
	300	19		ESD 99
	350	33		ESD 99
	400	45		ESD 99
	450	57		ESD 99
	500	67		ESD 99
	550	75		ESD 99
	600	82		ESD 99
	650	87		ESD 99
	700	91		ESD 99
Yield on Crude (volume %)				
	<u>Boiling Range (°C)</u>			
	Naphtha (C5-177)	25		OGJ 00
	Kerosene (177-274)	18		OGJ 00
	Light gas oil (274-344)	12		OGJ 00
	Heavy gas oil (344-538)	27		OGJ 00
	Residue (>538)	17		OGJ 00
Metals (ppm)				
	Nickel	8		OGJ 00
	Vanadium	38		OGJ 00