

Diesel Fuel Oil (Canada)

Reference ID

Synonyms: Automotive Gas Oil

Grade 1-D: straight-run fractions including kerosenes to intermediate distillates from mixed-base crudes; used for mobile service such as trucks, railroads and submarines.

Grade 2-D: similar to Grade 1-D but with lower volatility.; used for industrial and heavy mobile service.

Grade 4-D: residual fuel oils blended with more viscous distillates; used for larger stationary installations.

Data from EETD 85 are for a diesel sample purchased from a service station in the summer of 1984.

Data from Shell 1999 were taken from MSDS Number 322-110.

For additional fuel specifications refer to ASTM D975.

ASTM D 975

API Gravity

39.4

EETD 84

Equation(s) for Predicting Evaporation

Short term (<5 days): %Ev = (0.31 + 0.018T)^{√(t)}

Long term: %Ev = (5.8 + 0.045T)ln(t)

Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)

ESD 96

Sulphur (weight %)

0.10

EETD 86

0.16 (a)

(a) winter diesel

Flash Point (°C)

>40

Shell 99a

Flammability Limits in Air (volume %)

1 to 6

Shell 99a

Ignition Temperature (°C)

250

Shell 99a

Reid Vapour Pressure (kPa)

2

ESD 91

Density (g/mL)

Evaporation
(weight %)

Temperature
(°C)

0

0

0.8380

EETD 84

15

0.8245

ESD 96

<0.876

Shell 99a

25

0.8171

ESD 96

40

0.8063

28

0

0.8450

EETD 89

15

0.8350

Pour Point (°C)

-30

EETD 86

Dynamic Viscosity (mPa·s or cP)

Temperature
(°C)

0

4

EETD 85

15

2

ESD 96

25

2

40

1

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			Reference ID	
Kinematic Viscosity (mm²/s or cSt)	Temperature			
	(°C)			
	40	1.3 to 4.1	Shell 99a	
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Hydrocarbon Groups (weight %)	Waxes	1	ESD 91	
Surface Tension (mN/m or dynes/cm)	Temperature			
	(°C)			
	0	27.7	EETD 84	
	15	26.5	ESD 96	
	25	23.8		
	40	22.7		
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Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)	Temperature			
	(°C)			
	0	28.2	EETD 85	
	15	28.0		
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Oil/Fresh Water Interfacial Tension (mN/m or	Temperature			
	(°C)			
	0	30.1	EETD 85	
	15	29.4		
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(a) estimated				
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Boiling Point Distribution (weight %)	Boiling Point	Weight %		
	(°C)			
	40	1	ESD 95	
	60	1		
	80	1		
	100	1		
	120	1		
	140	3		
	160	11		
	180	23		
	200	34		
	250	65		
	300	91		
	350	99		
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Boiling Point Distribution (°C)	Weight %	Boiling Point		
		(°C)		
	5		ESD 95	
	10			
	15			
	20			
	25			
	30			
	35			
	40			
	45			
	50			
	55			

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Boiling Point Distribution (°C)				Reference ID
	Weight %	Boiling Point (°C)		
	60			ESD 95
	65			
	70			
	75			
	80			
	85			
	90			
	95			
Boiling Range (°C)				Reference ID
		246 to 388		Shell 99a
Metals (ppm)				
	Barium	<0.3		Cao 92
	Chromium	<1.5		
	Copper	<0.6		
	Iron	4.6		
	Lead	<3		
	Magnesium	12.3		
	Molybdenum	<0.6		
	Nickel	<1		
	Titanium	<0.6		
	Vanadium	<0.6		
	Zinc	1.2		
Aqueous Solubility (mg/L)				
	Temperature (°C)			
	20 (approx.)	39	(a)	MacLean 89
	22	3	(a)	Suntio 86
		2	(b) (d)	Murray 84
		8	(b) (e)	
	20 (approx.)	60	(c)	MacLean 89
(a) fresh water; (b) distilled water; (c) salt water (d) Gulf P20 diesel; (e) Gulf P40 diesel				
Acute Toxicity of Water Soluble Fraction (mg/L)				
	Test Organism			
48h EC50	Daphnia magna	4	(a)	MacLean 89
		0	(b)	EETD 89
48h LC50	Artemia spp.	22	(a)	MacLean 89
		1	(b)	EETD 89
	Daphnia magna	7	(a)	MacLean 89
		1	(b)	EETD 89
		Artemia spp.	24	(a)
1	(b)		EETD 89	
Rainbow trout larvae		2	(c)	Lockhart 87
		3	(d)	
(a) results based on fluorescence spectroscopy; (b) results based on GC purge-and-trap analysis; (c) closed container; (d) open container				