TYPIOLDF CARGILLE 12-APR-11

IMMERSION OIL TYPE LDF, CODE 387
n(5893A) 23'C = 1.5150
TYPICAL CHARACTERISTICS

COMPOSITION ..... Polybutenes, Natural Hydrocarbons, Alpha Bromonaphthalene
APPEARANCE ..... Colorless liquid
ODOR ..... Characteristic
COLOR STABILITY ..... In sun: will slowly darken, becoming light yellow after 1 month and developing a haze after 1 1/2 months
INDEX CHANGE RATE BY EVAPORATION .. Low: -0.00007 expected: exposed surface area to volume ratio of 0.2 sq.cm/cc @ 25'C for 32 days
CLOUD POINT 'C ..... <-14
POUR POINT 'C ..... <-14
BOILING POINT 'C @ 760mm Hg ..... >279
FLASH POINT 'C COC 171
DENSITY g/cc @ 23'C 0.984
DENSITY TEMP. COEF. g/cc/'C ..... -0.0006
COEF. OF THERM. EXP. cc/cc/'C 0.0006
VISCOSITY centistokes @ 23'C ..... 500 (aprox. 620 @ 20'C, 410 @ 25'C)
NEUTRALIZATION EQUIVALENT mg KOH/g <0.01 max
FLUORESCENCE (3560 A excitation) .. Extremely low (Cargille # 1-2)
SOLUBLE: Carbon Tetrachloride, Ethyl Ether, Heptane, Methylene Chloride, Naphtha, Toluene, Turpentine, Xylene
INSOLUBLE: Acetone, Ethanol, Galden PFS2, Water
COMPATIBLE: 1 month immersion 25'C: Acrylic, Cellulose Acetate, Epoxy, Mylar, Nylon, Polycarbonate, Polyester, Polyethylene, Polypropylene, Polyurethane, Polyvinyl Chloride, Phenolic, Teflon, Silicone and Fluorosilicone Rubber, Neoprene Rubber, Tygon, Aluminum, Brass, Copper, and Steel (testing 1 example each)
INCOMPATIBLE: Polystyrene, Latex Rubber, Polyvinyl Toluene
TOXICITY ..... Low (request MSDS)

CAUCHY EQUATION: refractive index as a function of wavelength at 23'C
W = wavelength in angstroms (A)
n(W) = 1.497597 + (566539)/W^2 + (1.315063E+12)/W^4

SOURCE OR SPECTRAL LINE	WAVELENGTH (angstroms)	REFRACTIVE INDEX 23'C	% TRANSMITTANCE 25'C 1mm	1cm	10cm
near UV cut off	3400	1.556	93	50	0
i (Hg)	3650	1.548	99	92	43
h (Hg)	4047	1.5371	99	95	60
F' (Cd)	4800	1.5247	100	98	82
F (H)	4861	1.5239	100	99	89
e (Hg)	5461	1.5181	100	100	97
D (Na D1,D2 mean)	5893	1.5150 (1.5143 @25'C)	100	100	98
HeNe laser	6328	1.5126	100	100	98
C' (Cd)	6439	1.5120	100	100	98
C (H)	6563	1.5115	100	100	98
Ruby laser	6943	1.5099	100	100	98
GaAs laser	8400	1.5059	100	100	92
Nd:YAG laser	10648	1.503	100	99	90
Diode	13000	1.501	100	95	63
Diode	15500	1.400	99	86	22

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nF-nC = 0.0125
Abbe vD: (nD-1)/(nF-nC) = 41.3
Temp. coef: dnD/dt 15-35'C = -0.000361

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CARGILLE
IMMERSION OIL TYPE DF, CODE 1261
n(5893A) 23'C = 1.5150
TYPICAL CHARACTERISTICS

COMPOSITION ..... Phthalate Esters and Chlorinated Aliphatic Hydrocarbons
APPEARANCE ..... Colorless liquid
ODOR ..... Very slight
COLOR STABILITY ..... In sun: may slightly darken after 1 year; very slightly more after 6 years
INDEX CHANGE RATE BY EVAPORATION .. Very Low: -0.00002 expected: exposed surface area to volume ratio of 0.2 sq.cm/cc @ 25'C for 32 days
CLOUD POINT 'C ..... <-6'C
POUR POINT 'C ..... -11
BOILING POINT 'C @ 760mm Hg 370
FLASH POINT 'C COC 199
DENSITY g/cc @ 23'C 1.225
DENSITY TEMP. COEF. g/cc/'C ..... -0.0009
COEF. OF THERM. EXP. cc/cc/'C 0.0007
VISCOSITY centistokes @ 23'C ..... 330 (435 @ 20'C, 280 @ 25'C)
NEUTRALIZATION EQUIVALENT mg KOH/g 0.15 max.
FLUORESCENCE (3560 A excitation) .. Very very low (Cargille # 4 max.)
SOLUBLE: Acetone, Carbon Tetrachloride, Ethanol, Ethyl Ether, Freon TF, Heptane, Methylene Chloride, Naphtha, Toluene, Turpentine, Xylene
INSOLUBLE: Water
COMPATIBLE: 10 month immersion 25'C: Acrylic, Cellulose Acetate, Epoxy, Mylar, Nylon, Polyester, Polyethylene, Polypropylene, Polyurethane, Polyvinyl Chloride, Phenolic, Teflon, Silicone and Fluorosilicone Rubber, Latex Rubber, Aluminum, Brass, Copper, and Steel (testing 1 example each)
INCOMPATIBLE: Polycarbonate, Polystyrene, Neoprene Rubber, Tygon
TOXICITY ..... Low (request MSDS)

CAUCHY EQUATION: refractive index as a function of wavelength at 23'C
W = wavelength in angstroms (A)
$n(W) = 1.497540 + (602657.1)/W^2 + (1.130597E+11)/W^4$

SOURCE OR SPECTRAL LINE	WAVELENGTH (angstroms)	REFRACTIVE INDEX 23'C	% TRANSMITTANCE 25'C 1mm	1cm	10cm
near UV cut off	3100	1.561	80	11	0
i (Hg)	3650	1.543	98	81	12
h (Hg)	4047	1.5348	99	95	59
F' (Cd)	4800	1.5239	100	99	90
F (H)	4861	1.5232	100	99	90
e (Hg)	5461	1.5179	100	99	93
D (Na D1,D2 mean)	5893	1.5150 (1.5142 @25'C)	100	100	97
HeNe laser	6328	1.5127	100	100	98
C' (Cd)	6439	1.5121	100	100	99
C (H)	6563	1.5116	100	100	99
Ruby laser	6943	1.5101	100	100	99
GaAs laser	8400	1.5061	100	100	96
Nd:YAG laser	10648	1.503	100	97	77
Diode	13000	1.501	99	95	60
Diode	15500	1.500	99	89	31

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nF-nC = 0.0117
Abbe vD: (nD-1)/(nF-nC) = 44.2
Temp. coef: dnD/dt 15-35'C = -0.000390

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