

CARGILLE LABORATORIES

55 Commerce Road • Cedar Grove • New Jersey • 07009 – 1289 USA

Ph: 973-239-6633 • Fax: 973-239-6096 • CargilleLabs@cargille.com • www.cargille.com

TCWMO37

WATER MATCHING OIL 37°C CODE 3421

30-NOV-17

$n(589.3\text{nm})_{37^\circ\text{C}} = 1.3310$

TYPICAL CHARACTERISTICS

<u>COMPOSITION</u>	Perfluorocarbon and Chlorofluorocarbon (does not contain types of CFC thought to affect the ozone)
<u>APPEARANCE</u>	Colorless liquid
<u>COLOR STABILITY IN DIRECT SUN</u>	No visible change after 10 years
<u>INDEX CHANGE RATE BY EVAPORATION</u>	Moderate: -0.00030 to +0.00009 expected Exposed surface area to volume ratio of 0.2 cm ² /cc @ 25°C for 32 days
<u>ODOR</u>	None
<u>POUR POINT</u> °C	< -20
<u>BOILING POINT</u> °C @ 760mm Hg	>215
<u>FLASH POINT</u> °C C.O.C.	None
<u>DENSITY</u> g/cc @ 25°C	1.926
<u>DENSITY TEMP. COEFFICIENT</u> g/cc/°C	-0.0020
<u>COEF. OF THERM. EXP.</u> cc/cc/°C	0.0010
<u>THERMAL CONDUCTIVITY</u> @ 25°C cal/sec/cm ² /°C – 1 cm thickness	0.00025 (0.105 watts/meter/°K)
<u>VISCOSITY</u> centistokes @ 25°C	15
<u>SURFACE TENSION</u> dynes/cm @ 25°C	18
<u>DIELECTRIC CONSTANT</u> @ 1000cps 25°C	2.19
<u>SOLUBLE:</u>	Galden PFS2, Fluoroclean HE, Chlorofluorocarbons
<u>PARTLY SOLUBLE:</u>	Most Organic Solvents (to remove from glass use tissue & Acetone)
<u>INSOLUBLE:</u>	Ethanol, Water
<u>COMPATIBLE</u>	10-month immersion at 25°C: Acrylic, Cellulose Acetate, Epoxy, Mylar, Nylon, Polycarbonate, Polyester, Polyethylene, Polypropylene, Polystyrene, Polyurethane, Polyvinyl Chloride, Phenolic, Teflon; Latex, Neoprene, Fluorosilicone (Silastic 730 RTV), Silicone (Sylgard 184, 3140 RTV) Rubbers; Tygon F-4040-A, Tygothane, Copper, Brass, Steel; (tests done on one example of each).
<u>INCOMPATIBLE:</u>	Burna-S, Natural, and some Silicone Rubbers; Tygon types: S-50-HL, R-3603, B-44-3; Chlorotrifluoro Ethylene Polymers, Aluminum

The above values are typical for this liquid and are calculated from values typical of its components

CAUCHY EQUATION: refractive index as a function of wavelength at 37.0°C

W = wavelength (nm)

$$n(W) = 1.3249201 + (2.1034804E+03) / W^2 + (3.4117299E+06) / W^4$$

SOURCE OR SPECTRAL LINE	WAVELENGTH (nm)	REFRACTIVE INDEX 37°C	% TRANSMITTANCE 25°C		
			0.1 mm	1 mm	1 cm
Near UV cut off	240	1.36	99	92	41
excimer	248	1.36	99	95	59
excimer	308	1.347	100	99	94
N laser	337	1.344	100	100	97
l (Hg)	365	1.3409	100	100	98
F (H)	486.1	1.3339	100	100	100
e (Hg)	546.1	1.3320	100	100	100
D (Na D1, D2 mean)	589.3	1.3310	100	100	100
HeNe laser	632.8	1.3302	100	100	100
C (H)	656.3	1.3298	100	100	100
GaAs laser	840	1.3279	100	100	100
Nd: YAG laser	1064.8	1.3268	99	100	100
Diode	1300	1.326	100	100	100
Diode	1550	1.326	100	100	99
near end max %T	2500	1.33	100	99	90
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$n_F - n_C$	=	0.0041			
Abbe $v_D: (n_D - 1)/(n_F - n_C)$	=	81.5			
Temp. coef: dn_D/dt 15 - 35°C	=	-0.000338			

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