

SubmergeDeep® SD-100 Series Pressure Compensation Fluids

Pressure Compensation, Electrical Insulation and Cooling

Engineered Fluids' SubmergeDeep Pressure Compensation Fluids are biodegradable, non-toxic dielectric fluids for use in submarine pressure compensating and water displacement applications. SubmergeDeep features excellent optical clarity, low thermal expansion, low compressibility, high dielectric strength, and low environmental impact.

INDUSTRIES SERVED:

Undersea Oil and Gas Exploration and Production • Undersea Wireline and Fiberoptic Communications • Marine Remotely Operated Vehicles and Robotics • Undersea Video, Optics & Illumination • Dive & Specialty Watches • Military Robotics

KEY PROPERTIES:

Low Coefficient of Expansion • Very Low Compressibility • Biodegradable • Non-Toxic High Dielectric Strength • Excellent Water Displacement, High Oxidation Stability • Inhibits and Suppresses Corrosion • Superior Optical Clarity

PRODUCT OVERVIEW:

Engineered Fluids' SubmergeDeep Pressure Compensation Fluids are formulated to meet the most extreme pressure, water displacement, high-performance power transfer, electrical insulating and lubrication challenges posed by undersea operation at any depth.

Modern electronic instrumentation, electrical propulsion, and robotic assemblies operating at depths exceeding 10m /30ft require fluid-based pressure compensation to prevent implosion due to water pressure. SubmergeDeep Pressure Compensation Fluids have been designed to meet the challenge of insulating and protecting electronics by providing full protection from high pressure, high heat, and water intrusion. SubmergeDeep obviates the need to structurally reinforce undersea device pressure containments and instead allows the Newtonian characteristics of SubmergeDeep to transit extreme pressures through the device. By evacuating all air/gas and then flooding a device with Engineered Fluids' SubmergeDeep, electronics and instruments are fully protected from rigors and extremes of underwater use.

In addition to pressure compensation, Engineered Fluids' SubmergeDeep fluids are available as Marine Hydraulic Fluids (See SubmergeDeep SD-200 Series of products). SubmergeDeep is formulated colorless and non-yellowing, transparent to both light and RF signals to GHz frequencies. SubmergeDeep Fluid's high thermal density also provides highly efficient heat-transfer enabling simplified thermal management.

Engineered Fluids' SubmergeDeep Pressure Compensation Fluids effectively solve the critical challenges of going deep and staying safe. SubmergeDeep fluids are biodegradable, nontoxic, non-halogenated, rated food grade by the NSF, and 100% ozone safe.

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Characteristics of SubmergeDeep® Pressure Compensation Fluids

Product ID	SD-110	SD-120	SD-130	SD-140
Typical Application	Low viscosity pressure compensation for watches, LEDs & cameras	Pressure compensation for watches, LEDs & cameras	High pressure insulating & compensation for ROV & Robotics	High temperature / insulating and high-pressure compensation
Appearance	Clear			
Fluid Behavior	Non-Compressible, Newtonian, Isotropic, Non-ionic			
Dielectric Strength ¹	>50kV			
Resistivity (ohm-cm)	>1x10 ¹⁴			
Dielectric Constant	2.08	2.11	2.20	2.20
Refractive Index n _D ²⁰	1.441	1.453	1.453	1.462
Pour Point (°C)	-54	-55	-54	-54
Flash Point (°C)	193	228	268	280
Density, g/cc @ 15.6°C	0.82	0.82	0.82	0.84
Coefficient of Thermal Expansion, volume/°C	0.00067	0.00066	0.00065	0.00063
Kinematic 0°C	43.10	109.6	144.00	794.61
Viscosity 40°C	8.11	16.0	19.00	67.00
(cSt) 100°C	2.22	3.6	4.10	9.53
Thermal 0°C	0.1382	0.1478	0.1519	0.1600
Conductivity 40°C	0.1359	0.1459	0.1508	0.1584
(W/m*K) 100°C	0.1325	0.1430	0.1495	0.1561
Specific 0°C	2.0608	2.0575	2.0502	2.0460
Heat 40°C	2.2121	2.2060	2.2030	2.1912
(KJ/Kg*K) 100°C	2.4390	2.4288	2.4180	2.4090
Global Warming Potential	0	0	0	0
Biodegradability ²	>90%	>90%	>60%	>40%
Materials Compatibility Warranty	Yes	Yes	Yes	Yes
Shelf Life (Yrs) ³	25	25	25	25

1) Dielectric Strength is measured using ASTM D1816 method with 2mm electrode gap

2) Biodegradation is stated for a 28-Day Test Period. Biodegradation continues to occur after the initial test period.

3) See product specific warranty statement for terms and conditions. Shelf-Life duration is stated for an original sealed steel container, Shelf-life period is included in the warranty period.

Need more information? Please contact us at
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**Manufactured
in the United States**



Engineered Fluids, Inc., Tyler TX USA

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