



Novec™

Engineered Metalworking Fluid MW-2410

Introduction

3M™ Novec™ Engineered Metalworking Fluid MW-2410 is a blend of the hydrofluoroether methoxynonafluorobutane (C₄F₉OCH₃) and a lubricious additive. It is intended to replace ozone-depleting lubricants and hydrocarbon lubricants in many metalworking applications, such as drilling and stamping, and to improve composite drilling operations.

Novec fluid MW-2410 is most useful in metalworking applications where lubricant residue is a problem—either because the residue is difficult to clean or because the parts themselves are difficult to clean. When employed as a lubricant, MW-2410 fluid evaporates completely, leaving only dry cuttings that may be swept away or vacuumed clean.

The fluid not only works well as a lubricant on metals such as aluminum or copper but also on composites like glass or carbon fiber epoxies. Testing on further metals and materials is continuing.

Unlike other lubrication systems—notably aqueous systems—lubrication with MW-2410 fluid is best accomplished with a low volume fluid jet or a low volume spray applied directly on to the drill bit or stamping tool. ***Excessive application by flooding actually decreases the effectiveness of Novec fluid MW-2410.***

Typical Applications

- Drilling of aluminum, copper, composites
- Stamping of copper, aluminum

Material Description

Not for
specification
purposes

Properties	Novec Fluid MW-2410
3M™ Novec™ Engineered Fluid HFE-7100—methoxynonafluorobutane	98%
Lubricious additive	2%
Appearance	Clear, colorless liquid

3M™ Novec™ Engineered Metalworking Fluid MW-2410 Typical Properties

Not for
specification
purposes

All values determined
at 25°C unless
otherwise specified

Properties	Novec Fluid MW-2410
Formulation	C ₄ F ₉ OCH ₃
Molecular Weight	250 g/mol
Boiling Point	61°C
Freezing Point	-135°C
Flash Point	None
Liquid Density	1.52 g/ml
Viscosity	0.61 cps
Surface Tension	13.6 dynes/cm
Solubility of Solvent in Water	12 ppmw
Solubility of Water in Solvent	95 ppmw
Vapor Pressure	200 mm Hg
Specific Heat	0.28 Cal/g °C

Environmental Properties

Not for
specification
purposes

Properties	Novec Fluid MW-2410
Ozone Depletion Potential ¹ , ODP	0.00
Global Warming Potential ² , GWP	320
Atmospheric Lifetime	4.1 years

¹CFC-11 = 1.0

²GWP – 100 year ITH, CO₂ = 1.0

Regulatory Status

3M™ Novec™ Engineered Metalworking Fluid MW-2410 has been accepted for commercial use by regulatory agencies in the United States, Canada, Japan, Korea, Australia and Europe (under the European List of Notified New Chemical Substances). Novec fluid MW-2410 is not regulated by Germany's 2.BImSchV.

The 3M™ Novec™ Engineered Fluid HFE-7100 component of MW-2410 fluid has been excluded by the U.S. EPA from the definition of a VOC on the basis that this compound has negligible contribution to tropospheric ozone formation.

Contact your local 3M representative regarding the regulatory status of MW-2410 fluid in other countries.

3M™ Novec™ Engineered Metalworking Fluid MW-2410 Toxicity Profile

The toxicological testing completed on 3M™ Novec™ Engineered Metalworking Fluid MW-2410 shows the overall toxicity is low. The material is practically non-irritating to the eyes, minimally irritating to the skin and is not a mutagen or cardiac sensitizer. It is rated “practically non-toxic” through inhalation. A 90-day inhalation study has helped establish a recommended exposure guideline of 750 ppm for an eight-hour average worker exposure per day. This exposure guideline was established by the American Industrial Hygiene Association.

Properties	Novec Fluid MW-2410
Acute Lethal Inhalation Concentration	>100,000 ppm (4 hour)
Oral	Practically non-toxic (>5 g/kg)
Eye Irritation	Practically non-irritating
Skin Irritation	Minimally irritating
Skin Sensitization	Not a skin sensitizer
Developmental Toxicity	Detailed results are available
Mutagenicity	Negative in the three assays conducted
Cardiac Sensitization	No signs of sensitization at exposures up to 100,000 ppm
Ecotoxicity Testing	Complete—very low aquatic toxicity
90-day Inhalation	750 ppm exposure guideline Detailed results are available

Environmental Policy

3M will continue to recognize and exercise its responsibility to: prevent pollution at the source wherever and whenever possible; develop products that will have minimal effect on the environment; conserve natural resources through the use of reclamation and other appropriate methods; assure that its facilities and products meet and sustain the regulations of all national and other official organizations engaged in environmental activities.

Environmental Health and Safety

Before using this product, please read the current product Material Data Safety Sheet (available through your 3M sales or technical service representative) and the precautionary statement on the product package. Follow all applicable precautions and directions.

Packaging and Availability

Novec fluid MW-2410 may be ordered in the following container sizes:

- 55-gallon drum
- 1-gallon pail

3M™ Novec™ Engineered Metalworking Fluid MW-2410 Storage and Shelf Life

Under ambient conditions, Novec fluid MW-2410 can be stored safely for up to two years.

Recycle and Disposal Options

Used Fluid Return Program

3M offers a program for free* pickup and return of used 3M specialty fluids in the U.S. and Puerto Rico through Safety-Kleen Corp. The fluid return program is covered by independent third-party financial and environmental audits of treatment, storage and disposal facilities. Necessary documentation is provided.

Safety-Kleen Corp. has a network of 156 branch service centers in the U.S. This large fleet will provide timely, economical fluid disposal service.

For additional information on the 3M Used Fluid Return Program, contact Safety-Kleen at this toll-free line: 1.888.932.2731. Contact your local 3M representative for fluid return programs outside the U.S.

* Must have a 30 or more gallon purchase to participate in the 3M paid program. Used product of 5-30 gallons can be returned through Safety-Kleen at the user's expense.

Resources

3M™ Novec™ Engineered Metalworking Fluid MW-2410 is supported by global sales, technical and customer service resources, with fully-staffed technical service laboratories in the U.S., Europe, Japan, Latin America and Southeast Asia. Users benefit from 3M's broad technology base and continuing attention to product development, performance, safety and environmental issues.

For additional technical information on Novec fluid MW-2410 in the United States, call 3M Performance Materials Division, **800 810 8513**.

For other 3M global offices, and information on additional 3M products, visit our web site at: **www.3m.com/fluids**

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Issued: 07/01

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98-0212-2518-4 (HB)