

## **Safety Data Sheet**

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## **SECTION 1: Identification**

#### 1.1. Product identifier

3M<sup>TM</sup> Novec<sup>TM</sup> 1901 Electronic Grade Coating

### **Product Identification Numbers**

98-0212-4857-4, 98-0212-4858-2, 98-0212-4859-0, 98-0212-4874-9

#### 1.2. Recommended use and restrictions on use

## Recommended use

Protective Barrier Coating. For Industrial Use Only. Not Intended for Use as a Medical Device or Drug.

## Restrictions on use

One or more components in this material are approved for specific commercial use(s) under a U.S. EPA low volume exemption. Approved commercial use: Coating for components in electronic devices.

3M Electronics Markets Materials Division (EMMD) will not knowingly sample, support, or sell its products for incorporation in medical and pharmaceutical products and applications in which the 3M product will be temporarily or permanently implanted into humans or animals. The customer is responsible for evaluating and determining that a 3M EMMD product is suitable and appropriate for its particular use and intended application. The conditions of evaluation, selection, and use of a 3M product can vary widely and affect the use and intended application of a 3M product. Because many of these conditions are uniquely within the user's knowledge and control, it is essential that the user evaluate and determine whether the 3M product is suitable and appropriate for a particular use and intended application, and complies with all local applicable laws, regulations, standards, and guidance.

#### 1.3. Supplier's details

**MANUFACTURER:** 

**DIVISION: Electronic Materials Solutions Division** 3M Center, St. Paul, MN 55144-1000, USA ADDRESS: **Telephone:** 1-888-3M HELPS (1-888-364-3577)

### 1.4. Emergency telephone number

1-800-364-3577 or (651) 737-6501 (24 hours)

# **SECTION 2: Hazard identification**

#### 2.1. Hazard classification

Not classified as hazardous according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.

#### 2.2. Label elements

#### Signal word

Not applicable.

## **Symbols**

Not applicable.

### **Pictograms**

Not applicable.

## 2.3. Hazards not otherwise classified

None.

# **SECTION 3: Composition/information on ingredients**

Ingredient	C.A.S. No.	% by Wt
Ethyl nonafluoroisobutyl ether	163702-06-5	60 - 70
Ethyl nonafluorobutyl ether	163702-05-4	25 - 35
Methyl Nonafluorobutyl Ether	163702-07-6	< 1
Methyl Nonafluoroisobutyl Ether	163702-08-7	< 5
Fluoroaliphatic polymer	Trade Secret*	1

<sup>\*</sup>The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

## **SECTION 4: First aid measures**

## 4.1. Description of first aid measures

#### **Inhalation:**

Remove person to fresh air. If you are concerned, get medical advice.

## **Skin Contact:**

No need for first aid is anticipated. If signs/symptoms persist, get medical attention.

#### **Eye Contact:**

Flush eyes with large amounts of water. If signs/symptoms persist, get medical attention.

## If Swallowed:

Rinse mouth. If you feel unwell, get medical attention.

### 4.2. Most important symptoms and effects, both acute and delayed

See Section 11.1. Information on toxicological effects.

## 4.3. Indication of any immediate medical attention and special treatment required

Not applicable.

## **SECTION 5: Fire-fighting measures**

### 5.1. Suitable extinguishing media

Material will not burn. Use a fire fighting agent suitable for the surrounding fire.

## 5.2. Special hazards arising from the substance or mixture

Exposure to extreme heat can give rise to thermal decomposition.

### **Hazardous Decomposition or By-Products**

**Substance** Carbon monoxide

Carbon dioxide Hydrogen Fluoride

#### Condition

**During Combustion During Combustion During Combustion** 

## 5.3. Special protective actions for fire-fighters

When fire fighting conditions are severe and total thermal decomposition of the product is possible, wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

# **SECTION 6: Accidental release measures**

### 6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Ventilate the area with fresh air. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

### **6.2.** Environmental precautions

Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

### 6.3. Methods and material for containment and cleaning up

Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and SDS. Seal the container. Dispose of collected material as soon as possible.

## **SECTION 7: Handling and storage**

## 7.1. Precautions for safe handling

Do not breathe thermal decomposition products. For industrial or professional use only. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment.

## 7.2. Conditions for safe storage including any incompatibilities

No special storage requirements.

## **SECTION 8: Exposure controls/personal protection**

### 8.1. Control parameters

#### Occupational exposure limits

If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	C.A.S. No.	Agency	Limit type	<b>Additional Comments</b>
Ethyl nonafluorobutyl ether	163702-05-	Manufacturer	TWA(as total isomers):200	
	4	determined	ppm	
Ethyl nonafluoroisobutyl ether	163702-06-	Manufacturer	TWA(as total isomers):200	
	5	determined	ppm	
Methyl Nonafluorobutyl Ether	163702-07-	AIHA	TWA:750 ppm	
	6			
Methyl Nonafluoroisobutyl Ether	163702-08-	AIHA	TWA:750 ppm	

Page 3 of 11

7

ACGIH: American Conference of Governmental Industrial Hygienists

AIHA: American Industrial Hygiene Association

CMRG: Chemical Manufacturer's Recommended Guidelines

OSHA: United States Department of Labor - Occupational Safety and Health Administration

TWA: Time-Weighted-Average STEL: Short Term Exposure Limit

CEIL: Ceiling

#### 8.2. Exposure controls

#### 8.2.1. Engineering controls

Provide appropriate local exhaust when product is heated. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

### 8.2.2. Personal protective equipment (PPE)

## Eye/face protection

None required.

## Skin/hand protection

No chemical protective gloves are required.

## **Respiratory protection**

Use a positive pressure supplied-air respirator if there is a potential for over exposure from an uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.

# **SECTION 9: Physical and chemical properties**

## 9.1. Information on basic physical and chemical properties

General Physical Form: Liquid

Odor, Color, Grade:
Clear colorless liquid
No Data Available
PH
Not Applicable
Not Applicable

Melting point

Boiling Point

165 °F

Flash Point

Evaporation rate

Flammability (solid, gas)

Flammable Limits(LEL)

Not Applicable
None detected

Flammable Limits(UEL)None detectedVapor Pressure200 mmHg [@ 68 °F]Vapor DensityNo Data AvailableDensity1.5 g/ml [@ 77 °F]

**Specific Gravity** 1.5 [@ 77 °F] [Ref Std: WATER=1]

Solubility In Water4 ppm [@ 77 °F]Solubility- non-waterNo Data AvailablePartition coefficient: n-octanol/ waterNo Data AvailableAutoignition temperatureNot ApplicableDecomposition temperatureNot Applicable

Viscosity 2 centipoise [@ 25 °C]

Percent volatile 99 %

Page 4 of 11

# **SECTION 10: Stability and reactivity**

#### 10.1. Reactivity

This material is considered to be non reactive under normal use conditions.

### 10.2. Chemical stability

Stable.

### 10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

### 10.4. Conditions to avoid

None known.

### 10.5. Incompatible materials

None known.

## 10.6. Hazardous decomposition products

## **Substance**

**Condition** 

None known.

Refer to section 5.2 for hazardous decomposition products during combustion.

Extreme heat arising from situations such as misuse or equipment failure can generate hydrogen fluoride as a decomposition product.

# **SECTION 11: Toxicological information**

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

### 11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

### **Inhalation:**

No known health effects.

#### **Skin Contact:**

Contact with the skin during product use is not expected to result in significant irritation.

### **Eye Contact:**

Contact with the eyes during product use is not expected to result in significant irritation.

### **Ingestion:**

May be harmful if swallowed.

Page 5 of 11

## **Toxicological Data**

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

**Acute Toxicity** 

Name	Route	Species	Value
Overall product	Ingestion		No data available; calculated ATE 2,000 - 5,000
			mg/kg
Ethyl nonafluoroisobutyl ether	Inhalation-	Rat	LC50 > 989 mg/l
	Vapor (4		
	hours)		
Ethyl nonafluoroisobutyl ether	Ingestion	Rat	LD50 > 2,000 mg/kg
Ethyl nonafluorobutyl ether	Inhalation-	Rat	LC50 > 989 mg/l
	Vapor (4		
	hours)		
Ethyl nonafluorobutyl ether	Ingestion	Rat	LD50 > 2,000  mg/kg
Methyl Nonafluoroisobutyl Ether	Inhalation-	Rat	LC50 > 1,000 mg/l
	Vapor (4		
	hours)		
Methyl Nonafluoroisobutyl Ether	Ingestion	Rat	LD50 > 5,000 mg/kg
Methyl Nonafluorobutyl Ether	Inhalation-	Rat	LC50 > 1,000 mg/l
	Vapor (4		
	hours)		
Methyl Nonafluorobutyl Ether	Ingestion	Rat	LD50 > 5,000 mg/kg

ATE = acute toxicity estimate

## Skin Corrosion/Irritation

Name		Value
Ethyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Ethyl nonafluorobutyl ether	Rabbit	No significant irritation
Methyl Nonafluoroisobutyl Ether	Rabbit	No significant irritation
Methyl Nonafluorobutyl Ether	Rabbit	No significant irritation

**Serious Eye Damage/Irritation** 

Name	Species	Value
Ethyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Ethyl nonafluorobutyl ether	Rabbit	No significant irritation
Methyl Nonafluoroisobutyl Ether	Rabbit	No significant irritation
Methyl Nonafluorobutyl Ether	Rabbit	No significant irritation

## **Skin Sensitization**

Name	Species	Value
Ethyl nonafluoroisobutyl ether	Guinea	Not sensitizing
	pig	
Ethyl nonafluorobutyl ether	Guinea	Not sensitizing
	pig	
Methyl Nonafluoroisobutyl Ether	Guinea	Not sensitizing
	pig	
Methyl Nonafluorobutyl Ether	Guinea	Not sensitizing
	pig	

## **Respiratory Sensitization**

For the component/components, either no data are currently available or the data are not sufficient for classification.

**Germ Cell Mutagenicity** 

Germ Gen Mutugemeny		
Name	Route	Value
Ethyl nonafluoroisobutyl ether	In Vitro	Not mutagenic
Ethyl nonafluoroisobutyl ether	In vivo	Not mutagenic
Ethyl nonafluorobutyl ether	In Vitro	Not mutagenic
Ethyl nonafluorobutyl ether	In vivo	Not mutagenic

Methyl Nonafluoroisobutyl Ether	In Vitro	Not mutagenic
Methyl Nonafluoroisobutyl Ether	In vivo	Not mutagenic
Methyl Nonafluorobutyl Ether	In Vitro	Not mutagenic
Methyl Nonafluorobutyl Ether	In vivo	Not mutagenic

# Carcinogenicity

For the component/components, either no data are currently available or the data are not sufficient for classification.

# **Reproductive Toxicity**

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
Ethyl nonafluoroisobutyl ether	Ingestion	Not toxic to female reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluoroisobutyl ether	Inhalation	Not toxic to female reproduction	Rat	NOAEL 260.1 mg/l	during gestation
Ethyl nonafluoroisobutyl ether	Ingestion	Not toxic to male reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluoroisobutyl ether	Inhalation	Not toxic to male reproduction	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluoroisobutyl ether	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 260 mg/l	during gestation
Ethyl nonafluorobutyl ether	Ingestion	Not toxic to female reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluorobutyl ether	Inhalation	Not toxic to female reproduction	Rat	NOAEL 260.1 mg/l	during gestation
Ethyl nonafluorobutyl ether	Ingestion	Not toxic to male reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluorobutyl ether	Inhalation	Not toxic to male reproduction	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluorobutyl ether	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 260 mg/l	during gestation
Methyl Nonafluoroisobutyl Ether	Ingestion	Not toxic to female reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl Nonafluoroisobutyl Ether	Inhalation	Not toxic to female reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl Nonafluoroisobutyl Ether	Ingestion	Not toxic to male reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl Nonafluoroisobutyl Ether	Inhalation	Not toxic to male reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl Nonafluoroisobutyl Ether	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 307 mg/l	during gestation
Methyl Nonafluorobutyl Ether	Ingestion	Not toxic to female reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl Nonafluorobutyl Ether	Inhalation	Not toxic to female reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl Nonafluorobutyl Ether	Ingestion	Not toxic to male reproduction	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl Nonafluorobutyl Ether	Inhalation	Not toxic to male reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl Nonafluorobutyl Ether	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 307 mg/l	during gestation

# Target Organ(s)

**Specific Target Organ Toxicity - single exposure** 

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Ethyl nonafluoroisobutyl ether	Inhalation	cardiac sensitization	Some positive data exist, but the data are not sufficient for classification	Dog	NOAEL 204 mg/l	17 minutes
Ethyl nonafluoroisobutyl ether	Inhalation	respiratory irritation	All data are negative	Rat	NOAEL 989 mg/l	4 hours
Ethyl nonafluorobutyl ether	Inhalation	cardiac sensitization	Some positive data exist, but the data are not sufficient for classification	Dog	NOAEL 204 mg/l	17 minutes
Ethyl nonafluorobutyl ether	Inhalation	respiratory irritation	All data are negative	Rat	NOAEL 989 mg/l	4 hours
Methyl Nonafluoroisobutyl Ether	Inhalation	nervous system	Some positive data exist, but the data are not sufficient for classification	Dog	LOAEL 913 mg/l	10 minutes
Methyl Nonafluoroisobutyl Ether	Inhalation	cardiac sensitization	All data are negative	Dog	NOAEL 913 mg/l	10 minutes
Methyl Nonafluorobutyl Ether	Inhalation	nervous system	Some positive data exist, but the data are not sufficient for classification	Dog	LOAEL 913 mg/l	10 minutes
Methyl Nonafluorobutyl Ether	Inhalation	cardiac sensitization	All data are negative	Dog	NOAEL 913 mg/l	10 minutes

**Specific Target Organ Toxicity - repeated exposure** 

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Ethyl nonafluoroisobutyl ether	Inhalation	liver   kidney and/or bladder   respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluoroisobutyl ether	Inhalation	heart   endocrine system   bone marrow   hematopoietic system   immune system   nervous system	All data are negative	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluoroisobutyl ether	Ingestion	blood   liver   kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluoroisobutyl ether	Ingestion	heart   endocrine system   bone marrow   hematopoietic system   immune system   nervous system   respiratory system	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluorobutyl ether	Inhalation	liver   kidney and/or bladder   respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluorobutyl ether	Inhalation	heart   endocrine system   bone marrow   hematopoietic system   immune system   nervous system	All data are negative	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluorobutyl ether	Ingestion	blood   liver   kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluorobutyl ether	Ingestion	heart   endocrine system   bone marrow   hematopoietic	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days

		system   immune system   nervous system   respiratory				
Methyl Nonafluoroisobutyl Ether	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 155 mg/l	13 weeks
Methyl Nonafluoroisobutyl Ether	Inhalation	bone, teeth, nails, and/or hair	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 129 mg/l	11 weeks
Methyl Nonafluoroisobutyl Ether	Inhalation	heart   skin   endocrine system   hematopoietic system   immune system   muscles   nervous system   eyes   kidney and/or bladder   respiratory system	All data are negative	Rat	NOAEL 155 mg/l	13 weeks
Methyl Nonafluoroisobutyl Ether	Ingestion	endocrine system   liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl Nonafluoroisobutyl Ether	Ingestion	heart   hematopoietic system   immune system   nervous system   eyes   kidney and/or bladder   respiratory system	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl Nonafluorobutyl Ether	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 155 mg/l	13 weeks
Methyl Nonafluorobutyl Ether	Inhalation	bone, teeth, nails, and/or hair	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 129 mg/l	11 weeks
Methyl Nonafluorobutyl Ether	Inhalation	heart   skin   endocrine system   hematopoietic system   immune system   muscles   nervous system   eyes   kidney and/or bladder   respiratory system	All data are negative	Rat	NOAEL 155 mg/l	13 weeks
Methyl Nonafluorobutyl Ether	Ingestion	endocrine system   liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl Nonafluorobutyl Ether	Ingestion	heart   hematopoietic system   immune system   nervous system   eyes   kidney and/or bladder   respiratory system	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days

## **Aspiration Hazard**

For the component/components, either no data are currently available or the data are not sufficient for classification.

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

# **SECTION 12: Ecological information**

**Ecotoxicological information** 

Page 9 of 11

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

#### Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

# **SECTION 13: Disposal considerations**

### 13.1. Disposal methods

Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. Combustion products will include halogen acid (HCl/HF/HBr). Facility must be capable of handling halogenated materials. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

EPA Hazardous Waste Number (RCRA): Not regulated

## **SECTION 14: Transport Information**

For Transport Information, please visit http://3M.com/Transportinfo or call 1-800-364-3577 or 651-737-6501.

## **SECTION 15: Regulatory information**

## 15.1. US Federal Regulations

Contact 3M for more information.

## 311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - No Delayed Hazard - No

### 15.2. State Regulations

Contact 3M for more information.

#### 15.3. Chemical Inventories

The components of this product are in compliance with the chemical notification requirements of TSCA. One or more of the components in this material is not listed on the TSCA inventory, but is approved for specific commercial use(s) under a US EPA low volume exemption.

Contact 3M for more information.

## **15.4. International Regulations**

Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

# **SECTION 16: Other information**

Page 10 of 11

#### NFPA Hazard Classification

Health: 3 Flammability: 1 Instability: 0 Special Hazards: None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

### **HMIS Hazard Classification**

**Health:** 1 Flammability: 1 Physical Hazard: 0 Personal Protection: X - See PPE section.

Hazardous Material Identification System (HMIS® III) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® III ratings are to be used with a fully implemented HMIS® III program. HMIS® is a registered mark of the American Coatings Association (ACA).

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