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Material Safety Data Sheet

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This MSDS has been prepared by Orthogonal Inc.

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**Section 1. Product and company information**

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Trade name: Orthogonal Developer 100 Solution  
Manufacturer / Supplier: Orthogonal Inc.  
95 Brown Rd.  
Ithaca, NY 14850

Intended Use of Product: For industrial use only, not intended for drug or household use.

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**Section 2. Hazards Identification information**

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2.1 GHS Classification

GHS Classification

Not classified as hazardous according to UN GHS criteria.

Signal word	No data available.
Symbols	No data available.
GHS Classification-Physical	No data available.
GHS Classification-Environmental	No data available.
GHS Classification-Health	No data available.
Hazard Statements-Physical	No data available.
Hazard Statements-Environmental	No data available.
HazardStatement-Health	No data available.
Hazard Statement-Target Organ Single Category 1	No data available.
Hazard Statement-Target Organ Single Category 2	No data available.
Hazard Statement-Target Organ Single Category 3	No data available.
Hazard Statement-Target Organ P/R Cat1	No data available.
Hazard Statement-Target Organ P/R Cat2	No data available.
Unknown % Acute Lethality	No data available.
Unknown % Environmental	100.00% of the mixture consists of ingredients of unknown hazards to the aquatic environment.
Precautionary Statements-General	No data available.

Precautionary Statements-Prevention	No data available.
Precautionary Statements-Response	No data available.
Precautionary Statements-Storage	No data available.
Precautionary Statements-Disposal	No data available.
Remarks	No data available.

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### Section 3. Ingredients identification information

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#### 3.1 Specific Ingredient Data

Tradename Orthogonal Developer 100 Solution

Synonym None

Ingredient Name	CAS number	Percentage
Pentane, 1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-(trifluoromethyl)-	132182-92-4	99– 100 wt%

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### Section 4. First-aid measures

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The first aid measures for different exposure routes

Instruction for eye contact: Flush eyes with large amounts of water. If signs/symptoms persist, get medical attention.

Instructions for skin contact: Wash affected area with soap and water. If signs/symptoms develop, get medical attention.

Instructions for Inhalation: Remove person to fresh air. If signs/symptoms develop, get medical attention.

Instructions for Ingestion: Do not induce vomiting unless instructed to do so by medical personnel. Give victim two glasses of water. Never give anything by mouth to an unconscious person. Get medical attention.

The most important symptoms and hazardous effects: As above

The protection of first-aid providers: Take class C Protective equipment to carry out first aid at the safety areas.

Notes to physicians None

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### Section 5. Fire-fighting measures

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Suitable Extinguishing Media:

Unsuitable Extinguishing Media:  
Not specified.

Exposure hazards during fire - No unusual fire or explosion hazards are anticipated. Exposure to extreme heat can give rise to thermal decomposition. Material will not burn.

Special Instructions for Fire Fighting –

Unusual Fire and Explosion Hazards -

Fire Fighting Procedures:

Water may be used to blanket the fire. Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

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## **Section 6. Accidental release measures**

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Personal Precautions:

Observe precautions from other sections. Evacuate unprotected and untrained personnel from hazard area.

Environmental precautions: Refer to methods for cleaning up.

Spill Response:

For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water. Ventilate the area with fresh air. 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. Collect as much of the spilled material as possible. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate area with fresh air. Read and follow safety precautions on the solvent label and MSDS. Place in a closed container approved for transportation by appropriate authorities. Seal the container. Dispose of collected material as soon as possible.

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## **Section 7. Safe handling and storage measures**

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Handling

Incompatible Materials/Conditions: Store away from heat.

Use Instructions: For industrial or professional use only. Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water. Avoid breathing of vapors, mists or spray. Avoid contact with oxidizing agents, strong acids or strong bases. Keep container tightly closed. Avoid skin contact with hot material. No smoking: smoking while using this product can result in contamination of the tobacco and/or smoke and lead to the formation of the hazardous decomposition products mentioned in the Reactivity Data section of this MSDS. Store work clothes separately from other clothing, food and tobacco products.

Storage Requirements: Store away from strong bases.

Ventilation: Keep container in well-ventilated area.

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## **Section 8. Exposure controls measures**

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#### Recommended Ventilation:

Use with appropriate local exhaust ventilation on open containers. For those situations where the fluid might be exposed to extreme overheating due to misuse or equipment failure, use with appropriate local ventilation sufficient to maintain levels of thermal decomposition products below their exposure guidelines. Provide appropriate local exhaust when product is heated.

#### Personal protective equipment

**Eye Protection:** Avoid eye contact. The following should be worn alone or in combination, as appropriate, to prevent eye contact: Safety glasses with side shields.

**Hand Protection:** Avoid skin contact with hot material. The following glove material(s) are recommended: Nitrile rubber, Polyethylene, or Ethylene vinyl alcohol.

**Skin Protection:** Avoid prolonged or repeated skin contact. Wear appropriate gloves when handling hot material to prevent thermal burns.

**Respirator Protection:** Under normal conditions, airborne exposures are not expected to be significant enough to require respirator protection. Avoid breathing of vapors, mists or spray. Avoid inhalation of thermal decomposition products. Avoid inhalation of vapors during heating.

**Ingestion:** Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water.

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### Section 9. Physical and chemical properties

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#### Physical state:

Physical form, color, odor	Low viscosity, clear liquid, faint odor
Odour	-
Odour threshold	-
Relative density	-
pH:	Not Applicable
Boiling point/boiling range:	97.8 C at 760 mm Hg
Melting point/melting range:	Not Applicable
Flash point:	Not Applicable
Autoflammability:	EXACT VALUE 408 C (DETAILS: per ASTM E-659 method)
Vapor pressure:	EXACT VALUE 0.8psia (CONDITIONS: at 20C)
Water solubility:	<10 ppm
Partition coefficient	(K <sub>o/w</sub> )
Specific gravity:	EXACT VALUE 1.6
Vapor density:	Not determined
Evaporation rate:	Not determined
Volatile organic compounds:	Not applicable
Viscosity:	< 5 centipoise (CONDITIONS: at 25C)
Percent Volatiles:	100%
Evaporation rate	Not determined

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## Section 10. Stability and reactivity

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Possible hazardous reactions -

Occurring under specific

Conditions

Conditions to avoid: Avoid contact with incompatible materials.

Materials to avoid: Strong bases.

Hazardous decomposition:

Carbon monoxide at elevated temperatures

Carbon dioxide at elevated temperatures

Hydrogen fluoride at elevated temperatures

Toxic vapor, gas, particulate at elevated temperatures

Stability and Reactivity: Hazardous polymerization will not occur. Stable.

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## Section 11. Toxicological information

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Numerical measures of -

Toxicity

Acute toxicity No data available.

Local effects

Effects from Eye Contact: Mild eye irritation: Signs/symptoms include redness, pain and tearing.

Effects from Skin Contact: Mild skin irritation: Signs/symptoms include localized redness, swelling and itching.

Effects from Inhalation: If thermal decomposition occurs: May be harmful if inhaled.

Effects from Ingestion: May be absorbed following ingestion and cause target organ effects.

Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Sensitization Information No data available

Other toxicological Information: Hydrogen Fluoride has an ACGIH Threshold Limit Value of 3 parts per million (as fluoride) as a Ceiling Limit and an OSHA PEL of 3 ppm of fluoride as an eight hour Time-Weighted Average and 6 ppm of fluoride as a Short Term Exposure Limit. The odor threshold for HF is 0.04 ppm, providing good warning properties for exposure. Prolonged or repeated exposure may cause:

Liver effects: Signs/symptoms may include loss of appetite, weight loss, fatigue, weakness, abdominal tenderness and jaundice. Kidney/Bladder Effects: Signs/symptoms may include changes in urine production, abdominal or lower back pain, increased protein in urine, increased blood urea nitrogen (BUN), blood in urine, and painful urination.

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## Section 12. Ecological information

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Environmental Data: No data available.

Mobility in Soil and Water

Persistence/Biodegradability

Bioaccumulation Potential

Ecotoxicity Data: Not determined.

Ecofate Data: Not determined.

Other Ecotoxicity Information: No data available.

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**Section 13. Waste disposal measures**

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Product as sold:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF. Facility must be capable of handling halogenated materials. As an additional disposal alternative, dispose of waste product in a facility permitted to accept chemical waste.

Potential for Recycling: Reclaim if feasible.

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**Section 14. Transportation information**

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International regulations	Non-regulated chemical (non-dangerous) for transport
IMO Class	-
ICAO Class	-
UN Number	none
Domestic regulations for transport	Roasway Traffic Safety Regulations
Special Instructions	Not regulated per U.S. DOT, IATA or IMO
Transport hazard class(es)	
Packing group, if applicable	
Marine pollutant (yes/no)	
Hazard Class:	Non-Hazard

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**Section 15. Regulatory information**

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Applicable regulations: Labor safety and hygiene installation regulations.

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**Section 16. Other information**

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Note that the “-” symbol means no information currently available or not applicable to the material. The “?” mark means the subjected information for the material is not determined.

The information in this Material Safety Data Sheet (MSDS) is believed to be correct as of the date issued. However, no guarantee or warranty of any kind, expressed or implied, is made by Orthogonal Inc. with respect to such information.