



Chengdu Taiyu Industrial Gases Co.,Ltd.

TEL: 86-28-88455212; FAX: 86-28-88455212

Email: info@cdtyqt.com; Website: www.cdtyqt.com

MATERIAL SAFETY DATA SHEET

1. Product Identification and company identification

Product name: Perfluoro(2-methyl-3-pentanone)

Synonyms: Novec 1230 (FK-5-1-12); Heptafluoroisopropyl pentafluoroethyl ketone;
1,1,1,2,2,4,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone.

CAS Number: 756-13-8 UN Number: 1044

Application: The intended or recommended application is as a FIRE EXTINGUISHING AGENT.

Company: Chengdu Taiyu Industrial Gases Co.,Ltd.

Address: No.2375,Chengluo Avenue, Longquanyi District, Chengdu City, China,610106.

Responsible Department: International Business Department

Tel: 86-28-88455212

Fax: 86-28-88455212

E-mail: info@cdtyqt.com

Emergency Phone: 86-28-88455212

2. Composition, Information or Ingredients

Ingredient Name: Perfluoro(2-methyl-3-pentanone)

Chemical Formula: $\text{CF}_3\text{CF}_2\text{C}(\text{O})\text{CF}(\text{CF}_3)_2$.

CAS No.:756-13-8.

UN Number: 1044

EINECS Number: Product complies with chemical notification requirements.

Purity: > 99.9%.

There are NO substances presenting a health or environmental hazard within the meaning of Directive 67/548/EEC, in concentrations equal to or greater than those laid down in the table set out in Article 3 (3) of Directive 1999/45/EC, nor with lower limits given in Annex I to Directive 67/548/EEC or in Annexes II, III or V to Directive 1999/45/EC.

There are NO substances for which there are Community workplace exposure limits, which are not already included in above.

NOTE: Unless a component presents a severe hazard, it does not need to be considered in the MSDS if the concentration is less than 1%. [According to Directive 1999/45/EC.]

3. Hazard Identification

FOR HUMANS:

EU Classification: This product is not classified as dangerous according to Directive 1999/45/EC.

Neither this preparation nor the substances contained in it have been listed as carcinogenic by National Toxicology Program, I.A.R.C., or OSHA.

AS PART OF GOOD INDUSTRIAL AND PERSONAL HYGIENE AND SAFETY PROCEDURE, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes, and clothing. DO NOT eat, drink or smoke when using this product.

SIGNS AND SYMPTOMS:

Acute Exposure:

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

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

Inhalation: Prolonged or repeated exposure, above recommended guidelines, may be absorbed following inhalation and cause target organ effects.

Ingestion: No health effects are expected.

Chronic Overexposure: Prolonged or repeated exposure, above recommended guidelines may cause liver effects.

Signs or symptoms may include loss of appetite, weight loss, fatigue, weakness, abdominal tenderness, and jaundice.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None known.

FOR ENVIRONMENT: NO harm to the environment is expected from an accidental release of this preparation. See Heading 12 ECOLOGICAL INFORMATION.

4. First Aid Measures

Eye Contact: Check for and remove any contact lenses. Immediately flush eyes with clean, running water for at least 15 minutes while keeping eyes open. Cool water may be used. Seek medical attention.

Skin Contact: After contact with skin, wash with generous quantities of running water. Gently and thoroughly wash affected area with running water and non-abrasive soap. Cool water may be used. Cover the affected area with emollient. Seek medical attention. Wash any contaminated clothing prior to reusing.

Inhalation: Remove the victim from the source of exposure to fresh, uncontaminated air. If victim's breathing is difficult, administer oxygen. Seek medical attention.

Ingestion: Do NOT induce vomiting. Give water to victim to drink. Seek medical attention.

5. Fire-Fighting Measures

This preparation is a fire extinguishing agent.

There are NO extinguishing media which must not be used for safety reasons.

Fire fighters should wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

See Heading 10 STABILITY AND REACTIVITY for hazardous combustion and thermal decomposition information.

6. Accidental Release Measures

Steps to be taken if material is spilled or otherwise released into the environment – Wear appropriate respirator, impervious boots and heavy rubber (or otherwise impervious) gloves. Scoop up solid material or absorb liquid material and place into appropriate container. Ventilate area and wash affected spill area after pickup is complete. Wash skin immediately with plenty of water. Place solid or absorbed material into containers and close for

disposal.

7. Handling and Storage

Do not breathe dust or vapor.

Have safety shower and eye wash available.

Do not get in eyes, on skin or on clothing.

Keep container tightly closed.

Store in a cool, dry, well-ventilated place.

Ensure adequate ventilation during use.

Use only in a chemical fume hood.

8. Exposure Controls and Personal Protection

Wear Protective safety goggles.

Wear chemical-resistant gloves.

Wear protective clothing and chemical resistant boots.

Ensure ventilation during use.

After contact with skin, wash immediately.

9. Physical and Chemical Properties

Appearance: Clear, colorless liquid.

Odor: Low odor.

pH: Not applicable.

Boiling point/boiling range: 49.2 °C (120.6 °F).

Heat of vaporization @ boiling point: 88.0 kJ/kg (37.9 BTU/lb).

Freezing point: -108 °C (-162.4 °F).

Flash point: Not applicable.

Flammability (solid/gas): Not applicable.

Explosive properties: Not applicable.

Oxidizing properties: Not an oxidizer.

Vapor Pressure: 244 mmHg, at 20 °C.

Relative Density (Water = 1): 1.6.

Solubility:

— Water solubility: <0.001 % by weight.

— Fat solubility: Not determined.

Partition coefficient, n-octanol/water: Not determined.

Viscosity: 0.6 centipoise, at 25 °C.

Vapor density (Air = 1): 11.6.

Evaporation rate (Butyl Acetate = 1): > 1.

Auto-ignition temperature: Not applicable.

10. Stability and Reactivity

Conditions to avoid: Avoid direct sunlight and ultraviolet light. There are NO other known conditions such as temperature, pressure, shock, etc., which may cause a dangerous reaction.

Materials to avoid: Strong bases, amines, or alcohols.

Hazardous decomposition products: Normally stable. Hazardous polymerization will NOT occur.
Combustion or decomposition products include carbon monoxide, carbon dioxide, and hydrogen fluoride.

11. Toxicological Information

Product:

Toxicity Data: Inhalation LC50 (rat) >10 % v/v.

NOAEL for cardiac sensitization >10 % v/v.

12. Ecological Information

Ecotoxicity: Not determined.

Mobility: Product is highly insoluble in water and volatile. Normal use would not typically result in releases to aquatic environments.

Persistence and degradability: Photolytic half-life is 3 to 5 days. The persistent photolytic degradation product is trifluoroacetic acid.

Bioaccumulative potential: Not determined.

Other adverse effects:

Ozone depletion potential: None.

Photochemical ozone creation potential: None.

Global warming potential: 1.

13. Disposal Considerations

Not regulated as a hazardous waste by the EPA under RCRA.

Reclaim if feasible.

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 a disposal alternative, dispose of waste product in a facility permitted to accept chemical waste.

Dispose of in compliance with national, regional, and local provisions that may be in force.

No harm to the environment is expected from this preparation.

14. Transport Information

Hazard Class or Division: 2.2 Not hazardous.

Label: No special label required.

Emergency response guide page number: Not applicable.

No harm to the environment is expected from this preparation.

Proper Shipping Name: Perfluoro(2-methyl-3-pentanone)

15. Regulatory Information

EU Classification: This product is not classified as dangerous according to Directive 1999/45/EC.

EINECS Status: The component of this product has been notified to ELINCS (European List of Notified or New Chemical Substances). Certain restrictions apply. Contact your distributor for additional information.

EPA TSCA Status: All components are included in TSCA inventories or are exempt from listing.

Canadian DSL (Domestic Substances List): All components are included in the DSL or are exempt from listing.

The product also complies with the chemical notification requirements for Korea (KECI), Australia (AICS), Japan (METI), and China (CICS).

Environmental restrictions: None are known.
Restrictions on Marketing and Use: None are known.
Refer to any other national measures that may be relevant.

16. Other Information

Revision Note

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This MSDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. Products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.