MATERIAL SAFETY DATA SHEET

HFC 365/245
(Pentafluorobutane/ Pentafluoropropane)

1. SUBSTANCE/PREPARATION AND COMPANY IDENTIFICATION

Data concerning producers

MANUFACTURER/DISTRIBUTOR: Cosutin Industrial CO., Limited
Add: UNIT B, 10/F LEE MAY BUILDING 788-790 NATHAN ROAD, MONGKOK, KOWLOON, H.K
TEL.: +852 21395855 FAX: +852 81673777
PHONE NUMBERS Product Information: +86 136 31481545
Transport Emergency: +86 136 31481545
Medical Emergency: +86 136 31481545

Identification of the substance or the preparation

Product name	:	HFC365/245
Chemical name	:	Pentafluorobutane/Pentafluoropropane
Formula:	:	C4H5F5/C3H3F5
MoleculaRWeight	:	142.4

2. COMPOSITION/INFORMATION ON INGREDIENTS

- **1,1,1,3,3-pentafluorobutane**

CAS Number	:	406-58-6
Symbols	:	F
Phrases R	:	11
Concentration	:	**60.00 %**

- **1,1,1,3,3-Pentafluoropropane**

CAS Number	:	460-73-1
Concentration	:	**40.00 %**

3. HAZARDS IDENTIFICATION

- Presents little hazard to human health and the environment.
- In case of decomposition, releases hydrogen fluoride, hydrofluoric acid (HF) and carbonyl halides.
- Hazard pictogram(s): no pictogram required
- Safety Description:
- S59 Refer to manufacturer / supplier for information on recovery / recycling.
- S61 Avoid release to the environment. Refer to special instructions / safety data sheets.
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4. FIRST-AID MEASURES

Effects

Inhalation
- No reported cases of intoxication in man.
- Risk of moderate consequences experimentally observed or undercertain conditions.
- At high concentrations, risk of narcosis.
- At high concentrations, risk of asphyxia by lack of oxygen.

Eyes contact
- Slight irritation.

Skin contact
- In case of repeated contact: dry and chapped skin.

Ingestion
- Gastrointestinal discomfort

First aid

Inhalation
- Remove the subject from the contaminated area.
- Oxygen or cardiopulmonary resuscitation if necessary.
- Consult with a physician in case of respiratory and nervous symptoms.

Eyes contact
- Flush eyes with running water for several minutes, while keeping the eyelids wide open.
- Consult with an ophthalmologist in case of persistent pain.

Skin contact
- Wash the affected skin with soap and water. Take off all contaminated clothing immediately. Wash contaminated clothing before re-use.
- Consult with a physician in case of persistent pain or redness.

Ingestion
- Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician immediately.

General recommendations
- Unknown symptoms : consult with a physician for advice.

If the subject is completely conscious:
- Rinse mouth and administer fresh water.

If the subject is unconscious:
- Not applicable

Medical treatment

General informations
- Do not give adrenergetic drugs.

5. FIRE-FIGHTING MEASURES

Common extinguishing means
- In case of fire in close proximity, all means of extinguishing are acceptable.

Inappropriate extinguishing means
- No restriction.

Specific hazards
- Formation of dangerous gas/vapours in case of decomposition (see section 10). Exposure to decomposition products may be a hazard to health.
- Product's vapours do not propagate the flame. This product is not flammable at ambient temperatures and atmospheric pressure. However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.
- Cool closed containers exposed to fire with water spray.
- Gas/vapours combustion possible in presence of aiRin very particular conditions (see section 9 and/or consult the producer).
- Do not allow run-off from fire fighting to enter drains or water courses.
- Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Protective measures in case of intervention
- Evacuate all non-essential personnel.
- Intervention only by capable personnel who are trained and aware of the hazards of the product.
- Wear self contained breathing apparatus when in close proximity or in confined spaces.
- When intervention in close proximity wear acid resistant over suit.
- After intervention, proceed to clean the equipment (take a shower, remove clothing carefully, clean and check).

Other precautions
- If safe to do so, remove the exposed containers, or cool with large quantities of water.
- Approach from upwind. Wear self-contained breathing apparatus and protective suit. No unprotected exposed skin areas.
- As foRany fire, do not breathe fumes, ventilate and clean the rooms before re-entry.

6. ACCIDENTAL RELEASE MEASURES

Precautions
- Follow the protective measures given in section 5.
- Follow the protective measures given in section 8.
- Eliminate all sources of ignition.
- Keep away materials and products which are incompatible with the product (see section 10).
- Cover the spreading liquid with foam in order to slow down the evaporation.
- If safe to do so, without over exposing anyone, try to stop the leak.
- Ventilate the premises.

Cleanup methods

- If possible, dam large quantities of liquid with sand or earth.
- Prevent the product from entering sewers or confined places.
- Collect the product with suitable means.
- Place everything into a closed, labelled container compatible with the product.
- Store the product in a safe and isolated place.
- Clean the area with large quantities of water.
- For disposal methods, refer to section 13.

Precautions for protection of the environment

- Prevent discharges into the environment (atmosphere,...).

7. HANDLING AND STORAGE

Handling

- Carry out industrial operations in closed, but vented, piping circuits and equipment.
- Operate in a well-ventilated area.
- Perform filling operations only at stations with exhaust ventilation facilities.Open drum carefully as content may be under pressure. Do not breathe vapours or spray mist.
- Prevent product vapours decomposition from contacting hot spots.
- Keep away from heat and sources of ignition..
- Keep away from reactive products (see section 10).

Storage

- Keep containers tightly closed in a dry, cool and well-ventilated place.
- Keep away from heat sources and direct sunlight.
- Keep away from reactive products (see section 10).
- Ensure adequate ventilation, especially in confined areas. Keep in original packaging, tightly closed.

Other precautions

- Grounded equipment.
- No open flames or sparks, no smoking.
- Follow the protective measures given in section 8.

Packaging

- Steel

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls

- Premises ventilation.
- Provide local ventilation suitable for the emission risk.
- Follow the protective measures given in section 7.
- Maintain employee exposures to levels below the applicable exposure limits.

Respiratory protection

- Minimum need if the local exhaust ventilation is adequate.
- In case of emissions, self-contained breathing apparatus.

- Use only respiratory protection that conforms to international/ national standards.

Hand protection
- Protective gloves - chemical resistant, Gloves must be inspected prior to use.
- Recommended materials: Neoprene

Eye protection
- Wear protective goggles for all industrial operations. Do not wear contact lenses.

Skin protection
- Protective clothing treated antistatic.
- Apron/boots of neoprene if risk of splashing.

Other precautions
- Shower and eye wash stations.
- Handle in accordance with good industrial hygiene and safety practice.
- Avoid contact with skin, eyes and clothing.
- Ensure adequate ventilation, especially in confined areas.
- Remove and wash contaminated clothing before re-use.
- Contaminated work clothing should not be allowed out of the workplace.
- Keep working clothes separately.
- Wash hands before breaks and immediately afteRhandling the product.
- Do not smoke, eat and drink in the working area.

- **Exposure Guidelines**

1,1,1,3,3-Pentafluoropropane
460-73-1 WEEL TWA 300 ppm 1,644 mg/m3

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Liquefied
Color/Colour: colorless/colourless
Odor/Odour: ethereal

Change of state
- Freezing point:
  No data
- Boiling point/range (1013 mbars):
  27 Cel

Flash point
- Non-flammable
  Method: DIN 51755 T2

Flammability
- Upper limit
  13.3 %(V)
  (HFC365mfc)

- Lower limit
  3.8 %(V)
  (HFC365mfc)

Auto-flammability
- = 580 Cel

Vapor/vapour pressure
- 1,013 - 1,296 hPa
  temperature 30 Cel

Density
- Specific gravity
  = 1.26 - 1.29
  temperature 20 Cel

Vapor/vapour density (air=1)
- = 4.3 - 4.9
  temperature 20 Cel

Solubility
- Soluble in
- Water
  1.7 g/l
  temperature 20 Cel

pH
- = 6
  Concentration 1.7 g/l

Partition coefficient P (n-octanol/water)
- log P o/w 1.6
  Method: Measured value

Viscosity
- 0.4 mPa.s
  temperature 25 Cel

Danger of explosion
- Remark: Explosion possible with gas/vapour and air mixtures.

10. STABILITY AND REACTIVITY

Stability
- Stable under certain conditions (see below).
- Decomposition produces dangerous gases, upon contact with flames or hot metallic surfaces.

Conditions to avoid
- Keep away from direct sunlight.
- Heat, flames and sparks.

Materials to avoid
- Oxidizing agents
- Metallic powders
- Alkaline metals

Hazardous decomposition products
- Hydrogen fluoride
- Fluorophosgene
- Carbon monoxide
- Carbon dioxide (CO2)
- Carbonyl halides

OtheRinformation
- The vapoRis heavieRthan air, disperses at ground level.

11. TOXICOLOGICAL INFORMATION

Acute toxicity
- Inhalation, LC 50, 4 h, rat, > 10 %
- Oral route, LD 50, rat, > 2,000 mg/kg (HFC365mfc)

Irritation
- Rabbit, non irritant (skin)(HFC365mfc)
- Rabbit, slightly irritant (eyes)(HFC365mfc)

Sensitization
- Guinea Pig, Non sensitizing (skin) (HFC365mfc)

Chronic toxicity
- Inhalation, after repeated exposure, rat, Target organ: skeleton, 50,000 ppm, observed effect (HFC365mfc)
- Inhalation, after repeated exposure, rat, 10 % , no observed effect (HFC245fa)
- Inhalation, after a single exposure, dog, >= 7.5 % , cardiac sensitization following adrenergic stimulation (HFC365mfc)
- No mutagenic effect (HFC365mfc)
- Rat NOEL: 500 ppm, Exposure time: 28 d, repeated dose toxicity of HFC245fa

Comments
- No specific data
- Not hazardous in normal conditions of handling and use

12. ECOLOGICAL INFORMATION

Acute ecotoxicity
- Fishes, Brachydanio rerio, LC 50, 96 h, > 200 mg/l (HFC365mfc)
- Fishes, Oncorhynchus mykiss (rainbow trout), LC 50, 96 h, >= 81.8 mg/l (HFC245fa)

- Crustaceans, Daphnia magna, NOEC, 48 h, > 200 mg/l
  (HFC365mfc)
- Daphnia, EC 50 ,48 h, >= 97.9 mg/l
  (HFC245fa)
- Bacteria, LC50, Species: not specified. no data available
  (HFC245fa)
- Algae, Selenastrum capricornutum, NOEC, 72 h, = 113 mg/l
  (HFC365mfc)

Mobility

- Air, Henry's law constant (H) ca. 3.8 kPa.m3/mol
  Result: considerable volatility
  Conditions: 20 °C / calculated value
  (HFC365mfc)
- Soil/sediments, adsorption, log KOC ca. 1.8
  Conditions: calculated value
  (HFC365mfc)

Abiotic degradation

- Air, indirect photo-oxidation, t 1/2 ca. 7.04 year(s)
  Conditions: sensitizer: OH radicals
  (HFC365mfc)
- Air, photolysis, ODP = 0
  Result: no effect on stratospheric ozone
  Reference value foRCFC 11: ODP = 1. (HFC365mfc)
- Air, greenhouse effect, GWP = 0.17
  Reference value foRCFC 11: GWP = 1. (HFC365mfc)

Biotic degradation

- Aerobic, test: ready biodegradability/closed bottle, = 13 %, 28 day(s)
  Result: non-readily biodegradable
  (HFC365mfc)

Potential foRbioaccumulation

- Bioconcentration: log Po/w ca. 1.61
  Result: improbable bioaccumulation
  Conditions: measured value
  (HFC365mfc)

Comments

- No specific data.
- Product is persistent in air(atmospheric lifetime: 16 - 19 years).
- Hazard for the aquatic environment is limited due to product properties:
- . considerable volatility.
- . low bioaccumulation potential.

13. DISPOSAL CONSIDERATIONS

Waste treatment

- Dispose in compliance with local/federal and national regulations.

- It is recommended to contact the producer recycling/recovery.
- Or
- Send the product to an authorized industrial waste incinerator.
- The incinerator must be equipped with a system for the neutralisation of HF.

Packaging treatment

- To avoid treatments, as far as possible, use dedicated containers.

14. TRANSPORT INFORMATION

- No subject

15. REGULATORY INFORMATION

EC Labelling

- This preparation contains one substance which is not listed in EINECS nor in ELINCS. A notification according to Directive 92/32/EEC has been submitted.

16. OTHERINFORMATION

Reason for update

- Update:
- section 3
- Revision Date: 7 May 2015

This MSDS is intended for only the selected countries to which it is applicable. For example, this MSDS is not intented for use nor distribution within North America.
The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product which conforms to the specification, unless otherwise stated. In this case of combinations and mixtures one must make sure that no new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and protection of human welfare and the environment.

End of MSDS