Novec Contact Cleaner #148-470

RS Components

Chemwatch:	4876-82	Print Date:	27/11/2013
Version No:	2.1.1.1	Issue Date:	26/11/2013
Material Safety Data Sheet according to NOHSC and ADG requirements		S.Local.AUS.EN	

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name:	Novec Contact Cleaner #148-470
Chemical Name:	Not Applicable
Synonyms:	Manufacturer's Code: 148-470
Proper shipping name:	AEROSOLS
Chemical formula:	Not Applicable
Other means of identification:	Not Available
CAS number:	Not Applicable

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses:	Application is by spray atomisation from a hand held aerosol pack , Electronics cleaning only; not intended for use as a medical device or drug.

Details of the supplier of the safety data sheet

Registered company name:	RS Components	RS Components	
Address:	25 Pavesi Street Smithfield 2164 NSW Australia	Units 30 & 31, 761 Great South Road Penrose 1006 Auckland New Zealand	
Telephone:	+1 300 656 636	+64 9 526 1600	
Fax:	+1 300 656 696	+64 9 579 1700	
Website:	Not Available	www.rsnewzealand.com	
Email:	Not Available	Not Available	

Emergency telephone number

Association / Organisation:	Not Available	Not Available	
Emergency telephone numbers:	1800 039 008 (24 hours),+61 3 9573 3112	Not Available	
Other emergency telephone numbers:	1800 039 008 (24 hours),+61 3 9573 3112	Not Available	

SECTION 2 Hazards identification

Classification of the substance or mixture

DANGEROUS GOODS. NON-HAZARDOUS SUBSTANCE. According to NOHSC Criteria, and ADG Code.

Poisons Schedule:	

Risk Phrases [1]

R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R44	Risk of explosion if heated under confinement.

Legend:*1. Classified by Chemwatch; 2. Classification drawn from HSIS ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI*

Label elements

Not Applicable
Relevant risk statements are found in section 2

Indication(s) of danger:	Not Applicable

Safety advice:

S15	Keep away from heat.
S23	Do not breathe gas/fumes/vapour/spray.
S29	Do not empty into drains.
S35	This material and its container must be disposed of in a safe way.
S38	In case of insufficient ventilation, wear suitable respiratory equipment.
S51	Use only in well ventilated areas.
S56	Dispose of this material and its container at hazardous or special waste collection point.
S57	Use appropriate container to avoid environmental contamination.

Other hazards

May produce discomfort of the respiratory system and skin*.
Cumulative effects may result following exposure*.
May affect fertility*.
May be harmful to the foetus/ embryo*.
Inhalation may produce health damage*.
Vapours potentially cause drowsiness and dizziness*.

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
163702-08-7	50-70	methyl nonafluoroisobutylether
163702-07-6	30-50	methyl nonafluorobutylether
124-38-9	1-5	carbon dioxide

SECTION 4 First aid measures

Description of first aid measures

Eye Contact:

If aerosols come in contact with the eyes:

- Immediately hold the eyelids apart and flush the eye with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact:

If solids or aerosol mists are deposited upon the skin:

- Flush skin and hair with running water (and soap if available).
- Remove any adhering solids with industrial skin cleansing cream.
- **DO NOT** use solvents.
- Seek medical attention in the event of irritation.

Inhalation:

If aerosols, fumes or combustion products are inhaled:

- Remove to fresh air.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- If breathing is shallow or has stopped, ensure clear airway and apply resuscitation, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

Ingestion:

- Not considered a normal route of entry.
- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.
- Avoid giving milk or oils.
- Avoid giving alcohol.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

SMALL FIRE:

- Water spray, dry chemical or CO2

LARGE FIRE:

- Water spray or fog.

Special hazards arising from the substrate or mixture

Fire Incompatibility:

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting:

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- If safe, switch off electrical equipment until vapour fire hazard removed.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- **DO NOT** approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

Fire/Explosion Hazard:

- Non combustible.
- Not considered to be a significant fire risk.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- Aerosol cans may explode on exposure to naked flames.
- Rupturing containers may rocket and scatter burning materials.
- Hazards may not be restricted to pressure effects.
- May emit acrid, poisonous or corrosive fumes.
- Decomposes on heating and may emit toxic fumes of carbon monoxide (CO).

&Decomposition may produce toxic fumes of:, carbon dioxide (CO_2), hydrogen fluoride , other pyrolysis products typical of burning organic material&

Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Minor Spills:

- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Wear protective clothing, impervious gloves and safety glasses.
- Shut off all possible sources of ignition and increase ventilation.
- Wipe up.
- If safe, damaged cans should be placed in a container outdoors, away from all ignition sources, until pressure has dissipated.

- Undamaged cans should be gathered and stowed safely.

Major Spills:

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water courses
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse / absorb vapour.
- Absorb or cover spill with sand, earth, inert materials or vermiculite.
- If safe, damaged cans should be placed in a container outdoors, away from ignition sources, until pressure has dissipated.
- Undamaged cans should be gathered and stowed safely.
- Collect residues and seal in labelled drums for disposal.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- **DO NOT** enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, **DO NOT** eat, drink or smoke.
- **DO NOT** incinerate or puncture aerosol cans.
- **DO NOT** spray directly on humans, exposed food or food utensils.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storage and handling recommendations contained within this MSDS.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Other information

- Keep dry to avoid corrosion of cans. Corrosion may result in container perforation and internal pressure may eject contents of can

Conditions for safe storage, including any incompatibilities

Suitable container:

- Aerosol dispenser.
- Check that containers are clearly labelled.

Storage incompatibility:

- Avoid reaction with oxidising agents
- Avoid strong bases.
- Avoid magnesium, aluminium and their alloys, brass and steel.
- Compressed gases may contain a large amount of kinetic energy over and above that potentially available from the energy of reaction produced by the gas in chemical reaction with other substances

Package Material Incompatibilities:

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	carbon dioxide	Carbon dioxide / Carbon dioxide in coal mines	9000 (mgm3) / 22500 (mgm3) / 5000 (ppm) / 12500 (ppm)	54000 (mgm3) / 30000 (ppm)	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-0	TEEL-1	TEEL-2	TEEL-3
carbon dioxide	5000(ppm)	30000(ppm)	40000(ppm)	40000(ppm)

Ingredient	Original IDLH	Revised IDLH
carbon dioxide	50,000(ppm)	40,000(ppm)

Exposure controls

Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.
General exhaust is adequate under normal conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Speed:

aerosols, (released at low velocity into zone of active generation)	0.5-1 m/s
direct spray, spray painting in shallow booths, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Personal protection

Eye and face protection:

No special equipment for minor exposure i.e. when handling small quantities. **OTHERWISE:** For potentially moderate or heavy exposures:

- Safety glasses with side shields.
- **NOTE:** Contact lenses pose a special hazard; soft lenses may absorb irritants and **ALL** lenses concentrate them.

Skin protection:

See Hand protection below

Hand protection:

- No special equipment needed when handling small quantities.
- **OTHERWISE:**
- For potentially moderate exposures:
- Wear general protective gloves, eg. light weight rubber gloves.
- For potentially heavy exposures:
- Wear chemical protective gloves, eg. PVC. and safety footwear.

Body protection:

See Other protection below

Other protection:

No special equipment needed when handling small quantities. **OTHERWISE:**

- Overalls.
- Skin cleansing cream.
- Eyewash unit.
- Do not spray on hot surfaces.

Thermal hazards:

Recommended material(s):

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
Novec Contact Cleaner #148-470

Not Available

Material	CPI

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection:

Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AX-AUS / Class1	-
up to 50	1000	-	AX-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	AX-2
up to 100	10000	-	AX-3
100+			Airline**

* - Continuous Flow ** - Continuous-flow or positive pressure demand
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Clear, colourless liquid aerosol with a slight ethereal odour; does not mix with water.

Physical state	Liquid	**Relative density (Water = 1)**	1.52 @ 20 deg.C
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	405
pH (as supplied)	Not Applicable	**Decomposition temperature**	Not Applicable
Melting point / freezing point (°C)	Not Applicable	**Viscosity (cSt)**	0.001 Pa.s
Initial boiling point and boiling range (°C)	61	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	49 BuAC = 1	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available

Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	100
Vapour pressure (kPa)	517 approx.	**Gas group**	Not Available
Solubility in water (g/L)	Immiscible	**pH as a solution(1%)**	Not Applicable
Vapour density (Air = 1)	8.6		

SECTION 10 Stability and reactivity

Reactivity:

See section 7

Chemical stability:

- Elevated temperatures.
- Presence of open flame.
- Product is considered stable.
- Hazardous polymerisation will not occur.

Possibility of hazardous reactions:

See section 7

Conditions to avoid:

See section 7

Incompatible materials:

See section 7

Hazardous decomposition products:

See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled:

Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.
Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.
Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.
Inhalation hazard is increased at higher temperatures.
Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.
WARNING:Intentional misuse by concentrating/inhaling contents may be lethal.

Ingestion:

Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments
Swallowing of the liquid may cause aspiration of vomit into the lungs with the risk of haemorrhaging, pulmonary oedema, progressing to chemical pneumonitis; serious consequences may result.
Signs and symptoms of chemical (aspiration) pneumonitis may include coughing, gasping, choking, burning of the mouth, difficult breathing, and bluish coloured skin (cyanosis).

Skin Contact:

Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.
Spray mist may produce discomfort
In common with other halogenated aliphatics, fluorocarbons may cause dermal problems due to a tendency to remove natural oils from the skin causing irritation and the development of dry, sensitive skin. They do not appear to be appreciably absorbed.
Open cuts, abraded or irritated skin should not be exposed to this material
Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

Eye:

Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
Direct contact with the eye may not cause irritation because of the extreme volatility of the gas; however concentrated atmospheres may produce irritation after brief exposures..

Chronic:

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
Principal route of occupational exposure to the gas is by inhalation.
It is generally accepted that the fluorocarbons are less toxic than the corresponding halogenated aliphatic based on chlorine. Repeated inhalation exposure to the fluorocarbon FC-11 does not produce pathologic lesions of the liver and other visceral organs in experimental animals. There has been conjecture in non-scientific publications that fluorocarbons may cause leukemia, cancer, sterility and birth defects; these have not been verified by current research. The high incidence of cancer, spontaneous abortion and congenital anomalies amongst hospital personnel, repeatedly exposed to fluorine-containing general anaesthetics, has caused some scientists to call for a lowering of the fluorocarbon exposure standard to 5 ppm since some are mutagens.
Long chain perfluorinated carboxylic acid (PFCAs) are present in the environment of most developed countries and have the potential to adversely affect animal and human health. In tests on laboratory animals, one PFCA (perfluorooctanoic acid, PFOA) has been shown to be tumourigenic and immunotoxic and to elicit moderate reproductive or developmental toxicity and moderate-to-high subchronic oral toxicity. It has been assumed that despite the absence of robust toxicity results for longer chain PFCAs, these substances are reasonably expected to be of greater concern than PFOA, as a result of their known slower clearance rates and higher bioaccumulation potential.

TOXICITY	IRRITATION
Novec Contact Cleaner #148-470	
Not Available	Not Available
methyl nonafluoroisobutylether	
Inhalation (rat) LC50: 100000 ppm/4h *	Eye (rabbit): non-irritating *
Inhalation (rat) LC50>12000: None ppm/4h*	Skin: mild**
Oral (rat) LD50: >5000 mg/kg *	Skin: minimally irritating *
Not Available	Not Available
methyl nonafluorobutylether	
Inhalation (rat) LC50: 100000 ppm/4h *	Eye (rabbit): non-irritating *
Inhalation (rat) LC50>12000: None ppm/4h*	Skin: mild**
Oral (rat) LD50: >5000 mg/kg *	Skin: minimally irritating *

Not Available	Not Available

carbon dioxide

Not Available	Not Available

Not available. Refer to individual constituents.

METHYL NONAFLUOROISOBUTYLETHER

NOEL (Inhalation rat) 90 day: None 7500 ppm * Developmental Toxicity: No abnormal effects observed * Mutagenicity: Not a mutagen in reverse mutation or chromosomal assay * * (based on structurally similar chemical, perfluoromethyl ether) ** (DuPont)

METHYL NONAFLUOROBUTYLETHER

NOEL (Inhalation rat) 90day: None 7500 ppm * Developmental Toxicity: No abnormal effects observed Mutagenicity: Not a mutagen in reverse mutation or chromosal assay *(based on structurally similar chemical, perfluoromethyl ether) * (DuPont)

CARBON DIOXIDE

- pulmonary effects IDLH: 50,000 ppm

METHYL NONAFLUOROISOBUTYLETHER, METHYL NONAFLUOROBUTYLETHER

(3M Company)

METHYL NONAFLUOROISOBUTYLETHER, METHYL NONAFLUOROBUTYLETHER

Not a skin sensitiser in guinea pigs.

Acute Toxicity:	Not Applicable	**Carcinogenicity:**	Not Applicable
Skin Irritation/Corrosion:	Not Applicable	**Reproductivity:**	Not Applicable
Serious Eye Damage/Irritation:	Not Applicable	**STOT - Single Exposure:**	Not Applicable
Respiratory or Skin sensitisation:	Not Applicable	**STOT - Repeated Exposure:**	Not Applicable
Mutagenicity:	Not Applicable	**Aspiration Hazard:**	Not Applicable

CMR STATUS

SECTION 12 Ecological information

Toxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
For perfluorinated carboxylic acids (PFCAs):
Environmental fate:
PFCAs are chemicals that can be unintentionally formed through the transformation of fluorotelomer-based substances. Fluorotelomer-based substances are commonly used as water and grease repellents for materials such as paper, fabric, leather and carpets. Substances that can be sources of PFCAs are referred to as precursors.
PFCA precursors can enter the environment through two routes:

- Through their release, because they are present as "residual" unreacted building blocks of fluorotelomer-based substances; and
- Through their release upon degradation of fluorotelomer-based substances. There are uncertainties regarding mechanisms and rates of degradation; consequently, the relative contribution of this source to environmental levels of PFCAs is uncertain. To address this uncertainty, degradation of fluorotelomer-based substances is the focus of ongoing research activity.

The PFCAs formed from fluorotelomer-based substances contain a range of carbon chain lengths. Many governments produce Action Plans to limit entry of PFCAs into the environment. These plans focus on the long chain PFCAs, i.e. those with nine or more carbons. However, consideration may be given to the inclusion of other chain lengths if information that justifies it becomes available.
Long chain PFCAs are present in the environment of most developed countries and have the potential to adversely affect animal and human health. In tests on laboratory animals, one PFCA (perfluorooctanoic acid, PFOA) has been shown to be tumourigenic and immunotoxic and to elicit moderate reproductive or developmental toxicity and moderate-to-high subchronic oral toxicity. It has been assumed that despite the absence of robust toxicity results for longer chain PFCAs, these substances are reasonably expected to be of greater concern than PFOA, as a result of their known slower clearance rates and higher bioaccumulation potential. Although the current environmental concentrations of PFCAs are low, concern arises from the evidence indicating a rapid upward trend in the levels observed in the environment.
Furthermore, available evidence indicates that PFCAs are environmentally persistent and the longer chain PFCAs (= 9 carbons) bioaccumulate. PFCAs are present in the environment as a result of human activity.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
Not Available	Not Available	Not Available

Bioaccumulative potential

Ingredient	Bioaccumulation
Not Available	Not Available

Mobility in soil

Ingredient	Mobility
Not Available	Not Available

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal:

- **DO NOT** allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Consult State Land Waste Management Authority for disposal.
- Discharge contents of damaged aerosol cans at an approved site.
- Allow small quantities to evaporate.
- **DO NOT** incinerate or puncture aerosol cans.
- Bury residues and emptied aerosol cans at an approved site.

SECTION 14 Transport information

Labels Required:

Marine Pollutant: NO

HAZCHEM: 2YE

Land transport (ADG)

UN number	1950	**Packing group**	Not Available
UN proper shipping name	AEROSOLS	**Environmental hazard**	No relevant data
Transport hazard class(es)	Class: 2.2 Subrisk:	**Special precautions for user**	Special provisions: 63 190 277 327 limited quantity: See SP 277

Air transport (ICAO-IATA / DGR)

UN number	1950	**Packing group**	Not Available
UN proper shipping name	Aerosols, non-flammable	**Environmental hazard**	No relevant data
Transport hazard class(es)	ICAO/IATA Class: 2.2 ICAO / IATA Subrisk: ERG Code: 2L	**Special precautions for user**	Special provisions: A98A145A167A802 Cargo Only Packing Instructions: 203 Cargo Only Maximum Qty / Pack: 150 kg Passenger and Cargo Packing Instructions: 203 Passenger and Cargo Maximum Qty / Pack: 75 kg Passenger and Cargo Limited Quantity Packing Instructions: Y203 Passenger and Cargo Maximum Qty / Pack: 30 kg G

Sea transport (IMDG-Code / GGVSee)

UN number	1950	**Packing group**	Not Available
UN proper shipping name	AEROSOLS, NON-FLAMMABLE	**Environmental hazard**	No relevant data
Transport hazard class(es)	IMDG Class: 2.2 IMDG Subrisk:	**Special precautions for user**	EMS Number: F-D,S-U Special provisions: 63 190 277 327 344 959 Limited Quantities: SP277

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

methyl nonafluoroisobutylether(163702-08-7) is found on the following regulatory lists

"OECD List of High Production Volume (HPV) Chemicals","Australia Inventory of Chemical Substances (AICS)"

methyl nonafluorobutylether(163702-07-6) is found on the following regulatory lists

"OECD List of High Production Volume (HPV) Chemicals","Australia Inventory of Chemical Substances (AICS)"

carbon dioxide(124-38-9) is found on the following regulatory lists

"Australia Exposure Standards","Australia Hazardous Substances Information System - Consolidated Lists","Australia Approved Active Constituents for Agricultural Chemical Products","Sigma-AldrichTransport Information","Acros Transport Information","OECD List of High Production Volume (HPV) Chemicals","Australia High Volume Industrial Chemical List (HVICL)","CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP","Australia Inventory of Chemical Substances (AICS)","International Numbering System for Food Additives","Australia Australian Pesticides and Veterinary Medicines Authority (APVM) Record of approved active constituents","Regulations concerning the International Carriage of Dangerous Goods by Rail - Table A: Dangerous Goods List - RID 2013 (English)","Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List","International Maritime Dangerous Goods Requirements (IMDG Code) - Substance Index","Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes","Australia Dangerous Goods Code (ADG Code) - Packing Instruction - Liquefied and Dissolved Gases","International Air Transport Association (IATA) Dangerous Goods Regulations","International Maritime Dangerous Goods Requirements (IMDG Code)"

SECTION 16 Other information

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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