



SECTION 1: IDENTIFICATION	
1.1 Product identifier	
Product name	Isospire (isoflurane) Inhalation Anesthetic
Chemical name	isoflurane
Synonyms	C ₃ -H ₂ -Cl-F ₅ -O; CF ₃ CHClOCHF ₂ ; 1-chloro-2,2,2-trifluoroethyl difluoromethyl ether; 2-chloro-2-(difluoromethoxy)-1,1,1-trifluoroethane; HCFE-235da2; Forane; Compound 469; general anaesthetic
Proper shipping name	Aviation regulated liquid, n.o.s. (contains isoflurane)
Chemical formula	C ₃ -H ₂ -Cl-F ₅ -O
Other means of identification	Not Available
CAS number	26675-46-7
1.2 Recommended use of the chemical and restrictions on use	
Relevant identified uses	Inhalation anesthetic (prescription drug) for use in horses and dogs.
1.3 Details of the supplier of the substance or mixture	
Registered company name (US)	Dechra Veterinary Products
Address	7015 College Blvd Suite 525 Overland Park, KS 66211 USA
Telephone	866-933-2472
Fax	Not Available
Email	Not Available
1.4 Emergency telephone numbers	
Dechra (US)	866-933-2472

SECTION 2: HAZARD(S) IDENTIFICATION	
2.1 Classification of the substance or mixture	
NFPA 704 diamond	
	Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)
Classification	Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2A, Reproductive Toxicity Category 2, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3
2.2 Label elements	
Hazard pictogram(s)	
Signal word	Warning
Hazard statement(s)	
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H361	Suspected of damaging fertility or the unborn child.
H335	May cause respiratory irritation.
Hazard(s) not otherwise classified Not Applicable	
Precautionary statement(s) Prevention	
P201	Obtain special instructions before use.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P261	Avoid breathing mist/vapors/spray.
P202	Do not handle until all safety precautions have been read and understood.
P264	Wash all exposed external body areas thoroughly after handling.
Precautionary statement(s) Response	
P308+P313	IF exposed or concerned: Get medical advice/ attention.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
P337+P313	If eye irritation persists: Get medical advice/attention.
P302+P352	IF ON SKIN: Wash with plenty of water and soap.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.
Precautionary statement(s) storage	
P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
Precautionary statement(s) disposal	
P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

CAS No.	% [weight]	Name
26675-46-7	>98	isoflurane

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

3.2 Mixtures

See section above for composition of Substances.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Remove contact lenses, if present and easy to do. Consult a physician.
Skin contact	In case of contact, wash off immediately with soap and plenty of water. Consult a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give Oxygen. If symptoms persist, consult a physician. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Ingestion	Never give anything by mouth to an unconscious person. Rinse mouth. Drink 1 or 2 glasses of water. Induce vomiting, but only if victim is fully conscious. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

See section 11.

4.3 Indication of immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1 Extinguishing media

Use foam, dry chemical powder, BCF (where regulations permit), carbon dioxide. For large fires use water spray or fog.

5.2 Special hazards arising from the substance or mixture

Fire incompatibility	Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.
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5.3 Special protective actions for fire-fighters:

Firefighting	Alert Fire Brigade and tell them location and nature of hazard. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or water course. Use water delivered as a fine spray to control fire and cool adjacent area. Avoid spraying water onto liquid pools. 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.
Fire / explosion hazard	Closed containers may rupture due to pressure buildup under fire conditions. Non flammable liquid. However vapor will burn when in contact with high temperature flame. Ignition ceases on removal of flame. May form a flammable / explosive mixture in an oxygen enriched atmosphere Heating may cause expansion/vaporization with violent rupture of containers Decomposes on heating and produces corrosive fumes of hydrochloric acid, carbon monoxide and small amounts of toxic phosgene. Combustion products include carbon dioxide, hydrogen chloride phosgene, hydrogen fluoride, and other pyrolysis products typical of burning organic material.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

See section 8.

6.2 Environmental precautions

See Section 12.

6.3 Methods and material for containment and cleaning up

Minor spills	Clean up all spills immediately. Avoid breathing vapors and contact with skin and eyes. Control personal contact with the substance by using protective equipment. Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.
Major spills	Clear area of personnel and move upwind. Alert Fire Brigade and tell them location and nature of hazard. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or water course. No smoking, naked lights or ignition sources. Increase ventilation. Stop leak if safe to do so. Contain spill with sand, earth or vermiculite. Collect recoverable product into labelled containers for recycling. Absorb remaining product with sand, earth or vermiculite. Collect solid residues and seal in labelled drums for disposal. Wash area and prevent runoff into drains. If contamination of drains or waterways occurs, advise emergency services. For release onto land, recommended sorbents listed in order of priority: cross-linked polymer – particulate, cross-linked polymer – pillow, sorbent clay – particulate, foamed glass – pillow.


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

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Safe handling	Storage in sealed containers may result in pressure buildup causing violent rupture of containers
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	not rated appropriately. Check for bulging containers. Vent periodically Always release caps or seals slowly to ensure slow dissipation of vapors. DO NOT allow clothing wet with material to stay in contact with skin. Avoid all personal contact, including inhalation. Wear protective clothing when risk of overexposure occurs. DO NOT enter confined spaces until atmosphere has been checked. Avoid smoking, naked lights or ignition sources. Avoid generation of static electricity. When handling, DO NOT eat, drink or smoke. Keep containers securely sealed when not in use. Avoid physical damage to containers. Use good occupational work practice. Observe manufacturer's storage and handling recommendations contained within this SDS.
Other information	Store in original containers. Keep containers securely sealed. Store in a cool, dry, well-ventilated area. Store away from incompatible materials and foodstuff containers.
7.2 Conditions for safe storage, including any incompatibilities	
Suitable container	Glass container is suitable for laboratory quantities Packing as supplied by manufacturer. Plastic containers may only be used if approved for flammable liquid. Store in a cool dry area, Store at room temperature.
Storage incompatibility	DO NOT use aluminium or galvanised containers Metal can or drum. Packaging as recommended by manufacturer. Check all containers are clearly labelled and free from leaks.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION			
8.1 Control parameters			
Occupational exposure limits (OEL)			
INGREDIENT DATA Not Available			
Emergency limits			
Ingredient	TEEL-1	TEEL-2	TEEL-3
isoflurane	21 ppm	230 ppm	610 ppm
Ingredient	Original IDLH	Revised IDLH	
isoflurane	Not Available	Not Available	
Occupational Exposure Banding			
Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit	
isoflurane	E	≤ 0.1 ppm	
Notes: Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.			
MATERIAL DATA			
8.2 Exposure controls			
Appropriate engineering controls	Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Supplied-air type respirator may be required in special circumstances.		
Personal protection			
Eye and face protection	Use Safety glasses with side shields or chemical goggles. Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants.		
Skin protection	See Hand protection below.		
Hands/feet protection	Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).		
Body protection	See Other protection below.		
Other protection	Overalls, P.V.C apron, barrier cream, skin cleansing cream, eye wash unit.		
Respiratory protection	Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent).		

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES	
9.1 Information on basic physical and chemical properties	
Appearance: Clear, colorless liquid Physical state: Liquid Odor: Not Available Odor threshold: Not Available pH (as supplied): Not Available Melting point / freezing point (°C): Not Available Initial boiling point and boiling range: 48.5°C Flash point (°C): Not Available Evaporation rate: Fast Flammability: Not Available Upper/lower flammability or explosive limits: Not Available Vapor pressure: 43.89 @ 25°C Relative density (Water = 1): 1.45 Solubility in water (mg/l): Immiscible	Vapor density: Not Available Auto ignition temperature (°C): Not Available Decomposition temperature (°C): Not Available Viscosity (°C): Not Available Explosive properties: Not Available Oxidizing properties: Not Available Partition coefficient: Log Pow: 2.271 Molecular weight: 184.50 Taste: Not Available Surface tension: Not Available Volatile component (%vol): 100 Gas group: Not Available pH as a solution: Not Available VOC g/L: Not Available Specific gravity @ 20°C (water = 1): Not Available

SECTION 10: STABILITY AND REACTIVITY

Reactivity	See Section 7
Chemical stability	Unstable in the presence of incompatible materials. Product is considered stable. Hazardous polymerization will not occur.
Possibility of hazardous reactions	See Section 7
Conditions to avoid	See Section 7
Incompatible materials	See Section 7
Hazardous composition	See Section 5

SECTION 11: TOXICOLOGICAL INFORMATION

Information on toxicological effects	
Inhalation	Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation.
Ingestion	Although ingestion is not thought to produce harmful effects (as classified under EC Directives), the material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g. liver, kidney) damage is evident.
Skin contact	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.
Eye contact	Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present 24 hours or more after instillation into the eye(s) of experimental animals.
Chronic	Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems. Exposure to the material may cause concerns for human fertility, generally on the basis that results in animal studies provide sufficient evidence to cause a strong suspicion of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects.
isoflurane	Acute toxicity
	Inhalation (Rat) LC50: 58.5 mg/L4h ^[2] Oral (Rat) LD50: 4770 mg/kg ^[2]
	Irritation
	Not Available
1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	
Acute Toxicity	* Carcinogenicity
Skin Irritation/Corrosion	✓ Reproductivity
Serious Eye Damage/Irritation	✓ STOT – Single Exposure
Respiratory or Skin Sensitization	* STOT – Repeated Exposure
Mutagenicity	* Aspiration Hazard
* - Data either not available or does not fill the criteria for classification, ✓ - Data available to make classification.	

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity					
isoflurane	Endpoint	Test Duration	Species	Value	Source
	NOEC(ECx)	0.42h	Fish	56.595mg/L	4
Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data					
The 100 year time horizon global warming potentials of isoflurane, desflurane, and sevoflurane are 510, 2540, and 130, respectively. The atmospheric degradation products of these anesthetics are not of environmental concern.					
DO NOT discharge into sewer or waterways.					
NOTE: The material is a greenhouse gas and may contribute to global warming.					
12.2 Persistence and degradability					
Ingredient	Persistence: Water/Soil		Persistence: Air		
isoflurane	HIGH		HIGH		
12.3 Bioaccumulative potential					
Ingredient	Bioaccumulation				
isoflurane	LOW (LogKOW = 2.06)				
12.4 Mobility in soil					
Ingredient	Mobility				
isoflurane	LOW (KOC = 46.28)				

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods	
Product/ packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. 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. Recycle wherever possible. Bury or incinerate residue at an approved site. Recycle containers if possible, or dispose of in an authorised landfill.

SECTION 14: TRANSPORT INFORMATION

Labels required



Marine pollutant NO

Land transport (DOT): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR)

UN number 3334

UN proper shipping name Aviation regulated liquid, n.o.s.* (contains isoflurane)

Transport hazard class(es)	ICAO/IATA Class	9
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	9A

Packing group III

Environmental hazard Not Applicable

Special precautions for user	Special provisions	A27
	Cargo Only Packing Instructions	964
	Cargo Only Maximum Qty / Pack	450L
	Passenger and Cargo Packing Instructions	964
	Passenger and Cargo Maximum Qty / Pack	450L
	Passenger and Cargo Limited Quantity Packing Instruction	Y964
	Passenger and Cargo Limited Maximum Qty / Pack	30 kg G

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code
 Not Applicable

14.8 Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
isoflurane	Not Available

14.9 Transport in bulk in accordance with ICG Code

Product name	Group
isoflurane	Not Available

SECTION 15: REGULATORY INFORMATION

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

Product regulated by FDA as a veterinary product.

isoflurane is found on the following regulatory lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic, US CWA (Clean Water Act) - Toxic Pollutants, US DOE Temporary Emergency Exposure Limits (TEELs)

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories

Flammable (Gases, Aerosols, Liquids, or Solids)	No
Gas under pressure	No
Explosive	No
Self-heating	No
Pyrophoric (Liquid or Solid)	No
Pyrophoric Gas	No
Corrosive to metal	No
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	No
Combustible Dust	No
Carcinogenicity	No
Acute toxicity (any route of exposure)	No
Reproductive toxicity	Yes
Skin Corrosion or Irritation	Yes
Respiratory or Skin Sensitization	No
Serious eye damage or eye irritation	Yes
Specific target organ toxicity (single or repeated exposure)	No
Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	No
Hazards Not Otherwise Classified	No

US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)
 None reported



State Regulations	
US. California Proposition 65	
None Reported	
National Inventory Status	
Australia - AIIC / Australia Non-Industrial Use	No (isoflurane)
Canada - DSL	No (isoflurane)
Canada - NDSL	No (isoflurane)
China - IECSC	No (isoflurane)
Europe - EINEC / ELINCS /NLP	Yes
Japan - ENCS	No (isoflurane)
Korea - KECI	No (isoflurane)
New Zealand - NZIoC	Yes
Philippines - PICCS	No (isoflurane)
USA - TSCA	No (isoflurane)
Taiwan - TCSI	Yes
Mexico - INSQ	No (isoflurane)
Vietnam - NCI	No (isoflurane)
Russia - FBEPH	No (isoflurane)
Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration	

SECTION 16: OTHER INFORMATION

Initial date: March 2022
 Version 2: January 2023 – Product name update

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. The 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.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average	STEL: Short Term Exposure Limit
PC—STEL: Permissible Concentration-Short Term Exposure Limit	TEEL: Temporary Emergency Exposure Limit
IARC: International Agency for Research on Cancer	ES: Exposure Standard
ACGIH: American Conference of Governmental Industrial Hygienists	OSF: Odor Safety Factor
IDLH: Immediately Dangerous to Life or Health Concentrations	NOAEL :No Observed Adverse Effect Level
AIIC: Australian Inventory of Industrial Chemicals	LOAEL: Lowest Observed Adverse Effect Level
IECSC: Inventory of Existing Chemical Substance in China	TLV: Threshold Limit Value
EINECS: European Inventory of Existing Commercial chemical Substances	LOD: Limit Of Detection
ELINCS: European List of Notified Chemical Substances	OTV: Odor Threshold Value
ENCS: Existing and New Chemical Substances Inventory	BCF: BioConcentration Factors
PICCS: Philippine Inventory of Chemicals and Chemical Substances	BEI: Biological Exposure Index
INSQ: Inventario Nacional de Sustancias Químicas	DSL: Domestic Substances List
NCI: National Chemical Inventory	NDSL: Non-Domestic Substances List
FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances	NLP: No-Longer Polymers
NZIoC: New Zealand Inventory of Chemicals	KECI: Korea Existing Chemicals Inventory
	TSCA: Toxic Substances Control Act
	TCSI: Taiwan Chemical Substance Inventory

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