



SECTION 1: IDENTIFICATION	
1.1 Product identifier	
Product name	Isoflurane
Chemical name	isoflurane
Synonyms	C ₃ H ₂ ClF 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 ClF ₅ O
Other means of identification	Not Available
CAS number	26675-46-7
1.2 Relevant identified uses of the substances or mixture and uses advised against	
Recommended uses	Inhalation anesthetic (prescription drug) for use in horses and dogs SDS are intended for use in the workplace. For domestic-use products, refer to consumer labels.
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: HAZARDS 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/vapours/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	
Not Applicable	
P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.

SECTION 3: INFORMATION ON THE INGREDIENTS

3.1 Substances

CAS No.	% w/w	Name
26675-46-7	100	isoflurane

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 or water spray or fog - Large fires only	
5.2 Special hazards arising from the substance or mixture	
Fire incompatibility	Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
5.3 Special protective actions for fire-fighters:	
Firefighting	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	Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions. Non flammable liquid, however vapour will burn when in contact with high temperature flame. Ignition ceases on removal of flame. May form a flammable or explosive mixture in an oxygen enriched atmosphere Heating may cause expansion/vapourisation with violent rupture of containers. Decomposes on heating and produces corrosive fumes of hydrochloric acid, carbon monoxide and small amounts of toxic phosphene.

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	Allow to evaporate. Isolate area until gas has dispersed. Avoid breathing vapours and contact with skin and eyes.
Major spills	Contain and recover liquid when possible. Do not let product enter drains. Collect liquid in an appropriate container or absorb with an inert material (e. g., sand, silica gel, acid binder, universal binder, sawdust) and place in a chemical waste container. Do not flush to sewer.
Personal Protective Equipment advice is contained in Section 8.	

SECTION 7: HANDLING AND STORAGE	
7.1 Precautions for safe handling	
Safe handling	Wear personal protective equipment. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Do not breathe vapors or spray mist. Avoid contact with skin and eyes. DO NOT allow clothing wet with material to stay in contact with skin DO NOT enter confined spaces until atmosphere has been checked. DO NOT eat, drink or smoke. 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. Observe manufacturer's storage and handling recommendations contained within this SDS. Keep out of reach of children.

cross-linked polymer - particulate	1	shovel	shovel	R, W, SS
cross-linked polymer - pillow	1	throw	pitchfork	R, DGC, RT
cross-linked polymer - pillow	6	throw	pitchfork	R, D, DGC, RT

7.2 Conditions for safe storage, including any incompatibilities	
Suitable container	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.
Storage incompatibility	Segregate from: powdered metals such as aluminium, zinc and alkali metals such as sodium, potassium and lithium. May attack, soften or dissolve rubber, many plastics, paints and coatings

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:	<i>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.</i>		
8.2 Exposure controls			
Appropriate engineering controls	Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide a 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. Employers may need to use multiple types of controls to prevent employee overexposure.		
Personal protection			
Eye and face protection	Safety glasses with side shields, chemical goggles Contact lenses may pose a special hazard		
Skin protection	See hand protection below.		
Hands/feet protection	Wear chemical protective gloves, e.g. PVC. Wear safety footwear or safety gumboots, e.g. Rubber		
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: NA pH (as supplied): NA Melting point / freezing point (degrees C): NA Initial boiling point and boiling range: 48.5°C Flash point: NA Evaporation rate: Fast Flammability: NA Upper/lower flammability or explosive limits: NA Vapor pressure: 43.89 @ 25 C Relative density (at degrees C): 1.45 Solubility in water (mg/l): Immiscible	Vapor density: NA Auto ignition temperature (degrees C): NA Decomposition temperature (degrees C): NA Viscosity (degrees C): NA Explosive properties: NA Oxidizing properties: NA Partition coefficient: Log Pow: 2.271 Molecular weight: 184.50 Taste: NA Surface tension: NA Volatile component (%vol): 100 Gas group: NA pH as a solution: NA VOC g/L: NA Specific gravity @ 20 degrees C (water = 1): NA
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10: STABILITY AN REACTIVITY

Reactivity	See Section 7
Chemical stability	Product is considered stable. Hazardous polymerization will not occur. Unstable in the presence of incompatible materials
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

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	Irritation
	Inhalation(Rat) LC ₅₀ : 58.5 mg/L4h ^[2] Oral (Rat) LD ₅₀ : 4770 mg/kg ^[2]	Not Available

1 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	*
Serios 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 (hr)	Species	Value	Source
	NOEC(ECx)	0.42h	Fish	56.595 mg/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					

DO NOT discharge into sewer or waterways.

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. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. DO NOT allow wash water from cleaning or process equipment to enter drains.
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SECTION 14: TRANSPORT INFORMATION

Labels required

	
Marine pollutant	No
Land transport (US: 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		
Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code		
Product name	Group	
isoflurane	Not Available	
Transport in bulk in accordance with the ICG Code		
Product name	Ship type	
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, US ACGIH Threshold Limit Values (TLV) - Notice of Intended Changes, 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)	Yes
Reproductive toxicity	Yes
Skin Corrosion or Irritation	No
Respiratory or Skin Sensitization	Yes
Serious eye damage or eye irritation	No
Specific target organ toxicity (single or repeated exposure)	No

Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	No
Hazards Not Otherwise Classified	Yes
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

Classification of the preparation and its individual components has drawn on an independent review by the Chemwatch Classification committee using available literature references.

Definitions and abbreviations

ACGIH: American Conference of Governmental Industrial Hygienists
 TEEL: Temporary Emergency Exposure Limit.
 IDLH: Immediately Dangerous to Life or Health Concentrations
 TLV: Threshold Limit Value
 BCF: BioConcentration Factors
 AIIC: Australian Inventory of Industrial Chemicals
 DSL: Domestic Substances List
 NDSL: Non-Domestic Substances List
 IECSC: Inventory of Existing Chemical Substance in China
 EINECS: European INventory of Existing Commercial chemical Substances
 ELINCS: European List of Notified Chemical Substances
 NLP: No-Longer Polymers
 ENCS: Existing and New Chemical Substances Inventory
 KECI: Korea Existing Chemicals Inventory
 NZIoC: New Zealand Inventory of Chemicals
 PICCS: Philippine Inventory of Chemicals and Chemical Substances
 TSCA: Toxic Substances Control Act
 TCSI: Taiwan Chemical Substance Inventory
 INSQ: Inventario Nacional de Sustancias Químicas
 NCI: National Chemical Inventory
 FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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