

Product name / chemical name: R600 / Butane

SAFETY DATA SHEET

SDS according to setting: EU 2015/830

(*) oncly chemical-announcement

(**) to be filled either 3.1 or 3.2

	SECTION 1: IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY/UNDERTAKING		
1.1	Product identifier		
	Product / Trade name	R600 Refrigerant	
	Chemical name, formula	C ₄ H ₁₀ 100 % (% by weight)	
	CAS No, EC No,	Butane, CAS 106-97-8, EC 203-448-7, REACH 01-2119474691-32 (100 %)	
	REACH-reg.no		

1.2	Relevant identified uses of the substance		
	Identified uses	Industrial and professional use. Perform risk assessment prior to use.	
		Refrigerant. Filling gas or filler fluid	
		Use of gas alone or in mixtures for the calibration of analytical	
		equipment.	
	Use advised against	Consumer use.	

1.3	Details of the supplier of the safety data sheet	
	Darment Oy	
	VAT	FI09368266
	Address	Ruosilantie 18
	Postal code and city	FI-00390 HELSINKI
	Telephone	+358 20 5588 250
	E-mail	info@darment.fi
	www-site, www-shop site	darment.fi, kauppa.darment.fi

Emergency telephone numbers in Finland

tel. 112

Emergency tel. your country: _

tes. 0800 147 111, HUS Poison Information Center (free calls), tel. 09 471 977, open 24 h/day.

SECTION 2	SECTION 2: HAZARDS IDENTIFICATION	
2.1	Classification of the substance or mixture	

Classification accordint to Regulation (EU) N:o 1272/2008 as amended.

Physical Hazards Gases under pressure

Liquefied gas

H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.



2.2

Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

Label Elements

SAFETY DATA SHEET

In case of leakage, eliminate all ignition sources.

Protect from sunlight. Store in a well-ventilated place.

GHS Hazard Pictogram(s) Hazard Statement(s):			
\wedge \wedge	H220	Extremely flammable gas.	
	H280	Contains gas under pressure; may explode if heated.	
	Precautiona	ry Statemen	ts
	Prevention	None	
\sim	Response	None	
•	Storage	P102	Keep out of reach of children
Signal Word: Danger		P210	Keep away from heat, hot surfaces, sparks, open
Signal Word. Danger			flames and other ignition sources - No smoking.
		P243	Take actions to prevent static discharges
		P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

2.3 Other haza

Vapors are heavier than air and may accumulate in wells and cause asphyxiation. Contact with evaporating liquid may cause frostbite or freezing of skin.

Disposal

P381

None Supplemental label information: Asphyxiant in high concentrations.

P410 + P403

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS				
3.1 Substances				
Chemical name, trade name	CAS No, EC-No, REACH Reg. No	Concentration (% by weight)	Classification CLP	
Butane, C4H10, R600	CAS 106-97-8 EC 203-448-7 REACH 01-2119474691-32	100 %	Flam. Gas 1A; H220 Press. Gas Liquefied Gas; H280	

All concentrations are nominal. Classification, CLP Regulation No. 1272/2008.

SECTION 4: FIRST AID MEASURES		
4.1	Description of first aid measures	

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility or consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor or 112. Apply artificial respiration if breathing stopped.

Skin contact: Contact with evaporating liquid may cause frostbite or freezing of skin. Thaw frosted parts with lukewarm water. Do not rub affected area. Do not remove clothing.

Eye contact: Rinse the eye with water immediately. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance.



SAFETY DATA SHEET

Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

Ingestion: Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms an effects, acute and delayed

Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. Shortness of breath.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling,

Treatment: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

SECTION 5: FIREFIGHTING MEASURES

Extremely flammable gas. Heat may cause the containers to explode.

5.1 Extinguishing media

Suitable extinguishing media: Extinguishing powder; Water spray jet, Water mist, foam Unsuitable Extinguishing media: High power water jet, carbon dioxide (CO₂)

5.2 Special hazards arising from the substance or mixture

Flammable gas. Fire or exessive heat may cause violent rupture of the containers. Formation of flammable or explosive vapour/air mixtures possible. Vapours are heavier than air. Keep all ignition sources out of area. In case of fire cool endangered containers with water.

5.3 Advice for firefighters

Special fire fighting procedures: Containers close to fire should be transferred to a safe place. Cool closed containers exposed to fire with water. Stop leak if safe to do so. Use extinguishant. Isolate the source of the fire or let it burn out.

Follow the internal emergency plan and general accident and emergency guidelines.

Depending on the intensity of the fire, it may be necessary to wear full protective clothing and self-contained breathing apparatus. Safety equipment and first aid equipment must be available at the minimum level.

Firefighters must wear standard protective equipment: a fire-resistant jacket, a helmet with a face shield, gloves and rubber boots even in an enclosed area with an oxygen device.

Instructions: EN 469 Protective clothing for firefighters. Requirements and test methods for fire rating. EN 15090 Safety footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in houses and others constructions. Standard EN 137 Compressed air breathing apparatus - Portable open circuit compressed air devices - Requirements, testing, marking.



6.1

Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipments and emergency procedures

Risk of explosion. Evacuate area. Provide adequate ventilation.

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

Standard EN 137 Respiratory protective devices – Self-contained open-circuit compressed air breathing apparatus with full face mask – Requirements, testing, marking.

6.2 Environmental precautions

The product is not classified as dangerous for the environment. Keep away from drains, surface and ground water. Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up

Use explosion-proof equipment, no sparking tools allowed. Provide adequate ventilation, allow to evaporate.

6.4 References to other sections

Refer to sections 8 and 13.



Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

 7.1 Precautions for safe handling Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and 	SECHOR	N 7: HANDLING AND STORAGE
	7.1	Precautions for safe handling
temperature.		• Use only properly specified equipment which is suitable for this product, its supply pressure and

- The substance must be handled in accordance with good industrial hygiene and safety procedures.
- Protect containers from physical damage; do not drag, roll, slide or drop.
- Do not remove or deface labels provided by the supplier for the identification of the container contents.
- When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc.
- Secure cylinders in an upright position at all times, close all valves when not in use.
- Provide adequate ventilation.
- Suck back of water into the container must be prevented.
- Do not allow backfeed into the container.
- Avoid suckback of water, acid and alkalis.
- Keep container below 50°C in a well ventilated place.
- Observe all regulations and local requirements regarding storage of containers.
- When using do not eat, drink or smoke.
- Observe all legal and local requirements for the storage of cylinders / containers.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to repair or modify container valves or safety relief devices.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Keep container valve outlets clean and free from contaminates particularly oil and water.
- If user experiences any difficulty operating container valve discontinue use and contact supplier.
- Never attempt to transfer gases from one container to another.
- Container valve guards or caps should be in place.

7.2 Conditions for safe storage including any incompatibilities

- Containers should not be stored in conditions likely to encourage corrosion.
- Stored containers should be periodically checked for general conditions and leakage.
- Container valve guards or caps should be in place.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible material, oxidizing agents and substances, explosive substances.

7.3 Specific end use(s)

None



Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Occupational exposure limit values

Critical ingredient	STM 09/2018 htp-values	ppm	mg/m ³
Butane	15 min	1000	2400
	8 h	800	1900

8.2	Exposure controls

Appropriate engineering controls

- Consider a work permit system e.g. for maintenance activities.
- Ensure adequate ventilation including exhaust ventilation to ensure that the specified exposure limit value is not exceeded.
- Systems under pressure should be regularly checked for leakages.
- Preferably use permanent leak tight connections (eg. welded pipes).
- Do not eat, drink or smoke when using the product.

Individual protection measures like personal protective equipment

General information: A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.

Eye and face protection

To avoid exposure to liquid splashes, safety glasses, eye protection or face shields should be used in accordance with EN 166. (Instructions: EN 166 Personal Eye Protection.)

Skin protection: see Hand and Face protection

Hand protection: Wear working gloves while handling containers. (Guidelines: EN 388 Protective gloves against mechanical risks)

Body protection: No special precautions.

Other: Wear safety shoes while handling containers. Guideline: ISO 20345 Personal protective equipment – safety footwear.

Respiratory protection: Respiratory filter type AX (gas).

Thermal hazards: No precautionary measures are necessary.

Hygiene measures: Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.



Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

Environmental exposure controls: Waste disposal, see sec. 13.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES				
9.1. Information on basic physical and chemical properties				
Appearance, physical state, form and color	Liquefied gas, colorless.			
Odor	petrol-like			
Odor threshold	No data available			
рН	No data available			
Melting point	- 138,2 °C			
Boiling point (°C)	- 0,5 °C			
Critical temperature (°C)	152,0 °C			
Flash point	- 60 °C			
Evaporation rate	Not applicable			
Flammability (solid, gas)	Extremely flammable gas.			
Flammability limit upper / lower	Lower flammability limit 1,4 % (V)			
Vapor pressure	242,65 kPa (25 °C)			
Vapor density (air=1)	2,07 (0 °C)			
Relative density	0,589 g/cm ³ (-25 °C)			
Solubility (Water)	61,2 mg/l			
Partition coefficient, n-oktanol/water	Log Pow 2.8 (20 °C)			
Autoignition temperature	287 °C			
Decomposition temperature	435 °C			
Viscosity, kinematic	Not applicable			
Viscosity, dynamic	0,007 mPa.s			
Explosive properties	May form explosive gas-air mixtures			
Oxidizing properties	No data availabe			

9.2 Other information

Gas/vapour is heavier than air. May accumulate in confined spaces, particularly at or below ground level.



SAFETY DATA SHEET

Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

SECTION 10: STABILITY AND REACTIVITY	
10.1	Reactivity
	Not classified as reactivity hazard.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions will not occur under normal transport or storage conditions

10.4 Conditions to avoid

Flames, heat and sparks. Sources of ignition. Do not expose to strong oxidizing agents. Risk of formation of explosive gas mixtures in the air.

10.5 Incompatible materials

Oxidizing agents, humidity.

10.6 Hazardous decomposition products

None

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

General information: None.

Acute toxicity /Oral

Product: Based on the available data, the classification criteria are not met.

Acute toxicity /Dermal

Product: Based on the available data, the classification criteria are not met.

Product information

Acute toxicity / Inhalation				
Butane	LC₅₀ (Rat 15 min)	800000 ppm		
	LC ₅₀ (Rat 15 min)	1442,738-1443 mg/l air		
	LC₅₀ (Mouse 2 h)	520400 - 539600 ppm		
	LC50 (Mouse 2 h)	1237 mg/l air		
Repeated c	lose toxicity			
Butane	NOAEC (Rat)	4000 - 16000 ppm		

16000 ppm
21394 mg/l air
opm
mg/l air



Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

SAFETY DATA SHEET

Skin corrosion / irritation Product: Based on the available data, the classification criteria are not met.

Serious eye damage / eye irritation Product: Based on the available data, the classification criteria are not met.

Respiratory or skin sensitization Product: Based on the available data, the classification criteria are not met.

Germ cell mutagenicity

Product: Based on the available data, the classification criteria are not met.

Carcinogenicity

Product: Based on the available data, the classification criteria are not met.

Reproductive toxicity Product: Based on the available data, the classification criteria are not met.

Specific target organ toxicity – single exposure Product: Based on the available data, the classification criteria are not met.

Specific target organ toxicity - repeated exposure

Product: Based on the available data, the classification criteria are not met.

Aspiration hazard

Not applicable to gases and gas mixtures.

Other relevant toxicity information

None

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Acute toxicity, Product	No ecological d	amage caused by this product.
Acute toxicity – Fish: Butane	LC ₅₀ (4 days)	24,11 – 147,54 mg/l
Acute toxicity – Aquatic invertebrates: Butane LC ₅₀ (48 h) 14,22 – 69,43 mg/l		
Toxicity to Aquatic Plants Butane	EC ₅₀ (4 days)	7,71 – 19,37 mg/l

12.2 Persistence and degradability

Readily biodegradable.



Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

12.3 Bioaccumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB

This product is not identified as a PBT/vPvB substance.

12.6 Other adverse effects

Ozone depletion potential (ODP):	0
Global Warming Potential (GWP):	4
When discharged in large quantities may cont	ribute to the greenhouse effect.
For GWP value of product and quantities, refe	r to container label.

Butane

EU. Regulation 517/2014/EU on FGGs- Global warming potential: 4, Annex IV: Method of calculating the total GWP of a mixture: The GWP of the following non-fluorinated substances are used to calculate the GWP of mixtures.

SECTION 13: DISPOSAL CONSIDERATIONS	
13.1. Waste treatment methods	

Waste type (EU Commission Regulation 1357/2014): HP3. Waste type: Flammable.

General information:

Do not discharge to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Refer to manufacturer or supplier for information on recovery or recycling.

Disposal methods

Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", http://www.eiga.org) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state or local laws.

European Waste Codes:

Container: 16 05 04*: gases in pressure containers (including halons) containing hazardous substances.

EU legistlation: Directive 2008/98/ETY, 2014/955/EU, EU Comission Regulation nr 1357/2014.

National legistlation (FI): Waste Act, 646/2011, 1104/2011, 195/2012, 1178/2013, 25/2014, 410/2014, 528/2014, 1062/2015, 1518/2015, 328/2016, 996/2016, 626/2017, 834/2017, 321/2018, 445/2018, 686/2018, 757/2018, 967/2018, 247/2019, 438/2019, 1421/2019.

SECTION 14: TRANSPORT INFORMATION 14.1 UN Number



Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

ADR 14.1 UN Number UN 1011 14.2 UN Proper Shipping Name BUTANE 14.3 Transport Hazard Classes 2 14.4 Packing Group _ 2F Classification code Hazard No. 23 Labels 2.1 Tunnel restriction code (B/D) 14.5 Environmental Hazards Not applicable 14.6 Special precautions for users RID 14.1 UN Number UN 1011 14.2 UN Proper Shipping Name BUTANE 2 14.3 Transport Hazard Classes 14.4 Packing Group Class 2F Labels 2.1 14.5 Environmental Hazards Not applicalble 14.6 Special precautions for user: IMDG 14.1 UN Number UN 1011 14.2 UN Proper Shipping Name BUTANE 14.3 Class 2.1 14.3 Packing Group _ Labels 2.1 EmS No. F-D, S-U 14.5 Environmental Hazards Not applicable 14.6 Special precautions for user ΙΑΤΑ 14.1 UN Number UN 1011 14.2 UN Proper Shipping Name BUTANE 14.3 Transport Hazard Classes 2.1 14.4 Packing Group Packing instructions (cargo) 200 Packing instructions (pass.) Not permitted for transport Class 2.1 14.5 Environmental Hazards Not applicable 14.6 Special precautions for user Other information

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable.



SDS according to setting: EU 2015/830

Additional instructions:

- Avoid transport on vehicles where the load space is not separated from the driver's compartment.
- Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
- Before transporting product containers ensure that they are firmly secured.
- Ensure that the container valve is closed and not leaking.
- Container valve guards or caps should be in place.
- Ensure adequate air ventilation

SECTION 15: REGULATORY INFORMATION	
15.1	Safety, health and environmental regulations / legislation specific for the substance or mixture

EU Regulations

- Regulation (EC) No 517/2014 on fluorinated greenhouse gases
- Regulation (EC) No 1907/2006 Annex XVII Restrictions on manufacture, placing on the market and use of certain dangerous substances, mixtures and articles.
- Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work.
- Regulation (EU) 2016/425 on personal protective equipment.
- Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX).
- Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.
- This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

National regulations:

- Chemicals Act 599/2013
- Act amending the Chemicals Act 554/2014, 746/2016, 199/2017, 656/2018, 756/2018, 711/2020.
- Classification and Labeling of Chemicals 807/2001: amendment 687/2005, 206/2007, 655/2008, 6/2010
- Government Decree on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products 837/2005.
- Government Decree on the limitation of emissions to air from certain activities and Installations using organic solvents 64/2015
- Waste Act, 646/2011, 1104/2011, 195/2012, 1178/2013, 25/2014, 410/2014, 528/2014, 1062/2015, 1518/2015, 328/2016, 996/2016, 626/2017, 834/2017, 321/2018, 445/2018, 686/2018, 757/2018, 967/2018, 247/2019, 438/2019, 1421/2019.
- Concentrations known as harmful 268/2014

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out.



Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

SECTION 16: OTHER INFORMATION

Revision information: -

Data sources of this SDS

Safety Data Sheet provided by the manufacturer. Legislation on hazardous chemicals valid at the time of writing. European Chemicals Agency, Guidance on the compilation of safety data sheets / REACH Regulation (EU) 1907/2006, ARTICLE 31: Requirements for safety data sheets. European Chemicals Agency, Information on registered substances. International Programme on Chemical Safety.

WWW-SOURCES

echa.europa.eu eiga.org esis.jrc.ec.europa.eu eur-lex.europa.eu atsdr.cc.gov www.lvm.fi/en/home http://toxnet.nlm.nih.gov/ http://www.who.int/ipcs/en/ www.ericards.net

Rating methods of classification

Regulation (EU) No 1272/2008 (CLP), Regulation on classification, labeling and packaging of substances and mixtures.

Precautionary, Wording of the H-statements in section 2 and 3

H220 Extremely flammable gas H280 Contains gas under pressure, may explode on heated.

Classification according to Regulation (EC) N:o 1272/2008 as amended

Flam. Gas. 1, H220 Press. Gas Liquefied Gas; H280

Training information

It is recommended that persons handling the product have minimum training in the prevention and protection of work-related hazards. This makes it easier to understand and interpret the safety data sheet and product labels. Users of breathing apparatus must be trained. Ensure all operators understand the flammability hazard.

Other information

Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Ensure equipment is adequately earthed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.



Product name / chemical name: R600 / Butane

SDS according to setting: EU 2015/830

Other information

Disclaimer:

This information is provided without warranty. The data is trusted to be flawless. This information should be used to make an independent determination of the practices that protect workers and the environment.

The information contained in this MSDS is based on sources, scientific and technical knowledge, existing national and EU legislation.

The release is intended to serve the safe use of the product. We do not know or control the working methods or conditions of the users of the product. The user is always ultimately responsible for taking measures to ensure compliance with the regulations in force in the handling, storage, use and disposal of chemicals.

In this context, it is noted that the information provided in the SDS also helps employers to fulfill their obligations under Directive 98/24 / EU10 on the protection of the health and safety of workers from the risks related to chemical agents at work.

On the basis of the safety data sheet, users should be able to take the necessary measures in the field of health and safety to ensure safety and protect the environment.

The Safety Data Sheet is provided for in Article 31 of REACH Regulation (EU) No 1907/2006 and in Annex II to the Regulation.