MATERIAL SAFETY DATA SHEET

Material Name: RS-1000 **Fuel Cells For Nailer** **MSDS ID:** FID-100018 (EU)

Section 1 - Chemical Product and Company Identification

Name Of Substance/Preparation: RS-1000 FUEL CELL FOR NAILER
Synonyms: None
Manufacturer Information:

Richard Schulze GmbH
Industriestr. 1
61200 Wölfersheim

06036 - 888 (phone)
06036 - 887 (fax)
info@richard-schulze.de
0162 2547991 (Emergency)

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

This product is a preparation

Component Information:

Component	CAS #	EINECS#	Percent w/w	EU Classification
PROPANE	74-98-6	200-827-9	60 - 80	F+; R12
N-BUTANE	106-97-8	203-448-7	15 - 25	F+; R12
ISOBUTANE	75-28-5	200-857-2	20 - 40	F+; R12

The full text for all R-phrases are displayed in Section 15

SECTION 3 - HAZARDS IDENTIFICATION

Hazard classification (*The classification is according to the EU Directive 1999/45/EC, and extended by company and literature data):*

F+; R12

Physical/Chemical Hazards: Extremely flammable. Can cause flash fire. Compressed gas or refrigerated liquid. Contents under pressure.

Human health hazards:

Eyes

Contact with the liquefied or pressurized gas may cause momentary freezing followed by swelling and eye damage.

Skin

Contact with the liquefied or pressurized gas may cause frostbite ("cold" burn). This material is a gas under normal atmospheric conditions. No harmful effects from skin absorption are expected.

Ingestion

This material is a gas under normal atmospheric conditions and ingestion is unlikely.

Inhalation

Asphyxiant. High concentrations in confined spaces may limit oxygen available for breathing.

Environmental Hazards

Unlikely to cause ground or water pollution. Petroleum gases released into the environment will rapidly disperse into the atmosphere and undergo photochemical degradation.

SECTION 4 - FIRST AID MEASURES

Eye

For contact with the liquefied gas, hold eyelids apart and gently flush the affected eye(s) with lukewarm water. Seek immediate medical attention.

Skin

Treat burned or frostbitten skin by flushing or immersing the affected area(s) in lukewarm water. After sensation has returned to the frostbitten skin, keep skin warm, dry, and clean. If blistering occurs, apply a sterile dressing. Seek immediate medical attention.

Inhalation

If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion

This material is a gas under normal atmospheric conditions and ingestion is unlikely.

SECTION 5 - FIRE FIGHTING MEASURES

Flash Point:	-60 °C / -140 °C	**Method Used:**	Closed Cup
Upper Flammable Limit (UFL):	9.5	**Lower Flammable Limit (LFL):**	1.8

General Fire Hazards

This material is flammable and can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. If container is not properly cooled, it can rupture in the heat of a fire. Closed containers exposed to extreme heat can rupture due to pressure buildup.

Hazardous Combustion Products

Carbon dioxide and carbon monoxide

Extinguishing Media

Dry chemical or carbon dioxide is recommended. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Fire Fighting Equipment/Instructions

For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Stay away from ends of container. Stop spill/release if it can be done with minimal risk. If this cannot be done, allow fire to burn. Cool equipment exposed to fire with water, if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Containment Procedures

Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof electrical equipment is recommended.

Clean-Up Procedures

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate danger area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant. Water spray may be useful in minimizing or dispersing vapors.

Evacuation Procedures

In case of large spills, follow all facility emergency response procedures.

SECTION 7 - HANDLING AND STORAGE

Handling Procedures

Avoid breathing vapors or spray mists. Avoid contact with skin and eyes.
Contents under pressure. The use of explosion-proof electrical equipment is recommended and may be required.
The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits.

Storage Procedures

Pressurized container: must not be exposed for temperatures above 50 °C
Ground all equipment containing material.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Occupational Exposure Limits

Propane (74-98-6)

ACGIH:	1000 ppm TWA (listed under Aliphatic hydrocarbon gases alkane C1-C4)
German DFG:	1000 ppm MAK; 1800mg/m3 MAK 2000 ppm Peak; 3600mg/m3 Peak
Switzerland:	4000 ppm STEL; 7200 mg/m3 STEL; 1000 ppm MAK; 1800 mg/m3 MAK

n-butane (106-97-8)

ACGIH:	1000 ppm TWA (listed under Aliphatic hydrocarbon gases alkane C1-C4)
German DFG:	1000 ppm MAK; 2400 mg/m3 MAK (Listed under Butane) 4000 ppm Peak; 9600 mg/m3 Peak (Listed under Butane)
OEL (Switzerland):	800 ppm VLA-ED; 1900 mg/m3 MAK

Isobutane (75-28-5)

ACGIH:	1000 ppm TWA (listed under Aliphatic hydrocarbon gases alkane C1-C4)
German DFG:	1000 ppm MAK; 2400 mg/m3 MAK (Listed under Butane) 4000 ppm Peak; 9600 mg/m3 Peak (Listed under Butane)
OEL (Switzerland):	800 ppm VLA-ED; 1900 mg/m3 MAK

Engineering Controls

If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used.

Personal Protective Equipment

Eyes/Face: Chemical goggles.
Skin: Rubber gloves are recommended.
Respiratory: In case of brief exposure or low pollution, use respiratory filter device. In case of intensive or longer exposure, use self-contained respiratory protective device.
Other Protection: Appropriate clothing to prevent any possibility of liquid contact and repeated or prolonged vapor contact.
General: Do not smoke in work area! Wash at the end of each work shift and before eating, smoking and using the toilet. Promptly remove any clothing that becomes contaminated. When using do not eat, drink or smoke.

SECTION 9 - PHYSICAL & CHEMICAL PROPERTIES

Physical state:	Compressed gas	**Color:**	Colorless
Odor:	Slight petroleum smell	**pH:**	NA
Vapor Density:	ND	**Vapor Pressure:**	ND
Boiling Point:	-11.7 °C / - 42.1°C	**Melting point:**	-160 °C / -187.1 °C
Solubility (H2O):	Negligible	**Specific Gravity (H_2O = 1):**	1.56 / 2.01

SECTION 10 - CHEMICAL STABILITY & REACTIVITY INFORMATION

Chemical Stability
Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Flammable gas

Conditions to Avoid
Avoid all possible sources of ignition. Avoid contact with strong oxidizing agents.

Hazardous Decomposition
Carbon monoxide, carbon dioxide.

Hazardous Polymerization
Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

Acute And Chronic Toxicity

Component Analysis - LD50/LC50

N-butane (106-97-8)

Inhalation LC50 Rat:	658000 mg/L/4H

Isobutane (75-28-5)

Inhalation LC50 Rat:	658000 mg/L/4H

Sensitization: No data available for this product.
Mutagenicity: No data available for this product.
Teratogenicity: No data available for this product.
Carcinogenicity:

Component Carcinogenicity

Isobutane (75-28-5)

United Kingdom:	R45 (may cause cancer); (containing at least 0.1% butadiene)

SECTION 12 - ECOLOGICAL INFORMATION

Component Analysis - Ecotoxicity - Aquatic Toxicity

There is no information available on the ecotoxicological effects of petroleum gases. Because of their high volatility, they are unlikely to cause ground or water pollution. Petroleum gases released into the environment will rapidly disperse into the atmosphere and undergo photochemical degradation.

Environmental Fate

No information available for the product.

Other adverse effects

No information available for the product.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Instructions

Do not crush, puncture or incinerate spent containers. Large numbers or aerosol containers may require handling as a hazardous waste. Consult local government agencies for the proper disposal method in your area.

SECTION 14 - TRANSPORTATION INFORMATION

The description shown below may not apply to all shipping situations. Consult appropriate Dangerous Goods Regulations for additional description requirements and mode-specific or quantity specific shipping requirements.

International Transportation Regulations:

RID/ADR (cross-border):

Class:	2.1
UN Number:	1950
Label:	Flammable gas
Packaging group:	--
Proper shipping name:	Aerosols, flammable

IMO/IMDG:

Class:	2.1
UN Number:	1950
Label:	Flammable gas
Packaging group:	--
Proper shipping name:	Aerosols, flammable

DOT:

Class:	2.1
UN Number:	1950
Label:	Flammable gas
Packaging group:	--
Proper shipping name:	Aerosols, flammable

TDG:

Class:	2.1
UN Number:	1950
Label:	Flammable gas
Packaging group:	--
Proper shipping name:	Aerosols, flammable

SECTION 15 - REGULATORY INFORMATION

Product Classification and Labeling (EEC)

The following product has labeling requirements under Council Directive 67/548/EEC, Annex I.

Classification:

Extremely flammable

Label Information:

R12 Extremely flammable.
S9 Keep container in a well-ventilated place.
S16 Keep away from sources of ignition - No Smoking.

Contains: PROPANE (EC 200-827-9), ISOBUTANE (EC 200-857-2)

Additional International Regulatory Information

Component Analysis – Inventory

Component	CAS #	TSCA	DSL	EINECS
Propane	74-98-6	Yes	Yes	Yes
n-Butane	106-97-8	Yes	Yes	Yes
Isobutane	75-28-5	Yes	Yes	Yes

SECTION 16 - OTHER INFORMATION

Disclaimer:

Supplier gives no warranty of merchantability or of fitness for a particular purpose. Any product purchased is sold on the assumption the purchaser will make his own tests to determine the quality and suitability of the product. Supplier expressly disclaims any and all liability for incidental and/or consequential property damage arising out of the use of this product. No information provided shall be deemed to be a recommendation to use any product in conflict with any existing patent rights. Read the Material Safety Data Sheet before handling product.

Key/Legend

NA = Not available or Not Applicable. ND = Not determined or No data. MAC = Maximum Allowable Concentration. TWA = Time Weighted Average. ACGIH = American Conference of Governmental Industrial Hygienists. IARC = International Agency for Research on Cancer. TSCA = Toxic Substance Control Act. DSL = Domestic Substances List (Canada). EINECS = European Inventory of Existing Commercial Substances

Sources used

EU Directive 2001/58/EC
EU Directive 1999/45/EC
EU Directive 67/548/EEC

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