

# Material Safety Data Sheet

Fuel Cartridge - M5, M10, M28

## 1. Product and company identification

<b>Product name</b>	: Fuel Cartridge - M5, M10, M28
<b>Supplier</b>	: SFC Energy AG
<b>Supplier/Manufacturer</b>	: Eugen-Sänger-Ring 7 D-85649 Brunnthal Tel +49 (0)89 673-592 Fax +41 (0)89 673-592-369 info@sfc.com
<b>Synonym</b>	: alcool methylique (french); alcool metilico (italian); carbinol; colonial spirit; columbian spirit; columbian spirits (dot); methanol (dot); metanolo (italian); methyl alcohol; methyl alcohol (dot); methylol; methylalkohol (german); methyl hydroxide; metylowy alkohol (polish); monohydroxymethane; pyroxylic spirit; wood alcohol; wood naphtha; wood spirit
<b>Material uses</b>	: FUEL CELL CARTRIDGES
<b>Code</b>	: Not available.
<b>MSDS #</b>	: Not available.
<b>Validation date</b>	: 17.09.2010.
<b>Print date</b>	: 21.09.2010.
<b>Responsible name</b>	: Chemical Check GmbH
<b>e-mail address of person responsible for this SDS</b>	: info@chemical-check.de; k.schnurbusch@chemical-check.de
<b>In case of emergency</b>	: Tel +49 (0)89/19240
<b>Product type</b>	: Liquid.

## 2. Hazards identification

<b>Physical state</b>	: Liquid. [Clear.]
<b>Odor</b>	: Sweet. Characteristic. Pungent.
<b>Emergency overview</b>	: DANGER!  FLAMMABLE LIQUID AND VAPOR. MAY BE FATAL IF INHALED. HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY CAUSE SKIN IRRITATION. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE BIRTH DEFECT HAZARD - MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA.  Flammable liquid. Very toxic by inhalation. Harmful in contact with skin and if swallowed. Irritating to eyes and respiratory system. Slightly irritating to the skin. Defatting to the skin. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. May cause target organ damage, based on animal data. May cause birth defects, based on animal data. May cause developmental abnormalities, based on animal data. Avoid exposure during pregnancy. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
<b>Routes of entry</b>	: Dermal contact. Eye contact. Inhalation. Ingestion.
<b>Potential acute health effects</b>	
<b>Inhalation</b>	: Very toxic by inhalation. Irritating to respiratory system.
<b>Ingestion</b>	: Toxic if swallowed.
<b>Skin</b>	: Toxic in contact with skin. Slightly irritating to the skin.
<b>Eyes</b>	: Irritating to eyes.

## 2. Hazards identification

### Potential chronic health effects

- Chronic effects** : May cause target organ damage, based on animal data. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.
- Carcinogenicity** : No known significant effects or critical hazards.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : May cause birth defects, based on animal data.
- Developmental effects** : May cause developmental abnormalities, based on animal data.
- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : May cause damage to the following organs: kidneys, liver, brain, gastrointestinal tract, upper respiratory tract, skin, eyes, central nervous system (CNS), optic nerve.

### Over-exposure signs/symptoms

- Inhalation** : Adverse symptoms may include the following:  
respiratory tract irritation  
coughing
- Ingestion** : No specific data.
- Skin** : Adverse symptoms may include the following:  
irritation  
redness  
dryness  
cracking
- Eyes** : Adverse symptoms may include the following:  
pain or irritation  
watering  
redness

- Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

## 3. Composition/information on ingredients

Name	CAS number	%
Methanol	67-56-1	60-100

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

## 4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Call medical doctor or poison control center immediately. Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

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### 4. First aid measures

- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

### 5. Fire-fighting measures

- Flammability of the product** : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.
- Extinguishing media**
- Suitable** : Use dry chemical, CO<sub>2</sub>, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Not available.
- Special remarks on explosion hazards** : Not available.

### 6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

## 6. Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

## 7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

- Storage** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## 8. Exposure controls/personal protection

<u>Occupational exposure limits</u>		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	Other	Notations
Methanol	US ACGIH 1/2009	200	262	-	250	328	-	-	-	-	[1]
	AB 4/2009	200	262	-	250	328	-	-	-	-	[1]
	BC 9/2009	200	-	-	250	-	-	-	-	-	[1]
	ON 8/2008	200	260	-	250	325	-	-	-	-	[1]
	QC 6/2008	200	262	-	250	328	-	-	-	-	[1]

[1]Absorbed through skin.

**Consult local authorities for acceptable exposure limits.**

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

- Engineering measures** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

## 8. Exposure controls/personal protection

<b>Hygiene measures</b>	: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
<b>Personal protection</b>	
<b>Respiratory</b>	: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapor filter (Type AX)
<b>Hands</b>	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. >8 hours (breakthrough time): Butyl gloves. 1-4 hours (breakthrough time): Viton
<b>Eyes</b>	: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Recommended: Tight fitting protective goggles with side shields.
<b>Skin</b>	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: Long-sleeved protective clothing.
<b>Environmental exposure controls</b>	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.
<b>Other protection</b>	: Not available.
<b>Personal protective equipment (Pictograms)</b>	: Not available.

## 9. Physical and chemical properties

<b>Physical state</b>	: Liquid. [Clear.]
<b>Flash point</b>	: Closed cup: 11°C (51,8°F)
<b>Burning time</b>	: Not applicable.
<b>Burning rate</b>	: Not applicable.
<b>Auto-ignition temperature</b>	: 464°C (867,2°F)
<b>Flammable limits</b>	: Lower: 5,5% Upper: 44%
<b>Color</b>	: Colorless.
<b>Odor</b>	: Sweet. Characteristic. Pungent.
<b>Taste</b>	: Not available.
<b>Molecular weight</b>	: 32,05 g/mole
<b>Molecular formula</b>	: C-H4-O
<b>pH</b>	: Not available.
<b>Boiling/condensation point</b>	: 64,7°C (148,5°F)
<b>Melting/freezing point</b>	: -98°C (-144,4°F)
<b>Critical temperature</b>	: Not available.
<b>Relative density</b>	: 0,792
<b>Vapor pressure</b>	: 12,8 kPa (96 mm Hg)

## 9. Physical and chemical properties

<b>Vapor density</b>	: 1,11 [Air = 1]
<b>Volatility</b>	: Not available.
<b>Odor threshold</b>	: Not available.
<b>Evaporation rate</b>	: 2,1 (butyl acetate = 1)
<b>SADT</b>	: Not available.
<b>Viscosity</b>	: Dynamic: 0,597 mPa·s (0,597 cP)
<b>Ionicity (in water)</b>	: Not available.
<b>Dispersibility properties</b>	: Not available.
<b>Solubility</b>	: Soluble in the following materials: cold water and hot water.
<b>Physical/chemical properties comments</b>	: Not available.

## 10. Stability and reactivity

<b>Chemical stability</b>	: The product is stable.
<b>Conditions to avoid</b>	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas. Avoid exposure during pregnancy.
<b>Materials to avoid</b>	: Reactive or incompatible with the following materials: oxidizing materials
<b>Hazardous decomposition products</b>	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
<b>Possibility of hazardous reactions</b>	: Under normal conditions of storage and use, hazardous reactions will not occur.

## 11. Toxicological information

### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Methanol	LC50 Inhalation Gas.	Rat	64000 ppm	4 hours
	LD50 Dermal	Rabbit	15800 mg/kg	-
	LD50 Oral	Rat	5600 mg/kg	-

**Conclusion/Summary** : Not available.

### Chronic toxicity

Not available.

**Conclusion/Summary** : Not available.

### Irritation/Corrosion

Not available.

**Conclusion/Summary** : Not available.

### Sensitizer

Not available.

**Conclusion/Summary** : Not available.

### Carcinogenicity

Not available.

**Conclusion/Summary** : Not available.

## 11. Toxicological information

**Classification**

Not available.

**Mutagenicity**

Not available.

**Conclusion/Summary** : Not available.

**Teratogenicity**

Not available.

**Conclusion/Summary** : Not available.

**Reproductive toxicity**

Not available.

**Conclusion/Summary** : Not available.

**Synergistic products** : Not available.

## 12. Ecological information

**Ecotoxicity** : Readily biodegradable This product shows a low bioaccumulation potential.

**Aquatic ecotoxicity**

Product/ingredient name	Result	Species	Exposure
Methanol	Acute LC50 2500000 ug/L Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 3289 mg/L Fresh water	Daphnia - Daphnia magna - Neonate - <24 hours	48 hours
	Acute LC50 >100000 ug/L Fresh water	Fish - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 0,2 to 0,5 g	96 hours

**Conclusion/Summary** : Not available.

**Persistence/degradability**

Not available.

**Conclusion/Summary** : Not available.

**Octanol/water partition coefficient** : -0,77

**Bioconcentration factor** : Not available.

**Mobility** : Not available.

**Toxicity of the products of biodegradation** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

## 13. Disposal considerations

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

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### 13. Disposal considerations





**Waste stream** : Not available.

**RCRA classification** : Not available.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

### 14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
<b>TDG Classification</b>	UN3473	FUEL CELL CARTRIDGES	3	-		-
<b>ADR/RID Class</b>	UN3473	FUEL CELL CARTRIDGES	3	-		<b>Limited quantity</b> LQ13
<b>IMDG Class</b>	UN3473	FUEL CELL CARTRIDGES	3	-		<b>Emergency schedules (EmS)</b> F-E, S-D
<b>IATA-DGR Class</b>	UN3473	Fuel cell cartridges	3	-		<b>Passenger and Cargo Aircraft</b> Quantity limitation: 5 kg Packaging instructions: 374 <b>Cargo Aircraft Only</b> Quantity limitation: 50 kg Packaging instructions: 374 <b>Limited Quantities - Passenger Aircraft</b> Quantity limitation: Forbidden Packaging instructions: Forbidden

PG\* : Packing group

### 15. Regulatory information

**United States inventory (TSCA 8b)** : This material is listed or exempted.

**WHMIS (Canada)** : Class B-2: Flammable liquid  
Class D-1B: Material causing immediate and serious toxic effects (Toxic).  
Class D-2A: Material causing other toxic effects (Very toxic).  
Class D-2B: Material causing other toxic effects (Toxic).

**Canadian lists**

**Canadian NPRI** : This material is listed.



## 15. Regulatory information

**CEPA Toxic substances** : This material is not listed.

**Canada inventory** : This material is listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

### EU regulations

**Hazard symbol or symbols** :



**Risk phrases**

: R11- Highly flammable.  
R23/24/25- Toxic by inhalation, in contact with skin and if swallowed.  
R39/23/24/25- Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

**Safety phrases**

: S1/2- Keep locked up and out of the reach of children.  
S7- Keep container tightly closed.  
S16- Keep away from sources of ignition - No smoking.  
S36/37- Wear suitable protective clothing and gloves.  
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

### International regulations

**International lists**

: **Australia inventory (AICS)**: This material is listed or exempted.  
**China inventory (IECSC)**: This material is listed or exempted.  
**Japan inventory**: This material is listed or exempted.  
**Korea inventory**: This material is listed or exempted.  
**New Zealand Inventory of Chemicals (NZIoC)**: This material is listed or exempted.  
**Philippines inventory (PICCS)**: This material is listed or exempted.

**Chemical Weapons  
Convention List Schedule I  
Chemicals**

: Not listed

**Chemical Weapons  
Convention List Schedule  
II Chemicals**

: Not listed

**Chemical Weapons  
Convention List Schedule  
III Chemicals**

: Not listed

## 16. Other information

**Label requirements**

: FLAMMABLE LIQUID AND VAPOR. MAY BE FATAL IF INHALED. HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY CAUSE SKIN IRRITATION. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE BIRTH DEFECT HAZARD - MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA.

**Hazardous Material  
Information System (U.S.A.)**

:

Health	*	4
Flammability		3

## 16. Other information

Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

References	: Not available.
Other special considerations	: Not available.
Date of printing	: 21.09.2010.
Date of issue	: 17.09.2010.
Date of previous issue	: No previous validation.
Version	: 1

Indicates information that has changed from previously issued version.

### Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.