Material Safety Data Sheet

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MATERIAL SAFETY DATA SHEET

According to Directive: 93/112/EU

1.1 IDENTIFICATION OF THE PRODUCT

Name:	Calcium carbide
CAS-No.:	75-20-7
UN-No.:	1402
EINECS-No.:	200-848-3
EU - No.:	006-004-00-9

1.2 IDENTIFICATION OF THE MANUFACTURER / SUPPLIER

Name:	Carbide Industries Limited
Address:	Althorpe Wharf, Keadby, Scunthorpe UNITED KINGDOM, DN17 3DA
Telephone:	+44 1724 782383

1.3 EMERGENCY TELEPHONE

Telephone:	NCEC	+ 44 1865 407333

2. COMPOSITION

CAS-No.	CHEMICAL NAME	CONC. (WEIGHT-%)	HAZARD CLASSIFICATION
75-20-7	Calcium carbide	~80	F - Highly flammable R -15: Contact with water liberates highly flammable gas.
1305-78-8	Calcium oxide	~15	C - Corrosive R -34: Causes burns.

3. HAZARD IDENTIFICATION

Reacts with water to form $Ca(OH)_2$ and flammable acetylene, which forms explosive mixture with air. By contact with water (humidity), acetylene gas with anaesthetic effect is liberated. Simultaneously, very small amounts of poisonous phosphine and hydrogen sulphide gas are set free.
Residue contains Calcium hydroxide which may cause burns.

4. FIRST AID MEASURES

Acute poisoning due to handling of calcium carbide is unlikely to occur if usual safety precautions are taken.

Skin:	Remove contaminated clothes immediately. Flush exposed skin abundantly with clean water and cover with sterile compress (do not use compress for burns).
Eyes:	Flush abundantly with clean water for at least 15 minutes forcing the eye-lids open. *Immediate transport* to hospital or eye specialist.
Inhalation:	By poisoning caused by inhalation of phosphine (and arsine) gas from moist calcium carbide : remove the victim from the source of exposure as quickly as possible. Usual first aid: rest , warmth, fresh air,. *By unconsciousness :* Loosen tight-fitting clothes, place the body in a stable, lateral position. *By breathing difficulties:* Give oxygen. *By breathing arrest* : Artificial respiration. *By heart arrest*: External heart compression. *Immediate transport to hospital* preferably under administration of oxygen.
Ingestion:	Not relevant.

5. FIRE-FIGHTING MEASURES

Dry calcium carbide is not inflammable. Contact with humidity and water liberates acetylene gas which is highly inflammable and can form explosive mixtures with air. The gas is lighter than air.

Fire extinction:	*Small fires*: Dry powder, lime or dry sand. *Large fires*: Withdraw from area and let fire burn.
Do not use:	Water or foam.
Protective measures:	If staying in atmosphere containing acetylene is unavoidable, be aware of the high risk of explosion and wear self-containing breathing equipment.

6. ACCIDENTAL RELEASE MEASURES

Be aware of the possibility of acetylene gas formation on contact with humid atmospheres or water.

- Shut off ignition sources.
- Stay upwind.
- Keep people and animals away from the polluted area.
- Removal: Collect material in suitable containers which must not be tightly closed. Protect the spilled material from contact with water and do not allow it to enter water courses.

Water contamination: Calcium Carbide should not be let into the sea, lakes, rivers etc. By the reaction with water alkaline calcium hydroxide is formed which is harmful to fish and marine organisms. Observe possible national/international pollution regulations.
Contamination of streets and the environments: Proceed as described previously. Evacuate the polluted area. Material remaining after collection must not be dumped into the public sewer.

In case of spillage affecting the environment, consult the authorities (pollution agency etc.) according to local regulations and rules. By serious accidents, inform the authorities concerned.

See also Sections 8, 12 and 13

7.1 HANDLING

- Keep tightly closed in a dry and cool place. Handle and open container with care.
- Use spark proof tools.
- Protect against humid air and water.
- Keep away from sources of ignition.
- No smoking.

7.2 STORAGE

- Calcium carbide must be stored in tightly closed containers in a dry, well ventilated place without sprinkler protection.
- Exclude possible sources of ignition of acetylene gas.
- Even traces of humidity will cause liberation of explosive acetylene gas.
- It should be stored separately from silver, mercury, copper and copper alloys.
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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

The working operation should be arranged in such a way that formation of dust is reduced to a minimum. Avoid moisture. Provide good ventilation.

Respiratory protection: For working operations involving *dust formation*, use approved dust mask (P2). In case of possible presence of phosphine-, (arsine-) and hydrogen sulphide gas: use combination filter or preferably fresh air mask until control measurements are done.
Hand Protection: Rubber gloves
Eye protection: Safety goggles, eye flushing facilities

Occupational Exposure Standards	Long-term Exposure (8 hour TWA reference period) ppm (mg/m^3)			Short-term Exposure Limit (15 minute reference period) ppm (mg/m^3)		
	UK[1]	USA[2]	I. Germ.[3]	UK	USA	Germ.
Calcium carbide			Not stated			
Acetylene-gas (C_2H_2)			Simple asphyxiant			
Phosphine-gas (PH_3)	0,3 (0,4)	0,3 (0,42)	0,1 (0,15)	1 (1)	1 (1,4)	- (-)
Arsine-gas (AsH_3)	0,05 (0,2)	0,05 (0,16)	0,05 (0,2)	- (-)	- (-)	- (-)
Hydrogen sulphide-gas (H_2S)	10 (14)	10 (14)	10 (15)	15 (21)	15 (21)	- (-)
Ammonia (NH_3)	25 (18)	25 (17)	50 (35)	35 (27)	35 (24)	- (-)
Calcium hydroxide ($Ca(OH)_2$)	- (5)					

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Lump-formed or granular, dark grey material
Smell: Onion-like, due to presence of phosphine or arsine as impurities.

Calcium Carbide:			Relative density	:	2.3 g/cm^3
Boiling point:	:	NA	Bulk density	:	~1100 kg/m^3
Melting point:	:	1700 - 1950°C			
Flash point:	:	Does not flash if dry	**Acetylene:**		
pH - value	:	NA	Explosion limit in air	:	1.5 – 82%
Vapour pressure (20^{o}C)	:	<<1 mbar (in dry air)	Ignition temperature	:	305°C
Solubility (water)	:	Reacts heavily	Specific gravity (air =1)	:	0.91

10. STABILITY AND REACTIVITY

Calcium carbide reacts violently with water with the liberation of flammable acetylene gas and the formation of corrosive calcium hydroxide solution. Small amounts of phosphine, arsine, hydrogen sulphide and ammonia are also released.
Even very small amounts of water will react with calcium carbide developing sufficient heat to make the acetylene gas ignite spontaneously.
Acetylene will react with copper, silver and mercury creating explosive compounds (acetylides which are shock and temperature sensitive.

11. TOXICOLOGICAL INFORMATION

Handling of dust - free, lumped-formed Calcium Carbide is not considered to be a health risk when safety precautions are taken.

Skin: Dust may irritate moist skin and can cause skin ulceration and eczema.
Eyes: Dust may damage the cornea and can in serious cases cause blindness.
Inhalation: Symptoms of acute poisoning are : nausea, vomiting, disorientation, burning sensation in the nose or throat and breathing difficulties.

12. ECOLOGICAL INFORMATION:

The decomposition products of calcium carbide, acetylene and calcium hydroxide are harmful to fish.

Acetylene: 200 mg/l lethal for trout fry
400 mg/l lethal for gold fish within 24 -48 hrs.
$Ca(OH)_2$: 20 mg/l harmful to fish.
70 mg/l lethal after 26 minutes

13. DISPOSAL CONSIDERATIONS

Small amounts of Calcium Carbide are collected and mixed with diatomaceous earth at a safe place in the open air. Add small portions of water in a suitable, open container. Ignite the acetylene gas with a pilot flame. Let burn out, and stay for 24 hours. Decant the fluid part and transfer the solid precipitate to an approved site for deposition or burial.
Equipment etc. can be cleaned with water. Observe the possibility of acetylene gas formation and use protective equipment.

14. TRANSPORT INFORMATION.

Calcium Carbide must only be packed and transported in packing according to international transport regulations. The packing must be strong and tightly closed to prevent access of humidity to the material.

UN No.	:	1402
Air Transport (ICAO-TI/IATA-DGR)	:	Class 4.3, P.G. II, P/A: 416/15 Kg CAO: 418/50 Kg
Sea Transport (IMDG-Code, Amdt. 25-89)	:	Class 4.3, PG. II, Page 4335 EMS: 4.3-03 MFAG:705 Stowage Cat.: B
Road Transport (ADR)	:	Class 4.3, Item 17(b) Kemlercode: 423/1402
Rail Transport (RID)	:	Class 4.3, Item 17(b) Kemlercode: 423/1402
CEFIC - Card	:	(R) - 192

For further information about the different transport classes, consult national / international transport authorities.

15. REGULATORY INFORMATION

According to EU-Dir. 67/548, as amended, the product is labelled as follows:

F -	Highly flammable
R 15	Contact with water liberates highly flammable gases
S 8	Keep container dry
S 43	In case of fire, use dry sand (i.e.) dry powder. Never use water.

16. OTHER INFORMATION

The information given here is based on the present state of our knowledge and describes our product under the aspect of safety. It should not therefore be construed as guaranteeing specific properties.

[1] Environmental Health Series No. 40 (EH 40), The Health and Safety Executive. Occupational Exposure Limits 1984.
[2] Threshold Limit Values 1992 - 1993, American Conference of Governmental Industrial Hygienists (ACGIH).
[3] List of MAK- and BAT-values. Commission for the investigation of health hazards of chemical components in the work area. Report No. 29. Deutsche Forschungsgemeinschaft. 1993.