



# Material Safety Data Sheet

## Carbon Di-Sulfide

### Section 1. Chemical Product and Company Identification

Trade Name	Carbon Disulfide	Validation date	31/12/2015
Material Used	For manufacturing of viscos rayon, cellphone films, rubber vulcanization, accelerators, xanthates, several fungicides, soil fungicides, insecticides and their intermediates, pharma intermediates. CS <sub>2</sub> used as solvent for rubbers, waxes, fats, oils, plastics, Sulfur, Bromine, Phosphorus, Selenium & Iodine	Manufacture  In emergency call	Indo-Baijin Chemicals Pvt. Ltd., Z 7/1, DSEZL-1, Dahej Vagra, Dist. Bharuch Gujarat-392 130 +91 70461 77744
UN Number	1131	Packaging Group	I
Packaging Class	3	Sub Class (sub risk)	6.1

### Section 2. Hazards identification

Physical stat & appearance	Liquid. This material is classified as hazardous under OSHA regulations
Emergency overview	<b>DANGER</b> <ul style="list-style-type: none"> <li>Extremely flammable liquid and vapours. Vapours cause flash fire</li> <li>May be fatal if inhaled or swallowed. Causes eye &amp; skin irritation.</li> <li>Keep away from heat, sparks &amp; flame. Keep container closed. Avoid contact with eye, skin, &amp; clothing. Avoid breathing vapours or mist. Use only with adequate ventilation. Avoid exposure during pregnancy.</li> </ul>
Route of entry	Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effect	
Eye	High vapour concentration may cause irritation, estimated at 48-320 ppm (150-1000 mg/m <sup>3</sup> )
Skin	Can absorb through intact skin causing harmful effect similar to the inhalation given below. CS <sub>2</sub> can get absorbed through CS <sub>2</sub> & water mixture. Repeated & prolonged contact may cause blistering & burns.
Inhalation	It is very toxic & forms very high vapour concentration at room temperature posing high inhalation risk. Relatively low concentration can cause headache, dizziness, fatigue, excitement or depression, harmful effect on CNS (Central Nervous System). High concentration can cause serious psychological disturbance (includes excitability, confusion, extreme irritability, uncontrolled anger, emotional instability, nightmares, depression) & death (rapid death at 5000 ppm).
Ingestion	It's not a common route of exposure. Death have reported at ingestion of approx. 15 ml. Symptoms includes tremors, exhaustion, short breath, peripheral vascular collapse, reduced body temperature, dilation of pupils, convulsion, coma and death in few hours. Possibility of CS <sub>2</sub> inhaled in lungs (aspired) during ingestion or vomiting. Small amount of liquid aspiration in lungs can be life threatening.
Potential Chronic Health effect	Not classified as carcinogenic by OSHA. No data available to prove mutagenic No data available to prove Teratogenic Repeated exposure to high concentration may lead to health deterioration



# Material Safety Data Sheet

## Carbon Di-Sulfide

Over exposure symptoms	This includes problems related to central and peripheral nervous system, eye, cardiovascular system, kidney, liver and alcoholism.
------------------------	--

### Section 3. Composition/information on ingredients

Name	CAS#	% by weight
Carbon Disulfide	75-15-0	90-99.9

### Section 4. First Aid Measures

Eye contact	Immediately flush with running lukewarm water for 15-20 minutes keeping eye open. Repeat flushing if irritation persists. Seek medical attention IMMEDIATELY.
Skin contact	Remove contaminated cloths, leather items like shoes, watch band, belts etc. Wash skin with water and soap for about 20 minutes to remove chemical present on skin.
Inhalation	Move victim to fresh air, remove contaminated clothing to avoid further inhalation. Give CPR if there is no breathing and no pulse. Give artificial respiration if only breathing stopped. Avoid mouth-to-mouth contact by using mouth guard. Obtain medical attention IMMEDIATELY.
Ingestion	Don't induce vomiting. If victim is conscious & not feeling convulsing, rinse mouth with 240-300 ml of water to dilute the material. If spontaneous vomiting occurs, lean victim forward with head down avoid breathing in vomitus, rinse mouth & administer more water. Immediately contact local poison control center and transport victim to medical facility.
Note to physician	No specific antidote. Medical staff must contact poison information center.

### Section 5. Fire Fighting Measures

Flammability	
Auto Ignition Temp. (AIT)	90.05° C
Flash Point	Minus 15° C
Flammability Limit	Lower: 1 to 3 %; Upper: 50 %
Products of combustion	Decomposition products includes oxides of Carbon & Sulfur viz. CO, CO <sub>2</sub> , SO <sub>2</sub> , SO <sub>3</sub> etc.
Fire hazards in presence of various substances	Extremely flammable in presence of oxidizing materials, reducing materials, combustible materials, organic materials, metals, acids, alkalis, moisture.
Explosion hazards in presence of various substances	Due to low AIT, ignition energy & flash point, ignition can occur on contact with hot surfaces viz. bulb, steam or exhaust pipe, which can lead to explosion hazard. Vapours are heavier than air hence can travel considerable distance along ground to source of ignition & flash back to source of leak.
Firefighting media & instruction	Small Fire: Use DCP (Dry Chemical Powder) Lager Fire: Use ARF (Alcohol Resistance Foam) foam or water spray or fog. Cool container with water jet to avoid pressure built-up, auto-ignition or explosion. Water being lighter than CS <sub>2</sub> can act as blanker on CS <sub>2</sub> liquid which has not caught fire.
Protective Clothing	Normal firefighting PPEs will not provide adequate protection. Full body chemical protective clothing with SCBA may be necessary. Caution to be taken as CS <sub>2</sub> flame is nearly invisible. Don't apply water jet which may spread liquid and complicate the situation. Use water spray or fog gently on the surface of liquid. Isolate material which is not on fire and take away from fire point if safe to do so. Keep the container exposed to fire cool with water spray to avoid its explosion due to overheating, use



# Material Safety Data Sheet

## Carbon Di-Sulfide

	automatic (unmanned) water monitor in such situation and evacuate the area. Take care to avoid coming in line with flying splinter in exposition. If leak spill is not ignited use water spray to create water blanket and dilute the leak.
--	---

### Section 6. Accidental Release Measures

Small spill & leak	Soak in non-reacting absorbing materials, put material in suitable labelled container. Flush are with water.
Large spill & leak	To contain spill, dike with earth, sand or absorbent material which don't react with CS <sub>2</sub> . Remove liquid using flame proof pump or vacuum pump and put in suitable labelled container. Flush are with water Ground all equipment & contact surfaces to prevent ignition due to static electricity.

### Section 7. Handling and Storage

Handling	Keep container closed and away from heat, spark or flame. Ensure good ventilation, earthing, bonding & grounding (to avoid no static risk) to avoid fire & explosion risk. Use explosion proof electrical equipment and spark proof hand tools.
Storage	Keep in closed container in cool and ventilated, approved and segregated area. Ensure earthing, bonding & ground during transfer. Use spark proof tools and explosion proof electrical equipment.

### Section 8. Exposure Controls, Personal Protection

Engineering Control	Due to high potential hazards associated stringent controls viz. isolation & enclosure are necessary. Close handling is advisable while handling volumes. Use non sparking ventilation systems, intrinsically safe electrical appliances, approved explosion proof equipment, appliance and tools should be used in the area. General and local exhaust ventilation are required. The non-sparking, grounded ventilation system should be separate from other exhaust ventilation systems. Exhaust directed to the outside or to incineration system. For large scale operations install leak and fire detection system along with suitable automatic fire suppression system.
<b>Personal Protection</b>	
Eye	Splash goggle
Body	Lab coat or overalls
Respirators	NOISH recommended CS <sub>2</sub> vapours concentration in air: 10 ppm: Chemical organic vapour cartridge or Supply Air Respirator (SAR) Up to 25 ppm: SAR operated in continuous flow mode; or powered air purifying system with organic vapour cartridge. Up to 50 ppm: Full face organic chemical vapours cartridge; or powered air purifying system with organic vapour cartridge with full face mask; or gas mask with organic vapour canister; or SCBA; or full face mask SAR. Up to 500 ppm: positive pressure SAR.
Hand	Gloves – Recommended (resistance to breakthrough longer than for 8 Hrs.): PVA (Poly Vinyl Alcohol), Viton <sup>TM</sup> , 4H <sup>TM</sup> , Barricade <sup>TM</sup> , Responder <sup>TM</sup> . Recommended (resistance to breakthrough longer than 4 Hrs.): Trelchem HSP <sup>TM</sup> .



# Material Safety Data Sheet

## Carbon Di-Sulfide

Foot	Appropriate industrial footwear
Personal protection in case of large spill	Splash goggle, full suit, vapour respirator, boots, gloves, SCAB (should be used to avoid inhalation). Care beyond this suggested always recommended, can experts' advice.

Exposure limits		
	ACGIH TLV (US, 1/2006)	Skin: TWA: 1 ppm 8 Hrs.
	NISH REL (US, 12/2001)	Skin: TWA: 3 mg/m <sup>3</sup> or 1 ppm 10 Hrs. STEL: 30 mg/m <sup>3</sup> or 10 ppm for 15 mins.
	OSAH PEL Z2 (US, 11/2006)	TWA: 20 ppm 8 Hrs. CEIL: 30 ppm AMP: 100 ppm 30 mins.

### Section 9. Physical and Chemical Properties

Physical state / appearance	Liquid	Specific gravity	1.26 (water=1)
Colour	Colourless	Vapour pressure	39.7 kPa (297.6 mm Hg) (at 20° C)
Odour	Garlic / Pungent	Vapour density	2.63 (air=1)
Molecular weight	76.13 g/mole	Odour threshold	0.1 ppm
Molecular formula	CS <sub>2</sub>	Evaporation rate	10.9 compared with Butyl acetate
pH	Not available	LogKow	Not available
Boiling / Condensation point	46.17 ° C (115.1° F)	Solubility	Partially soluble in cold water, soluble in ethanol, methanol, diethyl ether, benzene, chloroform, carbon tetra chloride & oils
Melting / Freezing point	-111.6 ° C (-168.9° F)		

### Section 10. Stability and Reactivity

Solubility & Reactivity	The product is soluble
Conditions of instability	Exposure to ultraviolet radiations from sunlight may cause CS <sub>2</sub> vapours to ignite & explode.
Incompatibility with	Reacts with oxidizing agents, reducing agent, metals and alkalis.
Hazardous decomposition products	Thermal decomposition includes toxic products including oxides of Sulfur.
Hazardous polymerization	Will not occur

### Section 11. Toxicological Information

Toxicological data	Test	Results	Route	Species
	LD50	3188 mg/kg	Oral	Rat
	LD50	2550 mg/kg	Oral	Rabbit
	LD50	2125 mg/kg	Oral	Guinea Pig
	LC50	25000 mg/m <sup>3</sup> (2 Hrs.)	Inhalation	Rat
	LC50	10000 mg/m <sup>3</sup> (2 Hrs.)	Inhalation	Mouse

Chronic effect on human	See Section 2
-------------------------	---------------



# Material Safety Data Sheet

## Carbon Di-Sulfide

Other toxic effect on human	Hazardous by following route of exposure: Skin contact (irritant), eye contact (irritant), Non-sensitizer to skin.
Special remarks on toxicity to animals	Embryo toxic, fetus-toxic effect on offspring of exposed rabbits, in absence of harmful effects on mother. Harmful effect on embryo and fetus (decreased weight & death) observed in offspring of rabbit following exposure to 600 ppm during pregnancy period, in absence of significant effect on mother. Teratogenic effect observed at 1200 ppm but only if presence of harmful effect on mother (decreased body weight gained, incoordination, wheezing). No harmful effect observed at 60-300 ppm.
Special remarks on chronic effect on human	No firm conclusion can be drawn on the basis of available human information
Target organs	Kidney, reproductive system, liver, peripheral nervous system, cardiovascular system, skin, CNS (Central Nervous System), eyes – lens & cornea.

### Section 12. Ecological Information

Toxicological data	Species	Test	Period	Result
	Poecilia recilata	LC50	96 Hrs.	4 mg/l
	Mosquito fish	CL50	96 Hrs.	135 ppm

Mobility	When released into soil, this material may biodegrade to moderate extent & expected leach into groundwater. When released in to soil or air this material is expected to quickly evaporate. When released into water, this material is expected to have half-life of less than one day. This material has an experimental determined bio concentration factor (BCF) of less than 100. It is not expected to significantly bio-accumulate. When released into the air, this material is expected to be readily degraded by reaction with photo chemically produced hydroxyl radicles & is expected to have half-life between 1-10 days.
Degradation product	Carbon oxides (CO, CO <sub>2</sub> ), Sulfur oxides (SO <sub>2</sub> , SO <sub>3</sub> etc.)
Toxicity of the products of biodegradation	The product of degradation are as toxic as the organic products.

### Section 13. Disposal Considerations

Waste information	Waste must be disposed in accordance to federal, state & local environmental control regulations. (consult local and regional authorities)
-------------------	--

### Section 14. Transport Information

US (DOT)	RQ, UN1131, Carbon Disulfide, 3(6.1), PG 3.
India (RTO)	RQ, UN1131, Carbon Disulfide, 3(6.1), PG 3.

### Section 15. Label Information

Hazardous warning	Danger! Extremely flammable, vapour may catch flash fire. May be fatal if swallowed or inhaled. Harmful if absorbed through skin. Affects central and peripheral nervous system. A developmental or reproductive hazard. Affects cardiovascular system, liver and kidney.
-------------------	---



## Material Safety Data Sheet

### Carbon Di-Sulfide

Precautions (label)	Keep away from heat, spark and flame. Do not breathe vapours. Keep container closed. Do not get into eye, skin or clothing. Use only with adequate ventilation. Wash thoroughly after handling.
First-Aid (label)	If swallowed, induce vomiting as directed by medical personnel. Never giving anything by mouth to unconscious person. If inhaled remove to fresh air. If not breathing, give artificial respiration. If no pulse give CPR (Cardio Pulmonary Resuscitation) If breathing is difficult give Oxygen. In case of contact, immediately flush eye or skin with plenty of water for at least 15 mins. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical help.

#### Section 16. Other Information

Reference literature	Dangerous Chemicals Safety Material Data, Chemical Industry Publishing House, 1997
Information Source	CS2 MSDS of Shanghai Baijin Chemicals Group Co. Ltd., Shanghai, China – 200 120.
Date of Form	1 <sup>st</sup> November, 2014
Dept. of Form	EHS Dept., Indo-Baijin Chemicals Pvt. Ltd., Dahej, Bharuch, India – 391 130.
Auditing dept. of data	EHS Dept., Indo-Baijin Chemicals Pvt. Ltd., Dahej, Bharuch, India – 391 130.
Modification Notice	Any amendment, will inform ASAP