2,2 AZOISOBUTYRONITRILE

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
2, 2 AZODIISOBUTYRONITRILE

OTHER NAMES
C8-H12-N4, AIBN, azobisisobutylnitrile, azobisisobutyronitrile, "Propofor 57", "2, 2 -azobis 2-methylpropionitrile", "propionitrile, 2, 2 -azobis 2-methyl-", "2, 2 -dicyano-2, 2 -azopropane Porophor N"

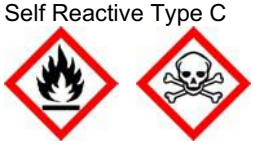
PROPER SHIPPING NAME
SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED(contains azodiisobutyronitrile)

PRODUCT USE
Polymerisation initiator, catalyst which is used in bulk and solution polymerisation production processes.

SUPPLIER
Company: S D FINE- CHEM LIMITED
Address:
315- 317, T.V.Ind.Estate,
248, Worli Road,
Mumbai- 400030, India
www.sdfine.com
Telephone: 91- 22 24959898/99
Fax: 91- 22 2493 7232
Email: technical@sdfine.com

Section 2 - HAZARDS IDENTIFICATION

GHS Classification
Acute Toxicity Category 4
Acute Toxicity Category 3
Chronic Aquatic Hazard Category 3
Self Reactive Type C



EMERGENCY OVERVIEW

HAZARD
DANGER

Determined by using GHS criteria

H242	Heating may cause a fire.
H301	Toxic if swallowed.
H332	Harmful if inhaled.
H412	Harmful to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS
Prevention

Code	Phrase
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P220	Keep/Store away from clothing/ ... /combustible materials.
P234	Keep only in original container.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

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P264	Wash ... thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well- ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response

Code	**Phrase**
P301+P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P330	Rinse mouth.

Storage

Code	**Phrase**
P403+P235	Store in a well- ventilated place. Keep cool.
P405	Store locked up.
P420	Store away from other materials.

Disposal

Code	**Phrase**
P501	Dispose of contents/container to ...

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
azodiisobutyronitrile	78-67-1	>98
decomposes on heating to produce		
tetramethyl succinonitrile	3333-52-6	
nitrogen	7727-37-9.	

Section 4 - FIRST AID MEASURES

SWALLOWED
- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- For advice, contact a Poisons Information Centre or a doctor.
- Urgent hospital treatment is likely to be needed.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.

EYE
■ If this product comes in contact with the eyes:
- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.

SKIN
■ If skin contact occurs:
- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.

NOTES TO PHYSICIAN
■ For tetramethyl succinonitrile:
Cyanide antidotes have no effect on tetramethyl succinonitrile poisonings.
Anaesthetic doses or pretreatment with the anticonvulsant trimethadione prevented TMSN convulsions and death.

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Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
■ For SMALL FIRES:
Dry chemical, CO_2, water spray or foam.
For LARGE FIRES:
Flood fire area with water from a distance.

FIRE FIGHTING
■ BEWARE OF POSSIBLE CONTAINER EXPLOSION
• Alert Fire Brigade and tell them location and nature of hazard.
• May be violently or explosively reactive.
• Wear full protective clothing plus breathing apparatus.
• Prevent, by any means available, spillage from entering drains or water course.

FIRE/EXPLOSION HAZARD
• Self-decomposition or self-ignition may be initiated by heat, chemical reaction, friction or impact.
• The material is particularly sensitive to temperature rises; above a given CONTROL TEMPERATURE, it may decompose violently and catch fire.
• DO NOT exceed the specified control temperature as self accelerating decomposition will occur.
• May decompose explosively when heated or involved in fire, carbon dioxide (CO_2), nitrogen oxides (NO_x), other pyrolysis products typical of burning organic material.
• Hot organic vapours or mist are capable of sudden spontaneous combustion when mixed with air even at temperatures below their published autoignition temperatures.
• The temperature of ignition decreases with increasing vapour volume and vapour/air contact times and is influenced by pressure change.
• Ignition may occur under elevated-temperature process conditions especially in processes performed under vacuum subjected to sudden ingress of air or in processes performed at elevated pressure, where sudden escape of vapours or mists to the atmosphere occurs.

FIRE INCOMPATIBILITY
• Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
• ELIMINATE all ignition sources (no smoking, flares, sparks or flames).
• Do NOT touch or walk through spilled material.
• Stop leak if safe to do so.
• Prevent entry into waterways, drains or confined spaces.
DO NOT VACUUM UP. Explosion hazard.

MAJOR SPILLS
• Clear area of personnel and move upwind.
• Alert Fire Brigade and tell them location and nature of hazard.
• DO NOT touch or walk through spilled material.
• Control personal contact with the substance, by using protective equipment.
Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING
• Avoid all personal contact, including inhalation.
• Wear protective clothing when risk of overexposure occurs.
• Use in a well-ventilated area.
• Prevent concentration in hollows and sumps.
• Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions)
• Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame.
• Establish good housekeeping practices.
• Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds.

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SUITABLE CONTAINER
■ For low viscosity materials and solids:
Drums and jerricans must be of the non-removable head type.
Where a can is to be used as an inner package, the can must have a screwed enclosure.<</>.

STORAGE INCOMPATIBILITY
• Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.
• Nitriles may polymerise in the presence of metals and some metal compounds.
• They are incompatible with acids; mixing nitriles with strong oxidising acids can lead to extremely violent reactions.
• Nitriles are generally incompatible with other oxidising agents such as peroxides and epoxides.
• The combination of bases and nitriles can produce hydrogen cyanide. Nitriles are hydrolysed exothermally in both aqueous acid and base to give carboxylic acids (or salts of carboxylic acids).
• The covalent cyano group is endothermic and many organic nitriles are reactive under certain conditions; N-cyano derivatives are reactive or unstable.
• The majority of endothermic compounds are thermodynamically unstable and may decompose explosively under various circumstances of initiation.
• Many but not all endothermic compounds have been involved in decompositions, reactions and explosions and, in general, compounds with significantly positive values of standard heats of formation, may be considered suspect on stability grounds.
BRETHERICK L.: Handbook of Reactive Chemical Hazards.
• Segregate from alcohol, water.
• Avoid reaction with oxidising agents.
• NOTE: May develop pressure in containers; open carefully. Vent periodically.
• Toxic gases are formed by mixing azo and azido compounds with acids, aldehydes, amides, carbamates, cyanides, inorganic fluorides, halogenated organics, isocyanates, ketones, metals, nitrides, peroxides, phenols, epoxides, acyl halides, and strong oxidising or reducing agents.
• Flammable gases are formed by mixing azo and azido compounds with alkali metals.
• Explosive combination can occur with strong oxidising agents, metal salts, peroxides, and sulfides
• Azo, diazo and azido compounds can detonate especially where organic azides have been sensitised by the addition of metal salts or strong acids.
Avoid aldehydes, alkali metals, heptane, alcohols, acetone
DO Not dissolve in acetone, explosion hazard.

STORAGE REQUIREMENTS
■ FOR MINOR QUANTITIES:
• Store in an indoor fireproof cabinet or in a room of noncombustible construction.
• Provide adequate portable fire-extinguishers in or near the storage area.
FOR PACKAGE STORAGE:
• Store in original containers in approved flame-proof area.
• No smoking, naked lights, heat or ignition sources.
Control Temperature 40 deg. C
EMERGENCY TEMPERATURE 45 deg. C

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA mg/m³	Notes
India Permissible Levels of Certain Chemical Substances in Work Environment	tetramethyl succinonitrile (Cyanide (as CN))	5	Skin

The following materials had no OELs on our records
• azodiisobutyronitrile: CAS:78- 67- 1
• nitrogen: CAS:7727- 37- 9

MATERIAL DATA
AZODIISOBUTYRONITRILE:
TETRAMETHYL SUCCINONITRILE:
■ For tetramethyl succinonitrile:
Exposure at or below the TLV-TWA is thought to minimise the potential for systemic toxicity which may produce headache, nausea and convulsions.
Because other dinitriles, notably succinonitrile and adiponitrile, have been absorbed percutaneously causing the death of animals, a skin notation is warranted.
When this substance is present as mixtures or with other sources of cyanide, exposure is thought to be additive and environmental limit should be calculated (NIOSH).

AZODIISOBUTYRONITRILE:

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TETRAMETHYL SUCCINONITRILE:
■ Exposure limits with "skin" notation indicate that vapour and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapour inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.

NITROGEN:
■ May act as a simple asphyxiants; these are gases which, when present in high concentrations, reduce the oxygen content in air below that required to support breathing, consciousness and life; loss of consciousness, with death by suffocation may rapidly occur in an oxygen deficient atmosphere.
CARE: Most simple asphyxiants are odourless or possess low odour and there is no warning on entry into an oxygen deficient atmosphere.

PERSONAL PROTECTION

RESPIRATOR
•Type AB-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE
• Safety glasses with side shields
• Chemical goggles.
• Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent].

HANDS/FEET
■ The selection of the suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:.
• Polyethylene gloves.
• Wear physical protective gloves, e.g. leather.
• Wear safety footwear.

OTHER
• Overalls.
• Eyewash unit.
• Barrier cream.
• Skin cleansing cream.
• Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
• For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS
■ For large scale or continuous use:
• Spark-free, earthed ventilation system, venting directly to the outside and separate from usual ventilation systems
• Provide dust collectors with explosion vents.
Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE
powder

PHYSICAL PROPERTIES
Contact with acids liberates very toxic gas.

State	DIVIDED SOLID	Molecular Weight	164.24
Melting Range (°C)	Do not heat	Viscosity	Not Applicable
Boiling Range (°C)	DETONATES	Solubility in water (g/L)	Reacts
Flash Point (°C)	DETONATES	pH (1% solution)	Not applicable
Decomposition Temp (°C)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°C)	60	Vapour Pressure (kPa)	Not available
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	>1.0
Lower Explosive Limit (%)	Not available	Relative Vapour Density (air=1)	Not applicable
Volatile Component (%vol)	<1	Evaporation Rate	Not applicable

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY
• Presence of incompatible materials.
• Product is considered stable.
• Hazardous polymerisation will not occur.
For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

Health hazard summary table:

Acute toxicity	Acute Tox. (inhal) 4 Acute Tox. (oral) 3
Skin corrosion/irritation	Not applicable
Serious eye damage/irritation	Not applicable
Respiratory or skin sensitization	Not applicable
Germ cell mutagenicity	Not applicable
Carcinogenicity	Not applicable
Reproductive toxicity	Not applicable
STOT- single exposure	Not applicable
STOT- repeated exposure	Not applicable
Aspiration hazard	Not applicable

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
■ Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
■ Nitrile poisoning exhibits similar symptoms to poisoning due to hydrogen cyanide.
The substances irritate the eyes and skin, and are absorbed quickly and completely through the skin.
■ Tetramethyl succinonitrile is a potent convulsant in rodents producing death in mice within 10 minutes of an LD50 dose.
Death may be delayed by 5 hours after the onset of convulsion or asphyxia.

EYE
■ Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may cause transient discomfort characterised by tearing or conjunctival redness (as with windburn).
Slight abrasive damage may also result.

SKIN
■ The material is not thought to be a skin irritant (as classified by EC Directives using animal models).
Abrasive damage however, may result from prolonged exposures.
■ Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.
■ Open cuts, abraded or irritated skin should not be exposed to this material.

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■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED
■ The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models).
Nevertheless inhalation of dusts, or fumes, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
■ Inhaled tetramethyl succinonitrile may be rapidly fatal (about 16.
5 times more toxic than acetonitrile in rats).
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result□□in excessive exposures.
■ Inhalation of dusts, generated by the material, during the course of normal handling, may be harmful.

CHRONIC HEALTH EFFECTS
■ Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

TOXICITY AND IRRITATION
■ For 2,2'-azobis(2methylpropionitrile): This substance causes general anaesthesia, sleepiness and inco-ordination if swallowed.
It does not seem to irritate the skin and eyes and is not a skin sensitiser. Repeated exposure may cause damage to the liver and kidneys, according to animal testing. It may reduce fertility and be toxic to the foetus at levels greater than 50mg/kg/day. The substance may not cause genetic toxicity.

SKIN

tetramethyl succinonitrile	India Permissible Levels of Certain Chemical Substances in Work Environment - Skin	Notes	Skin

Section 12 - ECOLOGICAL INFORMATION

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
tetramethyl succinonitrile	HIGH	No Data Available	LOW	MED
nitrogen	No Data Available	No Data Available	No Data Available	No Data Available

Section 13 - DISPOSAL CONSIDERATIONS

• Containers may still present a chemical hazard/ danger when empty.
• Return to supplier for reuse/ recycling if possible.
Otherwise:
• If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
• Where possible retain label warnings and MSDS and observe all notices pertaining to the product.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area.
A Hierarchy of Controls seems to be common - the user should investigate:
• Reduction.
• DO NOT allow wash water from cleaning or process equipment to enter drains.
• It may be necessary to collect all wash water for treatment before disposal.
• In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
• Where in doubt contact the responsible authority.
• Recycle wherever possible.

continued...

- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

Labels Required: FLAMMABLE SOLID

HAZCHEM:
1WE(1)

Land Transport UNDG:

Class or division:	4.1	Subsidiary risk:	None
UN No.:	3234	UN packing group:	None

Shipping Name:SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED (contains azodiisobutyronitrile)

Air Transport IATA:

ICAO/IATA Class:	4.1	ICAO/IATA Subrisk:	None
UN/ID Number:	3234	Packing Group:	-
Special provisions:	None		
Cargo Only			
Packing Instructions:	Forbidden	Maximum Qty/Pack:	Forbidden
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	Forbidden	Maximum Qty/Pack:	Forbidden
Passenger and Cargo		Passenger and Cargo	
Limited Quantity		Limited Quantity	
Packing Instructions:	Forbidden	Maximum Qty/Pack:	Forbidden

Shipping name:SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED(contains azodiisobutyronitrile)

Maritime Transport IMDG:

IMDG Class:	4.1	IMDG Subrisk:	None
UN Number:	3234	Packing Group:	None
EMS Number:	F- F, S- K	Special provisions:	194 274 923
Limited Quantities:	0		

Shipping name:SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED(contains azodiisobutyronitrile)

Section 15 - REGULATORY INFORMATION

REGULATIONS

azodiisobutyronitrile (CAS: 78-67-1) is found on the following regulatory lists;
"Acros Transport Information","India Hazardous Wastes (Management, Handling and Transboundary Movement) Rules - Schedule 2: List of Wastes Constituents with Concentration Limits","OECD List of High Production Volume (HPV) Chemicals","Sigma-AldrichTransport Information"

Regulations for ingredients

tetramethyl succinonitrile (CAS: 3333-52-6) is found on the following regulatory lists;
"India Hazardous Wastes (Management, Handling and Transboundary Movement) Rules - Schedule 2: List of Wastes Constituents with Concentration Limits","India Permissible Levels of Certain Chemical Substances in Work Environment"

nitrogen (CAS: 7727-37-9) is found on the following regulatory lists;
"CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP","FisherTransport Information","India Manufacture, Storage and Import of Hazardous Chemical Rules - Schedule 1: List of Hazardous and Toxic Chemicals","International Numbering System for Food Additives","OECD List of High Production Volume (HPV) Chemicals","Sigma-AldrichTransport Information"

continued...

Section 16 - OTHER INFORMATION

■ Classification of the preparation and its individual components has drawn on official and authoritative sources using available literature references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue Date: 29-May-2018