



SHOWA DENKO K.K.

GPS/JIPS Safety Summary

1. SUBSTANCE NAME

Acrylonitrile (CAS No.: 107-13-1)

2. GENERAL STATEMENT

Under normal temperatures, acrylonitrile takes the form of a clear and highly flammable liquid or vapor with a slightly irritating odor. It is a double bond, highly reactive organic compound. Making use of this property, the substance has been utilized primarily as resin source material for acrylic fibers, ABS resin, nitrile rubber and so forth, and as source material for chemical synthesis. When handling the substance, it is important to keep it away from heat, sparks, open flames, and other materials that could cause ignition. Additionally, it is recommended that one wear an appropriate protective mask and gloves when sampling for manufacture, etc. It may be fatal in the event the substance is swallowed, comes into contact with skin, or its vapor is inhaled. Chronic or repeated exposure leads to disorders of the nervous system, respiratory organs, blood system, testis, kidney and liver. Moreover, the substance causes skin irritation and severe eye irritation, and allergic cutaneous reactions. In addition, the substance is suspected of causing genetic defects and cancer. In order to minimize its effect on the environment and life forms, leakage prevention measures need to be implemented.

3. CHEMICAL IDENTITY

Item	Description
Chemical or generic name	Acrylonitrile
Product name	Acrylonitrile
CAS No.	107-13-1
Other Nos.	Japan: Chemical Substances Control Law (2)-1513 EC No./EINECS No.: 203-466-5
Chemical formula	CH ₂ CHCN
Structural formula	CH ₂ =CH-CN
Sources/references	Sections 3 and 16 of the SDS issued by SHOWA DENKO K.K.

4. USES AND APPLICATIONS

Main uses	Acrylonitrile has been used mainly as resin source material for acrylic fibers, ABS resin, nitrile rubber, and so forth, and as source material for chemical synthesis. Acrylic fibers perform excellent functions for heat and moisture retention, and have also been used as a source material for carbon fibers. ABS fibers have been widely used in home appliances, automobiles, toys, etc.
-----------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

5. PHYSICAL/CHEMICAL PROPERTIES

Appearance	Liquid
Color	Transparent, colorless
Odor	Slight, irritating
Relative density	0.8060 (20 °C)
Melting point/boiling point	-84 to -83 °C /77 to 79 °C
Lower and upper Flammability limits	3 to 17 vol% (in the air)
Auto-ignition temperature	480 °C
Molecular weight	53.1
Vapor pressure	14.7 kPa (25 °C)
Solubility in water	7.3 g/100 g (20 °C)
Partition coefficient (n-octanol/water)	Log Kow: 0.25
Sources/references	Section 9 of the SDS issued by SHOWA DENKO K.K.

6. HEALTH EFFECTS

Effect assessment	Results (GHS ^(Note 1) hazard classification)
Acute toxicity (oral)	Category 3
Acute toxicity (dermal)	Category 2
Acute toxicity (Inharation : gases)	Not applicable ^(Note 2)
Acute toxicity (Inharation : vapors)	Category 2
Acute toxicity (Inharation : dusts and mists)	Classification not possible ^(Note 3)
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Respiratory sensitization	Classification not possible
Skin sensitization	Category 1
Germ cell mutagenicity	Category 2
Carcinogenicity	Category 2
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 1 (nervous system, liver) Category 3 (respiratory tract irritaion, narcotic effect)
Specific target organ toxicity (repeated exposure)	Category 1 (nervous system, respiratory organ, blood system, testis, kidney, liver)
Aspiration hazard	Classification not possible
Sources/references	Sections 2, 11 of the SDS issued by SHOWA DENKO K. K.

(Note 1) GHS (Globally Harmonized System of Classification and Labeling of Chemicals): It is a system for classifying chemicals according to type and hazard level, and for indicating label information pursuant to the globally unified rules for offering Safety Data Sheets.

(Note 2) Not applicable: when chemicals do not fall within the scope of classification because the physical properties defined in the GHS do not apply.

(Note 3) Classification not possible: when unable to classify due to a lack of sufficiently reliable data for defining the classification.

7. ENVIRONMENTAL EFFECTS

Effect assessment	Results (GHS hazard classification)
Hazardous to the aquatic environment	
Acute hazard	Category 2
Long-term hazard	Not classified ^(Note 4)
Hazardous to the ozone layer	Montreal Protocol on Substances that Deplete the Ozone Layer (revised version): not included in the list
Sources/references	Sections 2 and 12 of the SDS issued by SHOWA DENKO K.K.
(Note 4) Not classified: when the hazards are believed to be less than even the lowest hazard classification defined in the GHS.	

Environmental fate/dynamics	Results
Mobility in soil	No reliable data available.
Persistence/degradability	Readily biodegradable.
Bioaccumulation potential	Bioaccumulation potential is presumed to be low.
Conclusion about PBT/vPvB	The criteria for persistent bioaccumulative and toxic (PBT; remaining persistently in the environment and possessing high bioaccumulation potential and toxicity) and very persistent and very bioaccumulative (vPvB; remaining very persistently in the environment and possessing very high bioaccumulation potential) chemicals are believed to be inapplicable.
Sources/references	Section 12 of the SDS issued by SHOWA DENKO K.K. and Section 8 of the Chemical Safety Report of REACH

8. EXPOSURE

	Exposure potentials through main uses
Occupational exposures	Since the company's product is produced in a closed process, the potential for occupational exposure is extremely limited. However, there is the potential for inhalation and contact with the skin and eyes during sampling, filling and transport. However, since the company's product is consumed almost entirely as source material, the substance remaining in acrylic fibers and ABS resins is extremely low in level.
Consumer exposures	The substance is not used in any case by general consumers.
Environmental exposures	Since the substance is normally manufactured and used in a closed process, its emission into the environment is extremely limited.
Precautions	If there is the potential for exposure during use in other applications, please implement appropriate measures by referring to the risk management recommendations.

9. RISK MANAGEMENT RECOMMENDATIONS

	Risk management recommendations
Occupational exposures	Technical measures
	<ul style="list-style-type: none"> • Install a wash stand, eye washer and safety shower at places that manufacture, store or handle the product. Additionally, make certain to implement antistatic measures and use explosion-proof electrical, ventilating and lighting equipments. In order to keep concentrations below the administrative level, install ventilation systems if mist is generated during the processes that handle the product. If handled outdoors, work on the windward side. Restrict entry by unauthorized persons to places where the product is handled.
	Local exhaust and total ventilation
	<ul style="list-style-type: none"> • For controlling and restricting environmental concentrations below the following recommended values, install local exhaust or total ventilation systems at places where the product is manufactured, stored or handled. Additionally, seal the process, conduct local exhaust and implement other measures within the facility to maintain air concentration levels below the administrative level.
	Allowable exposure limit
	<ul style="list-style-type: none"> • Concerning the product, the Japan Society for Occupational Health has announced (2012) a recommended value of 2 ppm (skin absorption), and the American Conference of Governmental Industrial Hygienists (ACGIH) has announced (2013) 2 ppm (the time-weighted average value; TWA) (skin absorption) as the recommended value of allowable exposure limit under the working environment. Implement control and restriction measures so as to maintain concentrations below these values.
	Protective equipment
	<p>(1) Respiratory protection Chemical-cartridge respirators for organic gases or cyanide gas, air-supplied respirators, air respirators</p> <p>(2) Hand protection Protective gloves (rubber)</p> <p>(3) Eye protection Goggle-type protective eyewear</p> <p>(4) Skin and body protection Protective boots (rubber), protective aprons (rubber), protective clothing (impermeable/antistatic-treated)</p>
Precautions	
	<ul style="list-style-type: none"> • Managers are asked to provide workers training concerning the selection and use of appropriate protective equipment, worksite management, etc.
Consumer exposures	The substance is not used by general consumers.
Environmental exposures	Do not drain leakage into rivers or sewerages. Moreover, do not release such substances into the environment.
Sources/references	Sections 6, 7, 8, and 13 of the SDS issued by SHOWA DENKO K.K.

10. STATE AGENCY REVIEW

Hazard assessment	Situations of review
International Chemical Safety Cards	ICSC No. :0092, http://www.ilo.org/dyn/icsc/showcard.display?p_lang=en&p_card_id=0092
OECD HPV	http://webnet.oecd.org/hpv/ui/handler.axd?id=a6c33d76-c932-4a52-b3de-870e14fd2b06
REACH	http://apps.echa.europa.eu/registered/data/dossiers/DISS-9d844a2d-b384-4b16-e044-00144f67d249/DISS-9d844a2d-b384-4b16-e044-00144f67d249.html

11. REGULATORY INFORMATION/GHS CLASSIFICATION-LABELING INFORMATION

Regulatory information only in Japan


Applicable laws	Regulatory situations
Chemical Substances Control Law	<ul style="list-style-type: none"> • Priority Assessment Chemical Substance, paragraph 5, Article 2 of the Act (acrylonitrile) • Former Type II Monitoring Chemical Substance (Paragraph 5, Article 2 of the former Act) (Abolished as of April 1, 2011)
Act on the Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof	Class I designated chemical substance, paragraph 2, Article 2 of the Act, Appended Table 1, Article 1 of the Enforcement Ordinance; conditions for application: products containing 1 mass% or more (acrylonitrile)
Industrial Safety and Health Act	<ul style="list-style-type: none"> • Existing chemicals recognized to have undergone mutagenicity, Article 57-5 of the Act, Notification by the Director of Labor Standards Bureau; conditions for application: materials containing the chemical, excluding those with a content of 1 wt% or less (Guideline of the Notification by the Director of Labor Standards Bureau No.312-3 of 1993 to Directors of Prefectural Labor Bureau) (acrylonitrile) • Criteria regarding assessment of the results of working environment measurements, paragraph 1, Article 65-2 of the Act (acrylonitrile) • Hazardous substances, inflammable substances, item 4, Appended Table 1 of the Enforcement Ordinance (other substances whose flash point is 0 °C or more and below 30 °C) • Class II specified chemical substance (specified class II substance), items 2, 3, paragraph 1, Article 2 of Ordinance on Prevention of Dangers Due to Specified Chemical Substances; conditions for application: preparations and others, excluding those with the content of 1% or less (Appended Table 1 of the Ordinance) (acrylonitrile) • Material to be labeled, Article 57-1 of the Act, Article 18 of the Enforcement Ordinance; conditions for application: preparations containing 1 wt% or more (Appended Table 2 of Ordinance on Industrial Safety and Health) (acrylonitrile) • Material to be notified, Article 57-2 of the Act, Appended Table 9, Article 18-2 of the Enforcement Ordinance;

	conditions for application: preparations and others containing 0.1 wt% or more (Item 634, Appended Table 9 of the Ordinance, Appended Table 2-2, Article 34-2 of Ordinance on Industrial Safety and Health) (acrylonitrile)
Poisonous and Deleterious Substances Control Act	Deleterious substance, Appended Table 2, Article 2 of the Act; conditions for application : technical product (pure industrial product) (acrylonitrile); Article 2, Cabinet Order for the Designation of the Poisonous and Deleterious Substances; conditions for application : preparations containing the substance (organic cyanogen compounds and preparations containing them)
Fire Service Act	Category IV inflammable liquids, Class I petroleum, non-water-soluble liquids (Appended Table 1 of hazardous materials, Category IV, paragraph 7, Article 2 of the Act); conditions for application: liquids containing the substance whose flash point is below 21 °C under 1 atm. (Remark 12, Appended Table 1 of the Act)
High Pressure Gas Safety Act	<ul style="list-style-type: none"> • Inflammable gas, Article 2-1 of Regulations for Safety Precautions for High-Pressure Gas (acrylonitrile) • Poisonous gas, Article 2-2 of Regulations for Safety Precautions for High-Pressure Gas (acrylonitrile)
Air Pollution Control Act	<ul style="list-style-type: none"> • Volatile organic compound, paragraph 4, Article 2 of the Act (Notification by the Ministry of the Environment to the Prefectural governments); conditions for application: exhaust (volatile organic compounds) • Hazardous air pollutants, substances requiring priority action (the ninth response by Central Environment Council); conditions for application: exhaust (acrylonitrile) • Substances covered in self-initiated management guidelines, notification of Ministry of the Environment; conditions for application: exhaust (acrylonitrile)
Water Pollution Control Act	• Specified substance, paragraph 4, Article 2 of the Act, Article 3-3 of the Enforcement Ordinance (acrylonitrile)
Sewerage Act	• Substances for which water quality standards have been stipulated, paragraph 2, Article 12-2 of the Act, Article 9-4 of the Enforcement Ordinance (cyanogen compounds)
Act on the Prevention of Marine Pollution and Maritime Disaster	<ul style="list-style-type: none"> • Hazardous liquid substance (Class Y substance), Appended Table 1 of the Enforcement Ordinance (acrylonitrile) • Hazardous material, Appended Table 1-4 of the Enforcement Ordinance (acrylonitrile)
Waste Management and Public Cleansing Act	• Specially managed industrial waste, paragraph 5, Article 2 of the Act, Article 2-4 of the Enforcement Ordinance; conditions for application: waste oil, waste acid, waste alkali and processed materials thereof containing 1 mg/liter (cyanogen) or more, sludge and its processed materials from which 1 mg/liter (cyanogen) or more elutes (specified hazardous industrial waste containing cyanogen compounds)
Act on Control of Export, Import and Others of Specified Hazardous Wastes and Other Wastes	• Hazardous substances contained in waste, item 1-b, paragraph 1, Article 2 of the Act, Notification No.1 of 1998 of three Ministries; conditions for application: waste, 0.1 wt% or more (organic cyanogen compounds)
Civil Aeronautics Act	• Inflammable liquid, Appended Table 1 specifying the hazardous substances, Article 194 of the Enforcement Regulations (UN No.1093: acrylonitrile (stabilized))

Ship Safety Act	•Inflammable liquids, Appended Table 1 specifying the hazardous substances, Article 3 of Regulations for the Carriage and Storage of Dangerous Goods in Ship (UN No.1093: acrylonitrile (containing stabilizing agent))
Act on Port Regulations	•Other hazardous materials, inflammable liquids, Article 21-2 of the Act, Article 12 of Enforcement Regulations, Appended table specifying the types of hazardous materials (acrylonitrile)
Road Act	•Restrictions on vehicle traffic, Article 19-13 of the Enforcement Ordinance, Appended Table 2 of Notification No.12 of Japan Expressway Holding and Debt Repayment Agency (acrylonitrile)
Foreign Exchange and Foreign Trade Act	•Item 4 of Appended Table 1 of Export Trade Control Order, Article 3 of Ordinance of Ministry of Economy, Trade and Industry Specifying Goods and Technologies Pursuant to Provisions of the Appended Table 1 of the Export Trade Control Order and the Appended Table of the Foreign Exchange Order; conditions for application: polymers of butadiene and acrylic acid only (polymers of butadiene, acrylonitrile and acrylic acid), (reactive products of tetraethylenepentamine, acrylonitrile and glycidol) •“Approval 2-2” of items requiring import approval of item 2, paragraph 1, Article 4 of Import Trade Control Order; conditions for application: 0.1 wt% or more (wastes) (organic cyanogen compound) •Item (2), Appended Table 1-16 of Export Trade Control Order (Nitrile-function compounds) •Appended Table 2 (export approval) of Export Trade Control Order; conditions for application: 0.1 wt% or more (wastes) (organic cyanogen compounds)
Labor Standards Act	•Chemical substances causing illness or injury, paragraph 2, Article 75 of the Act, Article 35 and item 4-1, Appended Table 1-2 of the Enforcement Regulations (acrylonitrile)
Soil Contamination Countermeasures Act	•Specified hazardous substance, paragraph 1, Article 2 of the Act, Article 1 of the Enforcement Ordinance (cyanogen compound)
UN classification	Class III (flammable liquids P.G 1)
UN No.	UN1093

GHS classification, label information

Hazards	Classification results (hazard information)
Physical chemical hazards	
Flammable liquids	Category 2
Pyrophoric liquids	Not classified
Health hazards	
Acute toxicity (oral)	Category 3
Acute toxicity (dermal)	Category 2
Acute toxicity (Inhalation : vapors)	Category 2
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Skin sensitization	Category 1
Germ cell mutagenicity	Category 2
Carcinogenicity	Category 2

Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 1 (nervous system, liver) Category 3 (respiratory tract irritation, narcotic effect)
Specific target organ toxicity (repeated exposure)	Category 1 (nervous system, respiratory organ, blood system, testis, kidney, liver)
Hazardous to the aquatic environment	
Acute hazard	Category 2
Long-term hazard	Not classified
GHS label elements	
Pictogram or symbol	
Signal word	Danger
Hazard statement	Highly flammable liquid and vapour Toxic if swallowed Fatal in contact with skin Fatal if inhaled Causes skin irritation Causes serious eye irritation May cause allergic skin reaction Suspected of causing genetic defects Suspected of causing cancer Suspected of damaging fertility or the unborn child Causes damage to organs (nervous system, liver) May cause respiratory irritation May cause drowsiness or dizziness Causes damage to organs (nervous system, respiratory organ, blood system, testis, kidney, liver) through prolonged or repeated exposure Toxic to aquatic life

12. CONTACT INFORMATION

Company name SHOWA DENKO K.K.
Address Muza Kawasaki Central Tower 23rd floor, 1310 Omiya-cho,
 Saiwai-ku, Kawasaki, Kanagawa, Japan
Department Organic Product Group, Ammonia and Derivatives Department,
 Basic Chemicals Division
Telephone, fax +81-44-520-1348/+81-44-520-1349

13. DATE OF ISSUE AND REVISION, ADDITIONAL INFORMATION

Date of issue: September 27, 2013

Revisions:

Date of revision	Revised section	Revised item	Version

Special instructions: none

14. DISCLAIMER

This Safety Summary which is a translation of original Safety Summary prepared in Japanese, has been prepared as a part of the efforts by GPS/JIPS: Japan Initiative of Product Stewardship by the chemical industry. This Safety Summary is meant to provide an outline of information related to the safe handling of the subject substance rather than provide expert information regarding the risk assessment processes, the effect on human health or the environment, etc. Moreover it is not a replacement for the Safety Data Sheet (SDS), the Chemical Safety Report (CSR), or other risk assessment documents. To the greatest extent possible, the Safety Summary contains accurate statements based on laws, materials, information and other data available at the time of issue. However, it does not cover all such data. Additionally, it does not intend to provide a guarantee in any way.