

PRODUCT SAFETY SUMMARY:

AMINOETHYLPIPERAZINE

This Product Safety Summary is intended to provide a general description of certain Huntsman chemical substances and products containing the chemical substance(s). The information in this Summary is not intended to replace the information included on the Safety Data Sheet (SDS), Product Safety Label, and other safe use and handling literature for the chemical substance(s). Additional information can be found on the Safety Data Sheet (SDS) for each specific product.

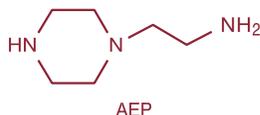
Chemical Identity

CAS #	Name	Synonyms
140-31-8	2-piperazin-1-ylethylamine	Aminoethylpiperazine, AEP

General Product Overview

Aminoethylpiperazine is an organic compound with a wide range of commercial and industrial applications. It is used primarily as reactive intermediates (i.e., building block) to produce other useful chemical products due to its unique combination of reactivity, surface activity, and basicity. It is also found in the composition of other ethyleneamine products as an impurity.

Aminoethylpiperazine



Aminoethylpiperazine is a cyclic single component product. It is part of the ethyleneamines group of chemicals and contains one primary, one secondary and one tertiary amine. The product is water soluble, clear, and colorless. An ammonia-like odor is typical of the product.

Manufacturing

Huntsman manufactures ethyleneamines by the ethylene dichloride/ammonia process. This process consists of the reaction of ethylene dichloride with ammonia, followed by neutralization with sodium hydroxide to produce a mixture of ethyleneamines and sodium chloride. The salt is removed from the amine mixture, and the individual amines are separated by fractional distillation. While most individual distillation

fractions are sold as products, others are formulated to obtain desired physical or chemical properties or reacted further to obtain the final product. Reliability, quality, and consistency are important in the production of ethyleneamines.

Applications and Uses

Aminoethylpiperazine is manufactured by Huntsman to be marketed as a chemical intermediate for the downstream manufacture of chemicals and products. Aminoethylpiperazine has a variety of applications and is used in the production of asphalt additives, corrosion inhibitors, epoxy curing agents, urethane chemicals, mineral processing aids and polyamide resins. Huntsman does not market aminoethylpiperazine directly for consumer use.

Physical and Chemical Properties

A summary of physico-chemical properties for Aminoethylpiperazine is listed below.

Physical/Chemical Property	Result
Molecular weight, Linear component	129.21
Molecular weight, Typical product	128.8
Boiling point, 760 mm Hg, °C	222
Freezing point, °C	-17
Vapor pressure, mmHg, 20°C	< 0.1
Density, g/ml, 20°C	0.98
Water solubility (%)	100

Additional physical and chemical property information is available on the product Safety Data Sheet (SDS) SDS@huntsman.com.

Human Health Information

The potential to experience health effects associated with overexposure to aminoethylpiperazine depends on the exposure level, route, duration, as well as other factors, including individual susceptibility. The potential health effects from overexposure to aminoethylpiperazine are discussed below.

Different regulatory classification criteria apply in different geographic regions. These differing criteria can result in different human health regulatory classifications for the same products in different geographic regions. Specific regulatory classification information is contained in the Safety Data Sheet for each product in use in the specific geographic region. The acute and chronic health effects information below is based on Safety Data Sheets in use in the United States.

The primary hazard of concern when working with aminoethylpiperazine are those typically associated with similar organic amines; namely, corrosive action on skin and eyes. Below is the generally accepted health hazard classification based on the “Globally Harmonized System of Classification and Labelling of Chemicals” (GHS).

Summary- Toxicological Data

Effect Assessment	Result
Acute Toxicity - Oral	Cat 4
Acute Toxicity - Dermal	Cat 3
Skin corrosion / irritation	Cat 1B
Serious eye damage / eye irritation	Cat 1
Skin sensitization	Cat 1
STOT RE (Respiratory tract)	Cat 1
Reproductive toxicity	Cat 2

Note: For more information on the health hazards of this substance and recommended protective equipment, please refer to the relevant SDS.

Acute Health Effects

Almost any ocular contact with any aminoethylpiperazine may cause irreparable damage, even blindness.

Acute dermal toxicity of aminoethylpiperazine is moderate. The dermal LD₅₀ for rabbits is 866 mg/kg for the aminoethylpiperazine. Acute accidental dermal exposure to aminoethylpiperazine may cause severe skin burns. Exposures may also cause allergic skin reactions in some individuals.

Acute oral toxicity of aminoethylpiperazine is low to moderate. The oral LD₅₀ for rats is in the range of 2000 mg/kg for the aminoethylpiperazine. However, accidental ingestion will cause burns to the membranes of the mouth, throat, and stomach, and may cause gastrointestinal irritation or ulceration.

Chronic Health Effects

Repeated or prolonged exposure to aminoethylpiperazine through the skin did not show negative effects in animal studies except local skin inflammation. Repeated exposure by inhalation produced changes in the upper respiratory tract that were caused by the corrosive nature of the substance.

Based on several in vitro and animal studies it was concluded that aminoethylpiperazine is not mutagenic or genotoxic.

It has been shown that aminoethylpiperazine (AEP) produces reproductive effects after repeated or prolonged exposure in animal studies. AEP can have a negative impact on the fertility and can cause congenital defects in the developing pups.

Summary: Environmental fate and pathway

Effect Assessment	Result
Aquatic Hazard (short-term)	Cat 3
Aquatic Hazard (long-term)	Cat 3

Aminoethylpiperazine is an industrial raw material used in closed systems. During normal operating conditions, aminoethylpiperazine is not expected to be released to the air, soil, or water. Procedural and/or control technologies are used to minimize emissions and potential exposure during cleaning and maintenance activities. Aminoethylpiperazine is not classified for environmental hazards according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Aquatic Toxicity

Aminoethylpiperazine is moderately harmful for aquatic organisms after acute or prolonged exposure.

Environmental Fate

If there is an unintentional release, aminoethylpiperazine is not readily biodegradable in freshwater. Aminoethylpiperazine will not bioaccumulate. AEP has low vapor pressures and releases via air are unlikely.

Potential Occupational Exposure

Aminoethylpiperazine is used at Huntsman in closed systems. During normal operating conditions, occupational exposure to aminoethylpiperazine is not expected during the manufacturing process. Procedural and/or control technologies are used to minimize exposure during sampling, cleaning, maintenance or upset conditions.

Potential Consumer Exposure

Huntsman does not market aminoethylpiperazine directly for consumer use. Because aminoethylpiperazine is fully reacted during the manufacture of various products, it is not expected to present an exposure risk to downstream users or consumers.

Safe Use Recommendations/Workplace Exposure Controls

Huntsman follows workplace exposure guidelines through a variety of industrial hygiene and ventilation measures. Due to aminoethylpiperazine corrosive properties, precautions should be taken to prevent contact by use of protective clothing and chemical goggles. If contact occurs, immediately flush the exposed area with plenty of water for at least 15 minutes. Eye exposures should be examined by a physician. Contaminated clothing should be laundered before reuse. If ingestion occurs, do not induce vomiting. Have the individual drink a large amount of water (or milk, if it is readily available) and transport them to a medical facility immediately.

See the Safety Data Sheets for aminoethylpiperazine for additional information about first aid measures, accidental releases (spills and leaks), waste disposal, toxicity, transportation, regulatory requirements and other important topics SDS@huntsman.com.

Labeling According to DHS

Under the Globally Harmonized System (GHS) for Hazard Communication, substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the Safety Data Sheets. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use.

Hazard Pictograms	
Signal word	Danger
Hazard Statements	H302 Harmful if swallowed. H311 Toxic in contact with skin. H314 Causes severe skin burns and eye damage. H317 May cause an allergic skin reaction. H361 Suspected of damaging fertility or the unborn child. H372 Causes damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled. H412 Harmful to aquatic life with long lasting effects.

Note: The hazard statements and symbols presented here refer to the hazard properties of the concentrated substance and are meant to provide a brief overview of the substance's labeling. It is not intended to be comprehensive or to replace information found in the Safety Data Sheet.

References

- Huntsman regional SDSs for aminoethylpiperazine
- Huntsman Technical Bulletins for aminoethylpiperazine
- Huntsman Brochure: ETHYLENEAMINES – A Global Profile of Products and Services
- ECHA Website: echa.europa.eu



Enriching lives through innovation

Disclaimer

The information and recommendations in this publication are to the best of our knowledge, information, and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity, and behavior of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behavior should be determined by the user and made known to handlers, processors, and end users.

The trademarks above are the property of Huntsman Corporation or an affiliate thereof.

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE.