

Safety Data Sheet per OSHA HazCom 2012

1 Identification Product identifier Product name: 4-Hydroxy-4-phenylpiperidine Stock number: H55418 **CAS Number:** 40807-61-2 EC number: 255-089-0 Relevant identified uses of the substance or mixture and uses advised against. Identified use: SU24 Scientific research and development Details of the supplier of the safety data sheet Manufacturer/Supplier: Alfa Aesar Thermo Fisher Scientific Chemicals, Inc. Inerrito Fisher Scheman C. 30 Bond Street Ward Hill, MA 01835-8099 Tel: 800-343-0660 Fax: 800-322-4757 Email: tech @alfa.com www.alfa.com Information Department: Health, Safety and Environmental Department Emergency telephone number: During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789. 2 Hazard(s) identification Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS) ! GHS07 Skin Irrit. 2 H315 Causes skin irritation. Eye Irrit. 2A H319 Causes serious eye irritation. STOT SE 3 H335 May cause respiratory irritation. Hazards not otherwise classified No information known. Label elements GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS) Hazard pictograms GHS07 Signal word Warning Hazard statements H315 Causes skin irritation. H319 Causes serious eye irritation. H335 May cause respiratory irritation. Precautionary statements P261 Avoid breathing dust/fume/gas/mist/vapours/spray. P280 Wear protective gloves/protective clothing/eye protection/face protection. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Store locked up. Dispose of contents/container in accordance with local/regional/national/international regulations. P405 WHMIS classification D2B - Toxic material causing other toxic effects Ţ Classification system HMIS ratings (scale 0-4) (Hazardous Materials Identification System) Health (acute effects) = 1Flammàbility = 1 TIVITY 1 Physical Hazard = 1 Other hazards Results of PBT and vPvB assessment PBT: Not applicable. vPvB: Not applicable 3 Composition/information on ingredients Chemical characterization: Substances CAS# Description: 40807-61-2 4-Hydroxy-4-phenylpiperidine Identification number(s): EC number: 255-089-0 4 First-aid measures Description of first aid measures After inhalation Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice. After skin contact Immediately wash with water and soap and rinse thoroughly. (Contd. on page 2)

Product name: 4-Hydroxy-4-phenylpiperidine (Contd. of page 1) Seek immediate medical advice. After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor. After swallowing Seek medical treatment. Information for doctor Most important symptoms and effects, both acute and delayed No further relevant information available. Indication of any immediate medical attention and special freatment needed No further relevant information available. 5 Fire-fighting measures Extinguishing media Suitable extinguishing agents Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam. Special hazards arising from the substance or mixture If this product is involved in a fire, the following can be released: Carbon monoxide and carbon dioxide Nitrogen oxides (NOX) Advice for fireficience Advice for firefighters Protective equipment: Wear self-contained respirator. Wear fully protective impervious suit. 6 Accidental release measures Personal precautions, protective equipment and emergency procedures Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation Environmental precautions: Do not allow product to reach sewage system or any water course. Methods and material for containment and cleaning up: Ensure adequate ventilation. Prevention of secondary hazards: No special measures required. Reference to other sections See Section 7 for information on safe handling See Section 8 for information on personal protection equipment. See Section 13 for disposal information. 7 Handling and storage Handling Precautions for safe handling Recautions for safe nanoing Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace. Information about protection against explosions and fires: No information known. Conditions for safe storage, including any incompatibilities Storage Requirements to be met by storerooms and receptacles: No special requirements. Information about storage in one common storage facility: Store away from oxidizing agents. Further information about storage conditions: Keep container tightly sealed. Store in cool, dry conditions in well sealed containers. Specific end use(s) No further relevant information available. 8 Exposure controls/personal protection Additional information about design of technical systems: Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute. Control parameters Components with limit values that require monitoring at the workplace: The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace. Additional information: No data Exposure controls Personal protective equipment rersonal protective equipment General protective and hygienic measures The usual precautionary measures for handling chemicals should be followed. Keep away from foodstuffs, beverages and feed. Remove all soiled and contaminated clothing immediately. Wash hands before breaks and at the end of work. Avoid contact with the eyes and skin. Maintain an ergonomically appropriate working environment Maintain an ergonomically appropriate working environment. Breathing equipment: Use suitable respirator when high concentrations are present. Recommended filter device for short term use: Use a respirator with type N95 (USA) or PE (EN 143) cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards. Protection of hands: Impervious gloves Check protective gloves prior to each use for their proper condition. The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer. Eye protection: Safety glasses Body protection: Protective work clothing. 9 Physical and chemical properties Information on basic physical and chemical properties General Information Appearance: Form: Color: Solid Pale brown Odor: Not determined Odor threshold: Not determined pH-value: Not applicable. Change in condition Melting point/Melting range: Boiling point/Boiling range: 157-161 °C (315-322 °F) Not determined

(Contd. on page 3)

Product name: 4-Hydroxy-4-phenylpiperidine

| Product name: 4-Hydroxy-4-phenyl | lpiperidine | |
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| | | (Contd. of page 2) |
| Sublimation temperature / start: Flammability (solid, gaseous) | Not determined Not determined. | |
| Ignition temperature: | Not determined | |
| Decomposition temperature: Auto igniting: | Not determined Not determined. | |
| Danger of explosion: | Not determined. | |
| Explosion limits: Lower: | Not determined | |
| Upper: | Not determined | |
| Vapor pressure: Density: | Not applicable. Not determined | |
| Relative density Vapor density | Not determined. Not applicable. | |
| Evaporation rate | Not applicable. | |
| Solubility in / Miscibility with Water: | Not determined | |
| Partition coefficient (n-octanol/water Viscosity: | r): Not determined. | |
| dynamic: kinematic: | Not applicable. Not applicable. | |
| Other information | Not applicable. No further relevant information available. | |
| 10 Stability and reactivity | | |
| 10 Stability and reactivity Reactivity No information known. | | |
| Chemical stability Stable under recon | nmended storage conditions. | |
| Possibility of hazardous reactions | s to be avoided : Decomposition will not occur if used and stored according to specifications. Reacts with strong oxidizing agents | |
| Conditions to avoid No further releva Incompatible materials: Oxidizing age | Int information available. | |
| Hazardous decomposition products | | |
| Carbon monoxide and carbon dioxide Nitrogen oxides | | |
| 11 Toxicological information | | |
| Information on toxicological effects | | |
| Acute toxicity: No effects known. | | |
| LD/LC50 valúes that are relevant for Skin irritation or corrosion: Causes s | [•] classification: No data skin irritation | |
| Eye irritation or corrosion: Causes s | erious eye irritation. | |
| Sensitization: No sensitizing effects kan Germ cell mutagenicity: No effects kan Germ cell mutagenicity kan Germ cell mutag | nown. nown | |
| Carcinogenicity: No classification dat | ta on carcinogenic properties of this material is available from the EPA. IARC. NTP. OSHA or ACGIH. | |
| Reproductive toxicity: No effects kno Specific target organ system toxicity | wn. y - repeated exposure: No effects known. | |
| Specific target organ system toxicity | y - single exposure: May cause respiratory irritation. | |
| Subacute to chronic toxicity: No effe | ects known. | |
| Additional toxicological information | : To the best of our knowledge the acute and chronic toxicity of this substance is not fully known. | |
| 12 Ecological information | | |
| Toxicity Aquatic toxicity: No further relevant in | nformation available | |
| Aquatic toxicity: No further relevant in Persistence and degradability No fur | rther relevant information available. | |
| Bioaccumulative potential No further Mobility in soil No further relevant info | ormation available. | |
| Additional ecological information: General notes: | | |
| Do not allow undiluted product or large | e quantities to reach ground water, water course or sewage system. | |
| Avoid transfer into the environment. Results of PBT and vPvB assessme | nt | |
| PBT: Not applicable. vPvB: Not applicable. | | |
| Other adverse effects No further relev | vant information available. | |
| 13 Disposal considerations | | |
| Waste treatment methods | | |
| Recommendation Consult state, local Uncleaned packagings: | l or national regulations to ensure proper disposal. | |
| Recommendation: Disposal must be | made according to official regulations. | |
| 14 Transport information | | |
| UN-Number DOT, ADN, IMDG, IATA | Not applicable | |
| UN proper shipping name DOT, ADN, IMDG, IATA | | |
| | Not applicable | |
| Transport hazard class(es) DOT, ADR, ADN, IMDG, IATA | | |
| Class | Not applicable | |
| Packing group DOT, IMDG, IATA | Not applicable | |
| Environmental hazards: | Not applicable. | |
| Special precautions for user | Not applicable. | |
| Transport in bulk according to Anne | ex II of MARPOL73/78 and the IBC Code Not applicable. | |
| | | (Contd. on page 4) |

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| Transport/Additional information: DOT Marine Pollutant (DOT): No UN "Model Regulation": - 15 Regulatory information - Signal word warning The product is classified and aboled in accordance with 29 CFR 1910 (OSHA HCS) Hard Signal word Warning Head of the substance or mixture of the substance of the substance of the substance or mixture of the substance of the substance of the substance or mixture of the substance of the substance of the substance or mixture of the substance or mixture of the substance of the substance or mixture of the substance or the substance or mixture of the substance of the substance or other substance or the substance or other substance or the substance or the substance or the substance or other substance or the substance or the substance or other substance or information. Proceedings of the substance or information or the substance or information or the substance or other substance or information. Proceeding of the substance or information. Proceedings of the substance or informatio | | |
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| Haard statements' H315 Gausses skin irritation. H319 Gausses skin irritation. H319 Gausses skin irritation. H325 May cause respiratory irritation. Precautionary statements' H326 Law 2014 Control of the earling dust/tume/gas/mist/vapours/spray. P201 Avoid breathing dust/tume/gas/mist/vapours/spray. P2014 P301 IF INTALED: Respiration of the earling dust/tume/gas/mist/vapours/spray. P304+P31+P303 IF INTALED: Respiration of the earling dust/tume/gas/mist/vapours/spray. P304+P31+P303 IF INTALED: Respiration of the earling dust/tume/gas/mist/vapours/spray. P304+P301 IF INTALED: Respiration of the earling dust/tume/gas/mist/vapours/spray. P304+P301 IF INTALED: Respiration of the earling dust/tume/gas/mist/vapours/spray. P304+P301 IF INTALED: Respiration of the earling dust/tume/gas/mist/vapours/spray. P305 Store locked up. P501 Dispose of contents/container in accordance with local/regional/national/international regulations. National regulations This product is not listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory. Use of this product is to trase of loc commercial purposes or in formulations for commercial purposes. This product is not listed on the Canadian Domestic Substances is not listed. Prop 63 - Development toxicity Substance is not listed. Promotion about limitation and prohibitive regulations for commercial purposes. Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006, Substance is not listed. The conditions of nestrictions according to Article 67 and Annex XVII of the Regulation (EC) No. 1907/2006, Substance is not listed. Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed. Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed. Chemical safety assessment: A Chemical | | |
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| Prop 65 - Chemicals known to cause cancer Substance is not listed. Prop 65 - Developmental toxicity, substance is not listed. Prop 65 - Developmental toxicity, male Substance is not listed. Prop 65 - Developmental toxicity, male Substance is not listed. Information about limitations of use: For use only by technically qualified individuals. Other regulations, limitations and prohibitive regulations Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed. The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing market and use must be observed. Substance is not listed. Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed. Chemical safety assessment: A Chemical Safety Assessment has not been carried out. 16 Other information Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user. Department issuing SDS: Global Marketing Department Date of preparation / last revision 11/24/2015 / - Abbreviations and acronyms: ADF: Accord européen use Ir ternsport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road) DOT: US Department of Transportation EINECS: European Inventory Of Existing Commercial Chemical Substances CAS: Chemical Abstracts Service (division of the Amerchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road) DOT: US Department of Transportation EINECS: European Inventory Of Existing Com | al regulations oduct is not listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory. Use of arch and development only. This product must be used by or directly under the supervision of a technically qualified individual as de t must not be used for commercial purposes or in formulations for commercial purposes. oduct is not listed on the Canadian Domestic Substances List (DSL) or the Canadian Non-Domestic Substances List (NDSL). Section 313 (specific toxic chemical listings) Substances is not listed | of this product is restricted |
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| vPvB: very Persistent and very Bioaccumulative ACCIH: American Conference of Governmental Industrial Hygienists (USA) OSLA: Conversional Software Manihe Mainistration (USA) | thal concentration, 50 percent thal dose, 50 percent y Persistent and very Bioaccumulative Imerican Conference of Governmental Industrial Hygienists (USA) couractional Safety and Health Administration (USA) | |
| STA: Octubational Safety and Program (USA) NTP: National Toxicology Program (USA) IARC: International Agency for Research on Cancer EPA: Environmental Protection Agency (USA) | Sand Toxicology Program (USA) mational Agency for Research on Cancer ironmental Protection Agency (USA) | USA |