Alpha-Methyl Styrene (AMS)

Part-2

Proposed title of Standard * (Note: Maximum 300 Characters allowed.)
Specification for Alpha-Methyl Styrene (AMS)

6. Aspect *
Product Specification

7. Define subject of standard * (Note : Maximum 1000 characters allowed.)
The BIS standard for Alpha-Methyl Styrene (AMS) specifies its quality, safety, and testing requirements for industrial use. Key elements include:

1. Scope- Defines the applications covered.
2. Specifications- Includes parameters like Appearance purity, Colour, PTBC Content, moisture content, and Polymer Content.
3. Test Methods- Covers analytical techniques such as gas chromatography for purity, coulometer titration for moisture, UV- Visible spectroscopy method for PTBC and Polymer content and Colorimeter for Colour.
4. Sampling- Guidelines for representative sampling and handling procedures.
5. Safety- Recommendations for safe storage, handling, and PPE.
6. Packaging and Marking- Details container types and labeling requirements.
7. This ensures AMS meets industry standards for quality and safe usage.

8. Select Most Relevant Technical Department * Know Your Department
Petroleum, Coal, and Related Products Department (PCD)

Part-3

9. Scope of proposed standard *(Note : Maximum 1000 characters allowed.)

The proposed BIS standard for Alpha-Methyl Styrene (AMS) defines specifications and testing methods for quality, safety, and industrial applications.

Key Elements:

1. **Application**: AMS used in resins, plastics, adhesives, and intermediates; ensures quality and safety during manufacturing, storage, and transport.
2. **Specifications**: Purity: ≥99.50%; Colour: ≤20 Pt/Co; PTBC: ≤20 mg/kg; Polymer Content: ≤10 mg/kg; Appearance: Clear, colourless; Moisture: ≤300 mg/kg.
3. **Testing Methods**: Purity (GC, ASTM D6144); Colour (ASTM D1209); PTBC and Polymer Content (UV-Visible, ASTM D4590/D2121-A); Appearance (Visual); Moisture (Coulometer, ASTM E1064).
4. **Implementation**: Developed via stakeholder input, aligned with international standards, and implemented through BIS committees, training, and audits.

This standard ensures industrial reliability, safety, and efficiency.

10. Purpose and Justification *(Note : Maximum 1000 characters allowed.)
Alpha-Methyl Styrene (AMS) is vital for manufacturing resins, coatings, and polymers like ABS, widely used in automotive and consumer goods. Deepak Phenolics aims to incorporate AMS specifications into BIS to ensure quality, safety, and market alignment. BIS standards help standardize purity, inhibitors, and colour, ensuring consistent industrial use, environmental safety, and trade facilitation.

The methodology involves referencing global standards (e.g., ASTM), stakeholder consultations, laboratory testing, and defining parameters like purity (via gas chromatography), PTBC inhibitor (Via UV Visible spectrophotometer) and moisture (via Coulometer titration).

Deepak Phenolics' involvement, through data sharing and compliance promotion, supports import substitution and strengthens India's industrial and export capabilities, aligning with global benchmarks and fostering sustainability.

Alpha-Methyl Styrene (AMS)

11. Likely users of standards and their inputs * (Note : Maximum 1000 characters allowed.)

Alpha-Methyl Styrene (AMS) is used in industries like resins, coatings, and adhesives. Key users and their roles include:

1. Manufacturers: Ensure AMS meets purity and safety standards for production.
2. Chemical Engineers: Design systems for safe AMS processing.
3. Regulatory Agencies: Oversee AMS safety, handling, and disposal regulations.
4. Health and Safety Professionals: Ensure worker safety with exposure limits and PPE.
5. Environmental Engineers: Manage AMS's environmental impact.
6. Laboratories: Test AMS purity and quality.
7. Distributors: Safely store and transport AMS.
8. End-Product Manufacturers: Ensure AMS-based products meet safety and performance standards.

Standards like ASTM, ISO, REACH, and OSHA ensure safe and compliant AMS use.

12. Any related standards/series of standard/system standard required to make this subject standard complete* (Note : Maximum 1000 characters allowed.)

To establish a complete standard for Alpha-Methyl Styrene (AMS), the following related standards are required:

1. **Chemical Properties**: ISO 472 for polymer industry terms.
2. **Safety Standards**: OSHA and NIOSH for hazard communication and exposure limits.
3. **Environmental Impact**: REACH and EPA for safe use, production, and disposal.
4. **Manufacturing & Quality Control**: ISO 9001 for quality management and ISO 14001 for environmental management.
5. **Transport & Storage**: ADR for chemical transport and UN GHS for labelling.
6. **Testing Methods**: ASTM D6144 for purity, ASTM D1209 for color, ASTM D4590 for inhibitors, ASTM D2121-A for polymer content, and ASTM E1064 for moisture.
7. **Fire Safety**: NFPA 30 for fire safety in handling.

These standards ensure AMS is produced, tested, transported, and disposed of safely and efficiently.

13. When the final standard would be required* Date (30-01-2025)

13. Any specific problem being faced without this standard* (Note : Maximum 1000 characters allowed.)

The absence of an Indian standard for AMS leads to several issues:

1. **Inconsistent Quality**: Variability in AMS quality impacts its use in critical applications.
2. **Safety Risks**: Lack of uniform safety guidelines increases exposure and handling hazards.
3. **Regulatory Challenges**: Difficulty in meeting global regulations like REACH and OSHA due to inconsistent specifications.
4. **Trade Barriers**: Discrepancies in AMS quality hinder international trade.
5. **Environmental Impact**: Non-standardized methods complicate compliance with emissions and waste regulations.
6. **Testing Issues**: Inconsistent testing methods lead to unreliable results and affect downstream processes.

Alpha-Methyl Styrene (AMS)

A dedicated Indian standard would resolve these challenges by providing unified specifications and methods, ensuring quality, safety, and global compliance.

14. Bearing with Govt legislation regulation, etc* (Note : Maximum 1000 characters allowed.)
    Our organization ensures that the sale and manufacturing of AMS comply fully with all government legislation and regulations.

15. Name and address of manufacturers/ implementing/ industries/ purchasing organization /component supplier/ raw material supplier, if any* (Note : Maximum 1000 characters allowed.)
    Name and address of manufacturers: Deepak Phenolics Ltd.

Name and address of / implementing/ industries/ purchasing organization /component supplier/ raw material supplier: STYRENIX PERFORMANCE MATERIALS LIMITED, Yasho Industries Limited, ORSON RESINS AND COATINGS PRIVATE LIMITE, Indosol Chemie, SHIVA PERFORMANCE MATERIALS PRIVATE LIMI, SOYVENTIS EUROPE B.V, Oriental Aromatics Limited, PRIVI SPECIALITY CHEMICALS LIMITED, ITOCHU Corporation TOKQR, RAIN CARBON GERMANY GMBH, RAJSHA CHEMICALS PRIVATE LIMITED

16. Status of the industry in the country* (Note : Maximum 1000 characters allowed.)

India is a major producer and consumer of rubber and plastic products, with AMS playing a role in these industries. The country's strong manufacturing base for tires, adhesives, and industrial coatings supports the AMS market. Additionally, India's growing construction and automotive industries are expected to further boost demand for AMS as it is used in durable coatings and lightweight vehicle components

Globally, the AMS market is projected to grow at a moderate CAGR, with India contributing significantly within the Asia-Pacific region due to its increasing industrial applications and export capabilities

18. Availability of test facilities in the country* (Note : Maximum 1000 characters allowed.)

Testing for Alpha-Methyl Styrene (AMS) is conducted in specialized laboratories, including:

1. **Government Labs**: National Chemical Laboratories and regional standards labs.
2. **Private Accredited Labs**: Global networks like SGS, Intertek, and Bureau Veritas offer AMS testing.
3. **Industry-Specific Labs**: Petrochemical companies and polymer manufacturers often have in-house testing facilities.
4. **Academic Institutions**: Universities with advanced chemical analysis capabilities may conduct AMS tests.

19. Whether related to variety reduction, export, health, safety consumer protection, mass consumption, energy conservation, technology transfer, technology upgradation, protection of environment & other National priorities*- (Note : Maximum 1000 characters allowed.)

Not Applicable

20. Whether subject requires consideration to be given to women/girl issues in line with Sustainable Goal 5 of the UN. If so, whether the issues are proposed to be addressed suitably in the proposed standard* (Note : Maximum 1000 characters allowed.)

Not Applicable

21. Relevant supportive document* (Only pdf file allowed. Max size : 20MB), (Note : Maximum 200 Characters allowed.)

Attached below document:

1. Generic specification
2. ASTM D6144 Testing Methods for AMS Purity
3. ASTM D1209 Testing Methods for Colour analysis
4. ASTM D4590 Testing Methods for PTBC analysis
5. ASTM D2121-A Testing Methods for Polymer analysis
6. TDS of AMS

Alpha-Methyl Styrene (AMS)

7. MSDS of AMS
22. R & D work done in India* (Note : Maximum 1000 characters allowed.) Not applicable
23. Any foreign collaboration (give details)*(Note : Maximum 1000 characters allowed.) Not applicable
24. Liaison with any organization(s)* (Note : Maximum 1000 characters allowed.) Not applicable
25. Preparatory work* Draft attached, Outline attached and draft can be prepared, No draft possible (provide reasons) We will attached Draft copy for Testing method.
26. Whether this project can be funded by your organization?* (Note : Maximum 1000 characters allowed.) Funding decisions depend on our organization's priorities and criteria.
27. Whether your organization would be interested to opt for BIS Standard Mark once the standard is published?* (Note : Maximum 1000 characters allowed.) We will review the standard once published and consider the BIS Standard Mark if it aligns with our needs
28. Any Other Attachment (extra) :*(Only pdf file allowed. Max size : 20MB), (Note : Maximum 200 Characters allowed.) NA

Alpha Methyl Styrene (Generic Specification)

Sr. No	PARAMETER	UOM	SPECIFICATION
1	AMS	Mass %	Min 99.5
2	Colour	Pt./Co	Max. 20
3	PTBC	mg/kg	10--20
4	Polymer Content	mg/kg	Max. 10
5	Water content	mg/kg	Max. 300

Deepak Phenolics Ltd.

Technical Datasheet
Alpha Methyl Styrene

Product Name : Alpha Methyl Styrene

Region : India

CAS Registry Number : 98-83-9

Synonym(s) : alpha-Methyl styrene 2-Phenylpropene, Isopropyl benzene 2-Phenyl-1-propene

Description : AMS is a colourless liquid organic chemical used to produce a wide variety of styrenic polymers. AMS adds heat resistance to ABS resins which can be found in automotive parts, electronic appliance housings and protective coatings. AMS is also used to improve the impact and heat resistant properties of certain polymers, including specialty grades of plastic, rubber, and adhesives. AMS is used in the production of para-cumyl phenol, a specialty intermediate for thermoplastics and polycarbonate resins.

Typical Properties

Property	Unit	Method	Value
Appearance	-	Visual	Clear Colourless liquid.
Purity	Mass %	ASTM D6144	99.30 min
Colour	Pt/Co	ASTM D1209	20 max
Water Content	Mass %	ASTM D1364	0.1 max
PTBC	mg/kg	ASTM D4590	25 max
Polymer Content	mg/kg	ASTM D2121	10 max
Phenol Content	mg/kg	ASTM D6144	20 max
Cumene Content	Mass %	ASTM D6144	0.15 Max
n-Propyl-Benzene Content	Mass %	ASTM D6144	0.07 Max
Butyl benzene Content	Mass %	ASTM D6144	0.2 Max
Refractive index @ 20°C	--	--	1.538-1.539
Refractive index @ 25°C	--	--	1.5350-1.5365
Dimeric alpha-Methyl Styrene Content	mg/kg	ASTM D6144	100 max
Benzaldehyde Content	mg/kg	ASTM D6144	100 max
Acetophenone Content	mg/kg	ASTM D6144	100 max
Styrene Content	mg/kg	ASTM D6144	100 max
SPGR @ 15.5°C	--	ASTM D4052	0.9120-0.9150
SPGR @ 25.0°C	--	ASTM D4052	0.9045-0.9085
Boiling Point	°C	--	165 - 169
Melting Point	°C	--	9.8
Flash Point (closed cup)	°C	ASTM D93	46-55

Deepak Phenolics Ltd.

Technical Datasheet
Alpha Methyl Styrene

Molecular weight	g/mol	--	118.18
Explosive limits in air % by volume	% Vol	--	Upper explosion limit: 6.1 Lower explosion limit: 0.9

Test Methods

Copies of copyrighted test methods can be obtained from the issuing organisations:

American Society for Testing and Materials (ASTM) : www.astm.org

Hazard Information

For detailed Hazard Information please refer to the Safety Data Sheet.

AMS (Alpha Methyl Styrene)

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878
Issue date: 5/18/2022 Revision date: 1/18/2024 Version: 2.0 SDS number: P2022050704

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Substance
Trade name : AMS (Alpha Methyl Styrene)

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Use of the substance/mixture : Industrial Purpose

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Deepak Phenolics Ltd.
12/B/1, Dahej GIDC, Village : Ambheta, Taluka : Vagra, District : Bharuch , Gujarat 392130.
T 02641-280723 / 02641-280702 / 02641-280814/02641-280708/02641-280703
firecontrolroom@godeepak.com

1.4. Emergency telephone number

No additional information available

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flammable liquids, Category 3	H226
Serious eye damage/eye irritation, Category 2	H319
Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation	H335
Hazardous to the aquatic environment – Chronic Hazard, Category 2	H411

Full text of H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

Flammable liquid and vapour. May cause respiratory irritation. Causes serious eye irritation. Toxic to aquatic life with long lasting effects.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

GHS02 GHS07 GHS09

Signal word (CLP) : Warning
Hazard statements (CLP) : H226 - Flammable liquid and vapour.
H319 - Causes serious eye irritation.
H335 - May cause respiratory irritation.
H350 – May Cause cancer.
H411 - Toxic to aquatic life with long lasting effects.
Precautionary statements (CLP) : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P235 - Keep cool.
P273 - Avoid release to the environment.
P370+P378 - In case of fire: Use media other than water to extinguish.

P391 - Collect spillage.
P403+P235 - Store in a well-ventilated place. Keep cool.

2.3. Other hazards

Contains PBT substances ≥ 0.1% assessed in accordance with REACH Annex XIII

Component	
Alpha methyl styrene dimer (6362-80-7)	This substance meets the PBT criteria of REACH regulation, annex XIII

SECTION 3: Composition/information on ingredients

3.1. Substances

Name : AMS (Alpha Methyl Styrene)

Name	Product identifier	Concentration (or range)
.alpha.-Methylstyrene	CAS-No.: 98-83-9 EC-No.: 202-705-0 EC Index-No.: 601-027-00-6	99.3 % Min

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). Call a poison center or a doctor if you feel unwell.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. Allow affected person to breathe fresh air. Allow the victim to rest. Call a poison center or a doctor if you feel unwell.

First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. Rinse skin with water/shower. Take off immediately all contaminated clothing.

First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persists. Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention. Call a poison center or a doctor if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects : Not expected to present a significant hazard under anticipated conditions of normal use.

Symptoms/effects after inhalation : May cause respiratory irritation.

Symptoms/effects after eye contact : Eye irritation.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Fire hazard	:	On combustion forms: Flammable liquid and vapour.
Hazardous decomposition products in case of fire	:	Toxic fumes may be released.

5.3. Advice for firefighters

Firefighting instructions	:	Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering the environment.
Protective equipment for firefighters	:	Do not enter fire area without proper protective equipment, including respiratory protection. Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment	:	Wear recommended personal protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures	:	Ventilate spillage area. Evacuate unnecessary personnel. No open flames, no sparks, and no smoking. Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid contact with skin and eyes.

6.1.2. For emergency responders

Protective equipment	:	Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures	:	Ventilate area.

6.2. Environmental precautions

Avoid release to the environment. Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	:	Collect spillage.
Methods for cleaning up	:	Take up liquid spill into absorbent material. Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials. Notify authorities if product enters sewers or public waters.
Other information	:	Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For disposal of residues refer to section 13 : "Disposal considerations".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Provide good ventilation in process area to prevent formation of vapour. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Flammable vapours may accumulate in the container. Use explosion-proof equipment. Wear personal protective equipment. Use only outdoors or in a well-ventilated area. Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid contact with skin and eyes.
Hygiene measures	:	Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Ground/bond container and receiving equipment.
Storage conditions	:	Keep container tightly closed in a cool, well-ventilated place. Keep container closed when not in use.
Suitable packaging material	:	Metal Barrel/Bulk ISO container

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

.alpha.-Methylstyrene (98-83-9)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	2-Phenylpropene
IOEL TWA	246 mg/m³
IOEL TWA [ppm]	50 ppm
IOEL STEL	492 mg/m³
IOEL STEL [ppm]	100 ppm
Regulatory reference	COMMISSION DIRECTIVE 2000/39/EC
Austria - Occupational Exposure Limits	
Local name	α-Methylstyrol (Isopropenylbenzol; 2-Phenylpropen)
MAK (OEL TWA)	246 mg/m³
MAK (OEL TWA) [ppm]	50 ppm
MAK (OEL STEL)	492 mg/m³
MAK (OEL STEL) [ppm]	100 ppm
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	α-Méthylstyrène # α-Methylstyreen
OEL TWA	246 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Croatia - Occupational Exposure Limits	
Local name	2-fenilpropen; α-metilstiren
GVI (OEL TWA) [1]	246 mg/m³
GVI (OEL TWA) [2]	50 ppm
KGVI (OEL STEL)	492 mg/m³
KGVI (OEL STEL) [ppm]	100 ppm (during the monitoring of exposure the relevant value of biological monitoring shall be taken into account as suggested by the Scientific Committee for Occupational Exposure Limits to Chemical Agents (SCOEL) (Cumene)

.alpha.-Methylstyrene (98-83-9)	
Remark	Direktiva: 2000/39/EZ
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 1/2021)
Cyprus - Occupational Exposure Limits	
Local name	2-Φαινυλοπροπένιο
OEL TWA	246 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Regulatory reference	Κανονισμοί του 2007 (Κ.Δ.Π. 295/2007)
Czech Republic - Occupational Exposure Limits	
Local name	2-Fenylpropen
PEL (OEL TWA)	250 mg/m³
PEL (OEL TWA) [ppm]	51 ppm
NPK-P (OEL C)	500 mg/m³
NPK-P (OEL C) [ppm]	102 ppm
Remark	I - dráždí sliznice (oči, dýchací cesty), respektive kůži.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)
Denmark - Occupational Exposure Limits	
Local name	α-Methylstyren (2-Phenylpropen)
OEL TWA [1]	246 mg/m³
OEL TWA [2]	50 ppm
Remark	E (betyder, at stoffet har en EF-grænseværdi)
Regulatory reference	BEK nr 2203 af 29. november 2021
Estonia - Occupational Exposure Limits	
Local name	Fenüülpropeen (propenüülbenseen, 2-fenüülpropeen)
OEL TWA	246 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 15.05.2021, 1)
Finland - Occupational Exposure Limits	
Local name	2-Fenyylipropeeni
HTP (OEL TWA) [1]	250 mg/m³
HTP (OEL TWA) [2]	50 ppm
HTP (OEL STEL)	490 mg/m³
HTP (OEL STEL) [ppm]	100 ppm
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)

.alpha.-Methylstyrene (98-83-9)	
France - Occupational Exposure Limits	
Local name	2-Phénylpropène (α-Méthylstyrène)
VME (OEL TWA)	123 mg/m³
VME (OEL TWA) [ppm]	25 ppm
VLE (OEL C/STEL)	492 mg/m³
VLE (OEL C/STEL) [ppm]	100 ppm
Remark	Valeurs règlementaires indicatives
Regulatory reference	Arrêté du 30 juin 2004 modifié (réf.: INRS ED 984, 2016)
Germany - Occupational Exposure Limits (TRGS 900)	
AGW (OEL TWA) [1]	250 mg/m³
AGW (OEL TWA) [2]	50 ppm
Peak exposure limitation factor	2(I)
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich)
Regulatory reference	TRGS900
Greece - Occupational Exposure Limits	
Local name	Μεθυλοστυρόλιο (όλα τα ισομερή)
OEL TWA	480 mg/m³
OEL TWA [ppm]	100 ppm
OEL STEL	720 mg/m³
OEL STEL [ppm]	150 ppm
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Hungary - Occupational Exposure Limits	
Local name	2-FENILPROPÉN
AK (OEL TWA)	246 mg/m³
CK (OEL STEL)	492 mg/m³
Remark	EU1 (2000/39/EK irányelvben közölt érték); R (Azok az anyagok, amelyek egészségkárosító hatása RÖVID expozíció hatására jelentkezik)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	2-Phenylpropene [α-Methylstyrene]
OEL TWA [1]	246 mg/m³
OEL TWA [2]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Remark	IOELV (Indicative Occupational Exposure Limit Values)
Regulatory reference	Chemical Agents Code of Practice 2021

.alpha.-Methylstyrene (98-83-9)	
Italy - Occupational Exposure Limits	
Local name	Fenilpropene, 2-
OEL TWA	246 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Regulatory reference	Allegato XXXVIII del D.Lgs. 9 aprile 2008, n. 81 e s.m.i.
Latvia - Occupational Exposure Limits	
Local name	2-Fenilpropēns (izopropēnilbenzols, α-metilstirols)
OEL TWA	246 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2011. gada 1. februārī noteikumiem Nr. 92)
Lithuania - Occupational Exposure Limits	
Local name	2-fenilpropenas (alfa-metilstirenas)
IPRV (OEL TWA)	246 mg/m³
IPRV (OEL TWA) [ppm]	50 ppm
TPRV (OEL STEL)	492 mg/m³
TPRV (OEL STEL) [ppm]	100 ppm
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Luxembourg - Occupational Exposure Limits	
Local name	2-Phénylpropène
OEL TWA	246 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Regulatory reference	Mémorial A Nº 226 de 2021 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
Malta - Occupational Exposure Limits	
Local name	2-Phenylpropene
OEL TWA	246 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Regulatory reference	S.L.424.24 - Chemical Agents at Work Regulations (L.N.356 of 2021)
Netherlands - Occupational Exposure Limits	
Local name	2-Fenylpropeen
TGG-8u (OEL TWA)	20 mg/m³

.alpha.-Methylstyrene (98-83-9)	
Regulatory reference	Arbeidsomstandighedenregeling 2022
Poland - Occupational Exposure Limits	
Local name	2-Fenylopropen
NDS (OEL TWA)	240 mg/m³
NDSCh (OEL STEL)	480 mg/m³
Regulatory reference	Dz. U. 2018 poz. 1286
Portugal - Occupational Exposure Limits	
Local name	α-Metilestireno
OEL TWA	246 mg/m³ (indicative limit value)
OEL TWA [ppm]	50 ppm (indicative limit value)
OEL STEL	492 mg/m³ (indicative limit value)
OEL STEL [ppm]	100 ppm (indicative limit value)
Remark	A3 (Agente carcinogénico confirmado nos animais de laboratorio con relevância desconhecida no Homem)
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	α-metilstiren/2-fenilpropenă
OEL TWA	246 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 53/2021)
Slovakia - Occupational Exposure Limits	
Local name	2-Fenylpropén
NPHV (OEL TWA) [1]	246 mg/m³
NPHV (OEL TWA) [2]	50 ppm
NPHV (OEL STEL)	492 mg/m³
NPHV (OEL STEL) [ppm]	100 ppm
NPHV (OEL C)	492 mg/m³
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (236/2020 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	2-fenilpropen
OEL TWA	246 mg/m³
OEL TWA [ppm]	50 ppm
OEL STEL	492 mg/m³
OEL STEL [ppm]	100 ppm
Remark	EU
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021

.alpha.-Methylstyrene (98-83-9)	
Sweden - Occupational Exposure Limits	
Local name	α-Metylstyren (2-Fenylpropen)
NGV (OEL TWA)	98 mg/m³
NGV (OEL TWA) [ppm]	20 ppm
KTV (OEL STEL)	492 mg/m³
KTV (OEL STEL) [ppm]	100 ppm
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

No additional information available

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:
Ensure good ventilation of the work station.

8.2.2. Personal protection equipment

Personal protective equipment:
Avoid all unnecessary exposure.

8.2.2.1. Eye and face protection

Eye protection:
Chemical goggles or safety glasses. Use eye protection according to EN 166. Safety glasses

8.2.2.2. Skin protection

Skin and body protection:
Wear suitable protective clothing

Hand protection:
Wear protective gloves. Wear suitable gloves tested to EN374

8.2.2.3. Respiratory protection

Respiratory protection:
Wear appropriate mask

8.2.2.4. Thermal hazards

No additional information available

8.2.3. Environmental exposure controls

Environmental exposure controls:
Avoid release to the environment.

Other information:
Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Colour	:	Colourless.
Odour	:	aromatic odor
Odour threshold	:	Not available
Melting point	:	Not available
Freezing point	:	-23.2°C
Boiling point	:	165-165.4°C
Flammability	:	Flammable liquid and vapour.
Explosive limits	:	Not available
Lower explosion limit	:	Not available
Upper explosion limit	:	Not available
Flash point	:	40 °C
Auto-ignition temperature	:	Not available
Decomposition temperature	:	Not available
pH	:	Not available
Viscosity, kinematic	:	Not available
Solubility	:	ca. 100 mg/L at 25°C
Partition coefficient n-octanol/water (Log Kow)	:	Not available
Vapour pressure	:	253 Pa
Vapour pressure at 50 °C	:	Not available
Density	:	Not available
Relative density	:	0.91
Relative vapour density at 20 °C	:	Not available
Particle characteristics	:	Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Flammable liquid and vapour.

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use. Hazardous polymerization will not occur.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7). Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity (oral) : Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

.alpha.-Methylstyrene (98-83-9)	
LD50 oral rat	4900 mg/kg
LD50 dermal rabbit	14560 mg/kg
LC50 Inhalation - Rat	22.85 mg/l (Exposure time: 6 h)

Skin corrosion/irritation : Not irritating
Serious eye damage/irritation : Causes serious eye irritation.
Respiratory or skin sensitisation : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified

.alpha.-Methylstyrene (98-83-9)	
IARC group	2B - Possibly carcinogenic to humans

Reproductive toxicity : NOAEL
1 000 mg/kg bw/day
STOT-single exposure : May cause respiratory irritation.
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

No additional information available

11.2.2. Other information

Other information : Likely routes of exposure: ingestion, inhalation, skin and eye

SECTION 12: Ecological information

12.1. Toxicity

Hazardous to the aquatic environment, short–term (acute) : Not classified
Hazardous to the aquatic environment, long–term (chronic) : Toxic to aquatic life with long lasting effects.

.alpha.-Methylstyrene (98-83-9)	
LC50 - Fish [1]	2.97 mg/l (Exposure time: 96 h - Species: Danio rerio [static])

12.2. Persistence and degradability

AMS (Alpha Methyl Styrene)	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

AMS (Alpha Methyl Styrene)	
Bioaccumulative potential	Not established.

.alpha.-Methylstyrene (98-83-9)	
BCF - Fish [1]	15 – 140
Partition coefficient n-octanol/water (Log Pow)	3.48 (at 25 °C (at pH 6)

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Endocrine disrupting properties

No additional information available

12.7. Other adverse effects

Additional information : Avoid release to the environment.

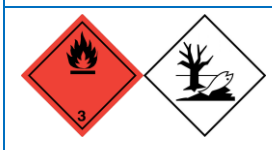
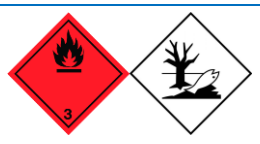
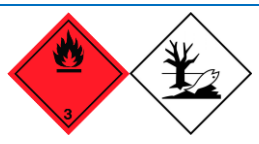
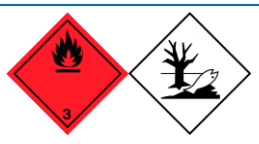
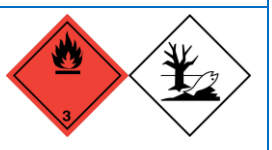
SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.
Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.
Additional information : Flammable vapours may accumulate in the container.
Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
UN 2303	UN 2303	UN 2303	UN 2303	UN 2303
14.2. UN proper shipping name				
ISOPROPENYLBENZENE	ISOPROPENYLBENZENE	Isopropenylbenzene	ISOPROPENYLBENZENE	ISOPROPENYLBENZENE
Transport document description				
UN 2303 ISOPROPENYLBENZENE, 3, III, (D/E), ENVIRONMENTALLY HAZARDOUS	UN 2303 ISOPROPENYLBENZENE, 3, III, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS (38°C c.c.)	UN 2303 Isopropenylbenzene, 3, III, ENVIRONMENTALLY HAZARDOUS	UN 2303 ISOPROPENYLBENZENE, 3, III, ENVIRONMENTALLY HAZARDOUS	UN 2303 ISOPROPENYLBENZENE, 3, III, ENVIRONMENTALLY HAZARDOUS
14.3. Transport hazard class(es)				
3	3	3	3	3
				
14.4. Packing group				
III	III	III	III	III

ADR	IMDG	IATA	ADN	RID
14.5. Environmental hazards				
Dangerous for the environment: Yes	Dangerous for the environment: Yes Marine pollutant: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes
No supplementary information available				

14.6. Special precautions for user

Overland transport

Classification code (ADR) : F1
Limited quantities (ADR) : 5l
Excepted quantities (ADR) : E1
Packing instructions (ADR) : P001, IBC03, LP01, R001
Mixed packing provisions (ADR) : MP19
Portable tank and bulk container instructions (ADR) : T2
Portable tank and bulk container special provisions (ADR) : TP1
Tank code (ADR) : LGBF
Vehicle for tank carriage : FL
Transport category (ADR) : 3
Special provisions for carriage - Packages (ADR) : V12
Special provisions for carriage - Operation (ADR) : S2
Hazard identification number (Kemler No.) : 30
Orange plates :

Tunnel restriction code (ADR) : D/E

Transport by sea

Limited quantities (IMDG) : 5 L
Excepted quantities (IMDG) : E1
Packing instructions (IMDG) : P001, LP01
IBC packing instructions (IMDG) : IBC03
Tank instructions (IMDG) : T2
Tank special provisions (IMDG) : TP1
EmS-No. (Fire) : F-E
EmS-No. (Spillage) : S-D
Stowage category (IMDG) : A
Flash point (IMDG) : 38°C to 54°C c.c.
Properties and observations (IMDG) : Colourless liquid. Flashpoint: 38°C to 54°C c.c. Explosive limits: 0.7% to 6.6% Immiscible with water. Irritating to skin, eyes and mucous membranes.

Air transport

PCA Excepted quantities (IATA) : E1
PCA Limited quantities (IATA) : Y344
PCA limited quantity max net quantity (IATA) : 10L
PCA packing instructions (IATA) : 355
PCA max net quantity (IATA) : 60L
CAO packing instructions (IATA) : 366
CAO max net quantity (IATA) : 220L
ERG code (IATA) : 3L

Inland waterway transport

Classification code (ADN) : F1
Limited quantities (ADN) : 5 L
Excepted quantities (ADN) : E1
Carriage permitted (ADN) : T
Equipment required (ADN) : PP, EX, A

Ventilation (ADN)	:	VE01
Number of blue cones/lights (ADN)	:	0

Rail transport

Classification code (RID)	:	F1
Limited quantities (RID)	:	5L
Excepted quantities (RID)	:	E1
Packing instructions (RID)	:	P001, IBC03, LP01, R001
Mixed packing provisions (RID)	:	MP19
Portable tank and bulk container instructions (RID)	:	T2
Portable tank and bulk container special provisions (RID)	:	TP1
Tank codes for RID tanks (RID)	:	LGBF
Transport category (RID)	:	3
Special provisions for carriage – Packages (RID)	:	W12
Colis express (express parcels) (RID)	:	CE4
Hazard identification number (RID)	:	30

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions
AMS (Alpha Methyl Styrene) is not on the REACH Candidate List
AMS (Alpha Methyl Styrene) is not on the REACH Annex XIV List
AMS (Alpha Methyl Styrene) is not subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 july 2012 concerning the export and import of hazardous chemicals.
AMS (Alpha Methyl Styrene) is not subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants
AMS (Alpha Methyl Styrene) is not subject to REGULATION (EU) No 1005/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 September 2009 on substances that deplete the ozone layer.
Contains no substance subject to Regulation (EU) 2019/1148 of the European Parliament and of the Council of 20 June 2019 on the marketing and use of explosives precursors.
Contains no substance subject to Regulation (EC) 273/2004 of the European Parliament and of the Council of 11 February 2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances.

15.1.2. National regulations

Germany

Employment restrictions	:	Observe restrictions according Act on the Protection of Working Mothers (MuSchG) Observe restrictions according Act on the Protection of Young People in Employment (JArbSchG)
Water hazard class (WGK)	:	WGK 2
Hazardous Incident Ordinance (12. BImSchV)	:	Is not subject of the Hazardous Incident Ordinance (12. BImSchV)

Netherlands

SZW-lijst van kankerverwekkende stoffen	:	The substance is not listed
SZW-lijst van mutagene stoffen	:	The substance is not listed
SZW-lijst van reprotoxische stoffen – Borstvoeding	:	The substance is not listed
SZW-lijst van reprotoxische stoffen – Vruchtbaarheid	:	The substance is not listed
SZW-lijst van reprotoxische stoffen – Ontwikkeling	:	The substance is not listed

Denmark

Danish National Regulations	:	Young people under 18 years are not allowed to use the product Pregnant/breastfeeding women working with the product must not be in direct contact with it

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Abbreviations and acronyms:	
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Effective concentration for 50 percent of test population (median effective concentration)
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Lethal concentration for 50 percent of test population (median lethal concentration)
LD50	Lethal dose for 50 percent of test population (median lethal dose)
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulation concerning the International Carriage of Dangerous Goods by Railways
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative
ED	Endocrine disrupting properties

Full text of H- and EUH-statements:	
Aquatic Chronic 2	Hazardous to the aquatic environment – Chronic Hazard, Category 2
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 3	Flammable liquids, Category 3
H226	Flammable liquid and vapour.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H411	Toxic to aquatic life with long lasting effects.
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation

Safety Data Sheet (SDS), EU

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.