

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

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

1.1 Product identifier

Trade name : MARLOTHERM® SH Heat Transfer Fluid

Product code : 34536-00, P34536S2, P34536S5, P34536S1, E3453601, P3453603, P3453602, P3453600, P3453601, P34536R0

REACH Registration Number : 01-2119488667-17-0000

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

Use of the Substance/Mixture : Heat transfer fluids

Recommended restrictions on use : None known.

1.3 Details of the supplier of the safety data sheet

Company : Eastman Chemical Company
200 South Wilcox Drive
37660-5280 Kingsport

Telephone : +14232292000

E-mail address of person responsible for the SDS : Visit our website at www.EASTMAN.com or email emnmsds@eastman.com

1.4 Emergency telephone

NCEC +44 (0)1235 239 670

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Reproductive toxicity, Category 1B	H360FD: May damage fertility. May damage the unborn child.
Aspiration hazard, Category 1	H304: May be fatal if swallowed and enters airways.
Long-term (chronic) aquatic hazard, Category 1	H410: Very toxic to aquatic life with long lasting effects.

2.2 Label elements

Labeling (REGULATION (EC) No 1272/2008)


SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Hazard pictograms : 

Signal Word : Danger

Hazard Statements : H304 May be fatal if swallowed and enters airways.
H360FD May damage fertility. May damage the unborn child.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.
Response:
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P331 Do NOT induce vomiting.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved facility in accordance with local, regional, national and international regulations.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Components

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version 2.2
Revision Date: 21.04.2021
PRD

SDS Number: 150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

Chemical name	CAS-No. EC-No.	Concentration (% w/w)
Dibenzylbenzene, ar-methyl derivative	53585-53-8 258-649-2	100

SECTION 4: First aid measures

4.1 Description of first-aid measures

- If inhaled : Move to fresh air.
Treat symptomatically.
If symptoms persist, call a physician.
- In case of skin contact : Wash off with soap and water.
If symptoms persist, call a physician.
- In case of eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- If swallowed : Call a physician or poison control center immediately.
Do NOT induce vomiting.
If victim is fully conscious, give a cupful of water.
Never give anything by mouth to an unconscious person.
Hold person's head low, to prevent aspiration.

4.2 Most important symptoms and effects, both acute and delayed

- Risks : May be fatal if swallowed and enters airways.
May damage fertility. May damage the unborn child.

4.3 Indication of any immediate medical attention and special treatment needed

- Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media : Carbon dioxide (CO₂)
Dry chemical
Water spray
- Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.
Do NOT use water jet.

5.2 Special hazards arising from the substance or mixture

- Specific hazards during fire fighting : None known.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Hazardous combustion products : No hazardous combustion products are known

5.3 Advice for firefighters

Special protective equipment for fire-fighters : Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

Further information : None known.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Wear appropriate personal protective equipment.
Local authorities should be advised if significant spillages cannot be contained.

6.2 Environmental precautions

Environmental precautions : Avoid release to the environment.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections

For personal protection see section 8., For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling : Do not taste or swallow.
Wash thoroughly after handling.

Advice on protection against fire and explosion : None known.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep tightly closed.

7.3 Specific end use(s)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Specific use(s) : Heat transfer fluids

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Routes of exposure	Potential health effects	Value
Dibenzylbenzene, ar-methyl derivative	Workers	Inhalation	Long-term systemic effects	0,259 mg/m ³
	Workers	Dermal	Long-term systemic effects	0,37 mg/kg bw/day
	General Population	Inhalation	Long-term systemic effects	64,4 µg/m ³
	General Population	Dermal	Long-term systemic effects	0,185 mg/kg bw/day
	General Population	Oral	Long-term systemic effects	18,5 µg/kg bw/day

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
Dibenzylbenzene, ar-methyl derivative	Fresh water	0,028 µg/l
	Marine water	0,003 µg/l
	Fresh water sediment	0,11 mg/kg dry weight (d.w.)
	Marine sediment	0,11 mg/kg dry weight (d.w.)
	Soil	2 mg/kg dry weight (d.w.)
	Sewage Treatment Plant	1000 mg/l

8.2 Exposure controls

Engineering measures

Good general ventilation (typically 10 air changes per hour) should be sufficient to control airborne levels.

Personal protective equipment

Eye protection : Safety glasses

Hand protection

Remarks : Wear suitable gloves.

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

Protective measures : Remove respiratory and skin/eye protection only after vapors have been cleared from the area.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Ensure that eye flushing systems and safety showers are located close to the working place.
Use personal protective equipment as required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	:	liquid
Color	:	colourless, yellow
Odor	:	slight
Odor Threshold	:	not determined
Melting point/freezing point	:	-39 - -32 °C
Boiling point/boiling range	:	390 °C
Upper explosion limit / Upper flammability limit	:	not determined
Lower explosion limit / Lower flammability limit	:	not determined
Flash point	:	212 °C Method: Pensky-Martens closed cup
Decomposition temperature	:	
Decomposition temperature	:	not determined
pH	:	not determined
Viscosity	:	
Viscosity, dynamic	:	not determined
Viscosity, kinematic	:	48 mm ² /s (20 °C) 16 mm ² /s (40 °C)
Solubility(ies)	:	
Water solubility	:	< 0,1 mg/l
Partition coefficient: n-octanol/water	:	log Pow: > 6 (22 °C)
Vapor pressure	:	< 0,01 hPa (20 °C)
Relative density	:	> 1

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

9.2 Other information

Explosives : No data available

Oxidizing properties : No data available

Evaporation rate : not determined

SECTION 10: Stability and reactivity

10.1 Reactivity

None reasonably foreseeable.

10.2 Chemical stability

No decomposition if stored normally.
Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : Heating can release hazardous gases. Stable

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Conditions to avoid : Direct heating, dirt, chemical contamination, sunlight, UV or ionising radiation.
Extremes of temperature and direct sunlight.

10.5 Incompatible materials

Materials to avoid : Strong oxidizing agents

10.6 Hazardous decomposition products

Carbon dioxide (CO₂)
Carbon monoxide

SECTION 11: Toxicological information

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

Acute toxicity

Not classified based on available information.

Components:

Dibenzylbenzene, ar-methyl derivative:

Acute oral toxicity : LD50 Oral (Rat): > 5.000 mg/kg
Method: OECD Test Guideline 401
Assessment: Based on available data, the classification criteria are not met.

Acute inhalation toxicity : LC0: > 0,24 mg/l

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Test atmosphere: vapour
Method: OECD Test Guideline 403
Assessment: Based on available data, the classification criteria are not met.

Acute dermal toxicity : LD₀ (Rabbit): > 2.000 mg/kg
Assessment: Based on available data, the classification criteria are not met.

LD₅₀ (Rat): > 2.000 mg/kg
Method: OECD Test Guideline 402
Assessment: Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Not classified based on available information.

Components:

Dibenzylbenzene, ar-methyl derivative:

Method : OECD Test Guideline 404
Result : slight irritation
Remarks : Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation

Not classified based on available information.

Components:

Dibenzylbenzene, ar-methyl derivative:

Method : OECD Test Guideline 405
Result : No eye irritation
Remarks : Based on available data, the classification criteria are not met.

Respiratory or skin sensitization

Skin sensitization

Not classified based on available information.

Respiratory sensitization

Not classified based on available information.

Components:

Dibenzylbenzene, ar-methyl derivative:

Species : Guinea pig
Result : Does not cause skin sensitisation.

Germ cell mutagenicity

Not classified based on available information.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Components:

Dibenzylbenzene, ar-methyl derivative:

Genotoxicity in vitro : Remarks: In vitro tests did not show mutagenic effects

Genotoxicity in vivo : Remarks: In vivo tests did not show mutagenic effects

Carcinogenicity

Not classified based on available information.

Components:

Dibenzylbenzene, ar-methyl derivative:

Remarks : Based on available data, the classification criteria are not met.

Reproductive toxicity

May damage fertility. May damage the unborn child.

Product:

Effects on fertility : Remarks: May damage fertility. May damage the unborn child.

Effects on fetal development : Remarks: May damage fertility. May damage the unborn child.

Reproductive toxicity - Assessment : May damage fertility or the unborn child.

Components:

Dibenzylbenzene, ar-methyl derivative:

Effects on fertility : Species: Rat, male and female
Application Route: Oral
General Toxicity Parent: NOAEL: 250 mg/kg bw/day
General Toxicity F1: NOAEL: 250 mg/kg bw/day
General Toxicity F2: NOAEL: 80 mg/kg body weight
Method: OECD Test Guideline 421
Remarks: May damage fertility. May damage the unborn child.

Effects on fetal development : Test Type: Developmental Toxicity
Species: Rabbit, female
Strain: NZW
Application Route: Oral
General Toxicity Maternal: NOAEL: 75 mg/kg body weight
Developmental Toxicity: LOAEL: 10 mg/kg body weight
Method: OECD Test Guideline 414

STOT-single exposure

Not classified based on available information.

Components:

Dibenzylbenzene, ar-methyl derivative:

Assessment : The substance or mixture is not classified as specific target

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

organ toxicant, single exposure.

STOT-repeated exposure

Not classified based on available information.

Components:

Dibenzylbenzene, ar-methyl derivative:

Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Repeated dose toxicity

Components:

Dibenzylbenzene, ar-methyl derivative:

Species	: Rat
NOAEL	: 50 mg/kg
LOAEL	: 500 mg/kg
Application Route	: Oral
Exposure time	: 120 d
Method	: OECD Test Guideline 408
Target Organs	: Liver

Aspiration toxicity

May be fatal if swallowed and enters airways.

11.2 Information on other hazards

Endocrine disrupting properties

Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Routes of exposure

Product:

Inhalation	: Remarks: None known.
Skin contact	: Remarks: None known.
Eye contact	: Remarks: None known.
Ingestion	: Remarks: May be fatal if swallowed and enters airways.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Further information

Components:

Dibenzylbenzene, ar-methyl derivative:

Remarks : Not expected to have a wide dispersive use and there is no evidence of frequent or long-term human exposure. The substance has been shown to be not genotoxic, therefore it is not expected to have a carcinogenic potential.

SECTION 12: Ecological information

12.1 Toxicity

Components:

Dibenzylbenzene, ar-methyl derivative:

Toxicity to fish	: (Danio rerio (zebra fish)): 0,00005 mg/l End point: mortality Exposure time: 96 h Test Type: Fish, Acute Toxicity Test
Toxicity to daphnia and other aquatic invertebrates	: LC50 (Daphnia magna (Water flea)): > 0,029 mg/l End point: Immobilization Exposure time: 48 h Test Type: Daphnia sp. Acute Immobilisation Test
Toxicity to algae/aquatic plants	: LC50 (Skeletonema costatum (marine diatom)): 0,000016 mg/l End point: Growth rate Exposure time: 72 h Test Type: Alga, Growth Inhibition Test
Toxicity to fish (Chronic toxicity)	: NOEC: > 0,46 mg/l End point: mortality Exposure time: 14 d Species: Leuciscus idus (Golden orfe) Test Type: Fish, Prolonged Toxicity Test: 14-day Study
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	: NOEC: 0,0014 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Test Type: Daphnia magna Reproduction Test
M-Factor (Chronic aquatic toxicity)	: 10

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher..

12.6 Endocrine disrupting properties

Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : Dispose of in accordance with local regulations.

SECTION 14: Transport information

14.1 UN number or ID number

ADN	: UN 3082
ADR	: UN 3082
IMDG	: UN 3082
IATA	: UN 3082

14.2 UN proper shipping name

ADN	: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dibenzylbenzene, ar-methyl derivative)
ADR	: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dibenzylbenzene, ar-methyl derivative)
IMDG	: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dibenzylbenzene, ar-methyl derivative)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

IATA : Environmentally hazardous substance, liquid, n.o.s.
(Dibenzylbenzene, ar-methyl derivative)

14.3 Transport hazard class(es)

ADN : 9
ADR : 9
IMDG : 9
IATA : 9

14.4 Packing group

ADN
Packing group : III
Classification Code : M6
Hazard Identification Number : 90
Labels : 9

ADR
Packing group : III
Classification Code : M6
Hazard Identification Number : 90
Labels : 9
Tunnel restriction code : (-)

IMDG
Packing group : III
Labels : 9
EmS Code : F-A, S-F
Remarks : Shipping in package sizes of less than 5 L (liquids) or 5 KG (solids) may lead to a non-regulated classification.

IATA (Cargo)
Packing instruction (cargo aircraft) : 964
Packing instruction (LQ) : Y964
Packing group : III
Labels : Miscellaneous
Remarks : Shipping in package sizes of less than 5 L (liquids) or 5 KG (solids) may lead to a non-regulated classification.

IATA (Passenger)
Packing instruction (passenger aircraft) : 964
Packing instruction (LQ) : Y964
Packing group : III
Labels : Miscellaneous
Remarks : Shipping in package sizes of less than 5 L (liquids) or 5 KG (solids) may lead to a non-regulated classification.

14.5 Environmental hazards

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

ADN

Environmentally hazardous : yes

ADR

Environmentally hazardous : yes

IMDG

Marine pollutant : yes

14.6 Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

14.7 Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

REACH - Candidate List of Substances of Very High Concern for Authorization (Article 59) : Not applicable

REACH - List of substances subject to authorisation (Annex XIV) : Not applicable

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer : Not applicable

Regulation (EU) 2019/1021 on persistent organic pollutants (recast) : Not applicable

Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals : Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances. E1 ENVIRONMENTAL HAZARDS

Volatile organic compounds : Directive 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
Not applicable

Other regulations:

Take note of Directive 92/85/EEC regarding maternity protection or stricter national regulations, where applicable.

Take note of Directive 94/33/EC on the protection of young people at work or stricter national

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

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2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

regulations, where applicable.

The ingredients of this product are reported in the following inventories:

TCSI	: On the inventory, or in compliance with the inventory
TSCA	: All substances listed as active on the TSCA inventory
AICS	: On the inventory, or in compliance with the inventory
DSL	: All components of this product are on the Canadian DSL
ENCS	: On the inventory, or in compliance with the inventory
ISHL	: On the inventory, or in compliance with the inventory
KECI	: On the inventory, or in compliance with the inventory
PICCS	: On the inventory, or in compliance with the inventory
IECSC	: On the inventory, or in compliance with the inventory

15.2 Chemical Safety Assessment

yes

SECTION 16: Other information

Full text of other abbreviations

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; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

Sources of key data used to : Chemical Safety Report
compile the Material Safety
Data Sheet

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

ZW / EN

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Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Annex: Exposure Scenarios**Table of Contents**

Number	Title
ES 1	dielectric fluids; Other (SU0).Industrial use; Manufacture of computer, electronic and optical products, electrical equipment (SU16).
ES 2	dielectric fluids (PC0); Other (SU0).Professional use; Manufacture of computer, electronic and optical products, electrical equipment (SU16).
ES 3	<p>Heat Transfer fluids; Further description of the use: DIBENZYL BENZENE, AR-METHYL DERIVATIVE is used in closed systems as a heat transfer fluid; as such it is handled, decanted to and recovered from heat transfer systems. Fluid within heat transfer systems may have elevated temperature. Follow advice in the product brochure and work in accordance with DIN 4754 (heat transfer systems using organic heat transfer fluids).</p> <p>Special Notes: During the use as Heat Transfer Fluid (HTF) at elevated temperatures thermal decomposition leads to the formation of low – and high boiling secondary products. During removal of low boiling decomposition products, with potential highly flammable properties from the system, appropriate risk management measures have to be applied, – especially when they are concentrated and collected.</p> <p>For flammable substances the following measures need to be implemented to control the risks and to show that safe use can be accomplished.</p> <p>The regulatory framework from managing the risk arising from flammable materials is highly developed. The regulatory framework should be fully complied with and is sufficient to prevent minor accidents which occur at the workplace. Additional measures such as those shown below or their equivalent should be implemented to further control this risk:</p> <ul style="list-style-type: none"> • Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking • Keep container tightly closed. • Ground/bond container and receiving equipment. • Use explosion-proof electrical/ventilating/lighting/.../ equipment. • Use only non-sparking tools. • Take precautionary measures against static discharge. • Wear protective gloves/eye protection/face protection. <p>Source of Ignition</p> <ul style="list-style-type: none"> • Electrostatic discharge may cause fire (Industrial). • Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional). • Do NOT use compressed air for filling, discharging or handling operations (Industrial). • Electrostatic charges may be generated during pumping. • Restrict line velocity during pumping in order to avoid generation of electrostatic discharge. (Industrial). • If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial). • Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional). • The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial)..Industrial use..
ES 4	Heat Transfer fluids; Mining, (without offshore industries) (SU2a); Further description of the

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

	<p>use:</p> <p>DIBENZYL BENZENE, AR-METHYL DERIVATIVE is used in closed systems as a heat transfer fluid; as such it is handled, decanted to and recovered from heat transfer systems. Fluid within heat transfer systems may have elevated temperature. Follow advice in the product brochure and work in accordance with DIN 4754 (heat transfer systems using organic heat transfer fluids).</p> <p>Special Notes: During the use as Heat Transfer Fluid (HTF) at elevated temperatures thermal decomposition leads to the formation of low – and high boiling secondary products. During removal of low boiling decomposition products, with potential highly flammable properties from the system, appropriate risk management measures have to be applied, – especially when they are concentrated and collected.</p> <p>For flammable substances the following measures need to be implemented to control the risks and to show that safe use can be accomplished.</p> <p>The regulatory framework from managing the risk arising from flammable materials is highly developed. The regulatory framework should be fully complied with and is sufficient to prevent minor accidents which occur at the workplace. Additional measures such as those shown below or their equivalent should be implemented to further control this risk:</p> <ul style="list-style-type: none">• Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking• Keep container tightly closed.• Ground/bond container and receiving equipment.• Use explosion-proof electrical/ventilating/lighting/.../ equipment.• Use only non-sparking tools.• Take precautionary measures against static discharge.• Wear protective gloves/eye protection/face protection. <p>Source of Ignition</p> <ul style="list-style-type: none">• Electrostatic discharge may cause fire (Industrial).• Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional).• Do NOT use compressed air for filling, discharging or handling operations (Industrial).• Electrostatic charges may be generated during pumping.• Restrict line velocity during pumping in order to avoid generation of electrostatic discharge. (Industrial).• If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial).• Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional).• The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial)..Professional use; Offshore industries (SU2b).; Manufacture of bulk, large scale chemicals (including petroleum products) (SU8).
ES 5	Formulation of Plasticizer.
ES 6	Use of Plasticizer in the production of rubber products; Manufacture of rubber products (SU11).

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

ES 1: dielectric fluids; Other (SU0).Industrial use; Manufacture of computer, electronic and optical products, electrical equipment (SU16).

1.1. Title section

Exposure Scenario name	: dielectric fluids, Industrial use
Structured Short Title	: dielectric fluids; Other (SU0).Industrial use; Manufacture of computer, electronic and optical products, electrical equipment (SU16).

Environment		
CS 1	Use of functional fluid at industrial site	ERC7
Worker		
CS 2	Use in closed, continuous process with occasional controlled exposure	PROC2
CS 3	Use in closed batch process (synthesis or formulation)	PROC3
CS 4	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS 5	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS 6	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC8b
CS 7	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 8	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 9	Treatment of articles by dipping and pouring	PROC13
CS 10	Treatment of articles by dipping and pouring	PROC13
CS 11	Hand-mixing with intimate contact and only PPE available	PROC19
CS 12	Hand-mixing with intimate contact and only PPE available	PROC19

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Use of functional fluid at industrial site (ERC7)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 0,1 tonnes/day

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Annual amount per site	: <= 10 tonnes/year
Emission days	: > 100 days/year
Conditions and measures related to sewage treatment plant	
STP type	: Municipal sewage treatment plant
STP sludge treatment	: Sludge is disposed or recovered.
STP effluent	: 2.000 m3/d
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Washings from cleaning are collected and disposed of as solvent waste. External treatment and disposal of waste should comply with applicable local and/or national regulations. External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18.000 m3/d
Local freshwater dilution factor	: 10
Local marine water dilution factor	: 100
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Use in closed process Prevent leaks and prevent soil / water pollution caused by leaks. Clear spills immediately. Prevent environmental discharge consistent with regulatory requirements.	

1.2.2. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Inhalation - minimum efficiency of 0 %	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Wear eye/face protection. Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

1.2.3. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Wear eye/face protection. Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

1.2.4. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics	
Covers	percentage substance in the product up to 100 %.
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers use up to < 4 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Wear eye/face protection. Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

1.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics	
Covers	percentage substance in the product up to 100 %.
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %	
Respirator with a half face mask. Inhalation - minimum efficiency of 90 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

1.2.6. Control of worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Wear eye/face protection. Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Temperature	:	< 40 °C
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1.2.7. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers use up to < 4 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %
Local exhaust ventilation Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Respiratory protection not applicable
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %
Wear eye/face protection. Use eye protection according to EN 166.
Other conditions affecting workers exposure
Indoor or outdoor use : Indoor
Temperature : < 40 °C

1.2.8. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Covers daily exposures up to < 8 h/day

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respirator with a half face mask. Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Wear eye/face protection. Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

1.2.9. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers use up to < 4 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Use eye protection according to EN 166.

Other conditions affecting workers exposure

Indoor or outdoor use : Indoor

Temperature : < 40 °C

1.2.10. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product : liquid

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Covers daily exposures up to < 8 h/day

Technical and organisational conditions and measures

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Inhalation - minimum efficiency of 30 %

Local exhaust ventilation
Inhalation - minimum efficiency of 90 %

Conditions and measures related to personal protection, hygiene and health evaluation

Respirator with a half face mask.
Inhalation - minimum efficiency of 90 %

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Dermal - minimum efficiency of 95 %

Use eye protection according to EN 166.

Other conditions affecting workers exposure

Indoor or outdoor use : Indoor

Temperature : < 40 °C

1.2.11. Control of worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Product (article) characteristics

Covers percentage substance in the product up to 5%.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers use up to < 1h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Inhalation - minimum efficiency of 0 %	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

1.2.12. Control of worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers use up to < 4 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Wear suitable respiratory protection
Inhalation - minimum efficiency of 90 %

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Dermal - minimum efficiency of 95 %

Use eye protection according to EN 166.

Other conditions affecting workers exposure

Indoor or outdoor use : Indoor

Temperature : < 40 °C

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Use of functional fluid at industrial site (ERC7)

Release route	Release rate	Release estimation method
Air	0,01 kg/day	Environmental Release Category (ERC)

Protection Target	Exposure estimate	RCR
Freshwater	0,000006 mg/L (ECETOC TRA environment v2.0)	0,213
Freshwater sediment	0,002 mg/kg dry weight (ECETOC TRA environment v2.0)	0,019
Marine water	0,0000009 mg/L (ECETOC TRA environment v2.0)	0,317
Marine sediment	0,000317 mg/kg dry weight (ECETOC TRA environment v2.0)	< 0,01
Soil	0,0007 mg/kg dry weight (ECETOC TRA environment v2.0)	< 0,01
Sewage treatment plant	0 mg/L	< 0,01

Additional information on exposure estimation

Releases to waste:

DIBENZYL BENZENE, AR-METHYL DERIVATIVE is intended for use in closed systems. Leakage or release of heat transfer fluid from the plant during operation and maintenance (including maintenance, cleaning, pressure relief, transfer and raw material/waste storage) must be prevented or captured, contained and managed to prevent release to water and soil.

Wash water should not be released to the environment but collected and disposed of in accordance with all relevant waste management regulations.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

Secondary containment in accordance with good industry practice must be provided for transfer and storage areas to prevent release to the environment.

Leakages or spillages should be immediately contained with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). The waste absorbent material must subsequently be managed as a solid waste (see below). Leakages or spillages must not be discharged to wastewater, surface waters, groundwater or soils.

Waste product must be collected and transferred to external waste treatment for recovery or disposal by hazardous waste incineration in accordance with applicable local and/or national regulations. Hazardous waste incineration results in complete combustion of waste material.

Solid waste containing DIBENZYL BENZENE, AR-METHYL DERIVATIVE (including, e.g., absorbent material, disposable PPE) should be transferred to a secure container (using mechanical methods). The waste must be stored in a designated area with adequate secondary containment to prevent release to the environment. Waste material must be labelled and disposed of in accordance with all relevant waste management regulations.

Waste material must be collected and disposed by hazardous waste incineration or external waste treatment for recovery in accordance with applicable local and/or national regulations. Hazardous waste recovery should not result in release to water or soil

1.3.2. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (ECETOC TRA worker v3)	0,444
Dermal	systemic	long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	0,185
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,629
inhalative	systemic	short-term	0,794 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,794 mg/m ³	
Dermal	local	long-term	0,009 mg/cm ²	
Dermal	local, acute		0,009 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.3.3. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (ECETOC TRA worker v3)	0,444
Dermal	systemic	long-term	0,034 mg/kg bw/day (ECETOC TRA worker v3)	0,093
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,537
inhalative	systemic	short-term	0,794 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,794 mg/m ³	
Dermal	local	long-term	0,01 mg/cm ²	
Dermal	local, acute		0,01 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.3.4. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,048 mg/m ³ (ECETOC TRA worker v3)	0,184
Dermal	systemic	long-term	0,085 mg/kg bw/day (RISKOFDERM v2.1)	0,23
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,414
inhalative	systemic	short-term	0,079 mg/m ³	
inhalative	local	long-term	0,048 mg/m ³ (ECETOC TRA worker v3)	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,079 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,008 mg/m ³ (ECETOC TRA worker v3)	0,031
Dermal	systemic	long-term	0,085 mg/kg bw/day (RISKOFDERM v2.1)	0,23
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,26
inhalative	systemic	short-term	0,007 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,007 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.3.6. Worker exposure: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,04 mg/m ³ (ECETOC TRA worker v3)	0,153
Dermal	systemic	long-term	0,05 mg/kg bw/day (RISKOFDERM v2.1)	0,135
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,289
inhalative	systemic	short-term	0,04 mg/m ³	
inhalative	local	long-term	0,04 mg/m ³	
inhalative	local, acute		0,04 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.3.7. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,048 mg/m ³ (ECETOC TRA worker v3)	0,184
Dermal	systemic	long-term	0,151 mg/kg bw/day (RISKOFDERM v2.1)	0,408
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,592
inhalative	systemic	short-term	0,079 mg/m ³	
inhalative	local	long-term	0,048 mg/m ³	
inhalative	local, acute		0,079 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.3.8. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,007 mg/m ³ (ECETOC TRA worker v3)	0,031
Dermal	systemic	long-term	0,151 mg/kg bw/day (RISKOFDERM v2.1)	0,408
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,439
inhalative	systemic	short-term	0,007 mg/m ³	
inhalative	local	long-term	0,007 mg/m ³	
inhalative	local, acute		0,007 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.3.9. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,048 mg/m ³ (ECETOC TRA worker v3)	0,184
Dermal	systemic	long-term	0,128 mg/kg bw/day (RISKOFDERM v2.1)	0,346
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,53
inhalative	systemic	short-term	0,079 mg/m ³	
inhalative	local	long-term	0,048 mg/m ³	
inhalative	local, acute		0,079 mg/m ³	
Dermal	local	long-term	0,1 mg/cm ²	
Dermal	local, acute		0,1 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version: 2.2
Revision Date: 21.04.2021
PRD

SDS Number: 150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.3.10. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,007 mg/m ³ (ECETOC TRA worker v3)	0,031
Dermal	systemic	long-term	0,128 mg/kg bw/day (RISKOFDERM v2.1)	0,346
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,377
inhalative	systemic	short-term	0,007 mg/m ³	
inhalative	local	long-term	0,007 mg/m ³	
inhalative	local, acute		0,007 mg/m ³	
Dermal	local	long-term	0,1 mg/cm ²	
Dermal	local, acute		0,1 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.3.11. Worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,003 mg/m ³ (ECETOC TRA worker v3)	0,012
Dermal	systemic	long-term	0,076 mg/kg bw/day (RISKOFDERM v2.1)	0,205
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,218
inhalative	systemic	short-term	0,016 mg/m ³	
inhalative	local	long-term	0,003 mg/m ³	
inhalative	local, acute		0,016 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

1.3.12. Worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,005 mg/m ³ (ECETOC TRA worker v3)	0,018
Dermal	systemic	long-term	0,203 mg/kg bw/day (RISKOFDERM v2.1)	0,549
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,567

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

inhalative	systemic	short-term	0,007 mg/m ³	
inhalative	local	long-term	0,004 mg/m ³	
inhalative	local, acute		0,007 mg/m ³	
Dermal	local	long-term	0,25 mg/cm ²	
Dermal	local, acute		0,25 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Not applicable

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

ES 2: dielectric fluids (PC0); Other (SU0).Professional use; Manufacture of computer, electronic and optical products, electrical equipment (SU16).

2.1. Title section

Exposure Scenario name	: dielectric fluids, Professional use
Structured Short Title	: dielectric fluids (PC0); Other (SU0).Professional use; Manufacture of computer, electronic and optical products, electrical equipment (SU16).

Environment		
CS 1	Widespread use of functional fluid (outdoor), Widespread use of functional fluid (indoor)	ERC9b, ERC9a
Worker		
CS 2	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 3	Hand-mixing with intimate contact and only PPE available	PROC19

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Widespread use of functional fluid (outdoor) (ERC9b) / Widespread use of functional fluid (indoor) (ERC9a)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: 0,0005 tonnes/day
Fraction of EU tonnage used in region	: 10 %
Fraction of main source to local environment	: 0,02
Emission days	: > 365 days/year
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Washings from cleaning are collected and disposed of as solvent waste. External treatment and disposal of waste should comply with applicable local and/or national regulations. External recovery and recycling of waste should comply with applicable local and/or national regulations.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Use in closed process
Prevent leaks and prevent soil / water pollution caused by leaks.
Clear spills immediately.
Prevent environmental discharge consistent with regulatory requirements.

2.2.2. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers use up to < 4 h/day
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respirator with a half face mask. Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

2.2.3. Control of worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Product (article) characteristics	
Covers percentage substance in the product up to 5%.	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers use up to < 1h/day
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour).	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Widespread use of functional fluid (outdoor) (ERC9b) / Widespread use of functional fluid (indoor) (ERC9a)

Protection Target	Exposure estimate	RCR
Freshwater	0,00005 mg/L (EUSES v2.1.2)	0,213
Freshwater sediment	0,0021 mg/kg dry weight (EUSES v2.1.2)	0,019
Marine water	0,0000008 mg/L (EUSES v2.1.2)	0,317
Marine sediment	0,0003 mg/kg dry weight (EUSES v2.1.2)	< 0,01
Soil	0,0007 mg/kg dry weight (EUSES v2.1.2)	< 0,01
Sewage treatment plant	0 mg/L (EUSES v2.1.2)	< 0,01

Additional information on exposure estimation

Releases to waste:

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

DIBENZYL BENZENE, AR-METHYL DERIVATIVE is intended for use in closed systems. Leakage or release of heat transfer fluid from the plant during operation and maintenance (including maintenance, cleaning, pressure relief, transfer and raw material/waste storage) must be prevented or captured, contained and managed to prevent release to water and soil.

Wash water should not be released to the environment but collected and disposed of in accordance with all relevant waste management regulations.

Secondary containment in accordance with good industry practice must be provided for transfer and storage areas to prevent release to the environment.

Leakages or spillages should be immediately contained with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). The waste absorbent material must subsequently be managed as a solid waste (see below). Leakages or spillages must not be discharged to wastewater, surface waters, groundwater or soils.

Waste product must be collected and transferred to external waste treatment for recovery or disposal by hazardous waste incineration in accordance with applicable local and/or national regulations. Hazardous waste incineration results in complete combustion of waste material.

Solid waste containing DIBENZYL BENZENE, AR-METHYL DERIVATIVE (including, e.g., absorbent material, disposable PPE) should be transferred to a secure container (using mechanical methods). The waste must be stored in a designated area with adequate secondary containment to prevent release to the environment. Waste material must be labelled and disposed of in accordance with all relevant waste management regulations.

Waste material must be collected and disposed by hazardous waste incineration or external waste treatment for recovery in accordance with applicable local and/or national regulations. Hazardous waste recovery should not result in release to water or soil

2.3.2. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,007 mg/m ³ (ECETOC TRA worker v3)	0,026
Dermal	systemic	long-term	0,201 mg/kg bw/day (RISKOFDERM v2.1)	0,543
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,57
inhalative	systemic	short-term	0,006 mg/m ³	
inhalative	local	long-term	0,011 mg/m ³	
inhalative	local, acute		0,011 mg/m ³	
Dermal	local	long-term	0,1 mg/cm ²	
Dermal	local, acute		0,1 mg/cm ²	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

2.3.3. Worker exposure: Hand-mixing with intimate contact and only PPE available (PROC19)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,004 mg/m ³ (ECETOC TRA worker v3)	0,018
Dermal	systemic	long-term	0,076 mg/kg bw/day (ECETOC TRA worker v3)	0,205
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,223
inhalative	systemic		0,023 mg/m ³	
inhalative	local	long-term	0,004 mg/m ³	
inhalative	local, acute		0,023 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Used Riskofderm model.

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

ES 3: Heat Transfer fluids; Further description of the use:

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

DIBENZYL BENZENE, AR-METHYL DERIVATIVE is used in closed systems as a heat transfer fluid; as such it is handled, decanted to and recovered from heat transfer systems. Fluid within heat transfer systems may have elevated temperature. Follow advice in the product brochure and work in accordance with DIN 4754 (heat transfer systems using organic heat transfer fluids).

Special Notes: During the use as Heat Transfer Fluid (HTF) at elevated temperatures thermal decomposition leads to the formation of low – and high boiling secondary products. During removal of low boiling decomposition products, with potential highly flammable properties from the system, appropriate risk management measures have to be applied, – especially when they are concentrated and collected.

For flammable substances the following measures need to be implemented to control the risks and to show that safe use can be accomplished.

The regulatory framework from managing the risk arising from flammable materials is highly developed. The regulatory framework should be fully complied with and is sufficient to prevent minor accidents which occur at the workplace. Additional measures such as those shown below or their equivalent should be implemented to further control this risk:

- Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking
- Keep container tightly closed.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting/.../ equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Wear protective gloves/eye protection/face protection.

Source of Ignition

- Electrostatic discharge may cause fire (Industrial).
- Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional).
- Do NOT use compressed air for filling, discharging or handling operations (Industrial).

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

- Electrostatic charges may be generated during pumping.
- Restrict line velocity during pumping in order to avoid generation of electrostatic discharge. (Industrial).
- If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial).
- Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional).
- The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial)..**Industrial use..**

3.1. Title section

Exposure Scenario name	: Heat Transfer fluids, Industrial use
Structured Short Title	: Heat Transfer fluids; Further description of the use: DIBENZYL BENZENE, AR-METHYL DERIVATIVE is used in closed systems as a heat transfer fluid; as such it is handled, decanted to and recovered from heat transfer systems. Fluid within heat transfer systems may have elevated temperature. Follow advice in the product brochure and work in accordance with DIN 4754 (heat transfer systems using organic heat transfer fluids). Special Notes: During the use as Heat Transfer Fluid (HTF) at elevated temperatures thermal decomposition leads to the formation of low – and high boiling secondary products. During removal of low boiling decomposition products, with potential highly flammable properties from the system, appropriate risk management measures have to be applied, – especially when they are concentrated and collected. For flammable substances the following measures need to be implemented to control the risks and to show that safe use can be accomplished. The regulatory framework from managing the risk arising from flammable materials is highly developed. The regulatory framework should be fully complied with and is sufficient to prevent minor accidents which occur at the workplace. Additional measures such as those shown below or their equivalent should be implemented to further control this risk: · Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking · Keep container tightly closed. · Ground/bond container and receiving equipment. · Use explosion-proof electrical/ventilating/lighting/.../ equipment. · Use only non-sparking tools.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

- Take precautionary measures against static discharge.
- Wear protective gloves/eye protection/face protection.
- Source of Ignition
- Electrostatic discharge may cause fire (Industrial).
- Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional).
- Do NOT use compressed air for filling, discharging or handling operations (Industrial).
- Electrostatic charges may be generated during pumping.
- Restrict line velocity during pumping in order to avoid generation of electrostatic discharge. (Industrial).
- If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial).
- Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional).
- The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial)..Industrial use..

Environment		
CS 1	Use of functional fluid at industrial site	ERC7
Worker		
CS 2	Use in closed, continuous process with occasional controlled exposure	PROC2
CS 3	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS 4	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a
CS 5	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 6	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Use of functional fluid at industrial site (ERC7)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 0,5 tonnes/day
Annual amount per site	: <= 50 tonnes/year
Fraction of EU tonnage used in region	: 10 %

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Emission days	:	> 100 days/year
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal sewage treatment plant
STP sludge treatment	:	Sludge is disposed or recovered.
STP effluent	:	2.000 m3/d
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	Washings from cleaning are collected and disposed of as solvent waste. External treatment and disposal of waste should comply with applicable local and/or national regulations. External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other conditions affecting environmental exposure		
Receiving surface water flow	:	18.000 m3/d
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
Use in closed process Prevent leaks and prevent soil / water pollution caused by leaks. Clear spills immediately. Prevent environmental discharge consistent with regulatory requirements.		

3.2.2. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Inhalation - minimum efficiency of 0 %	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

3.2.3. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Inhalation - minimum efficiency of 0 %	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

3.2.4. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Product (article) characteristics	
Covers	percentage substance in the product up to 100 %.
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respirator with a half face mask. Inhalation - minimum efficiency of 95 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

3.2.5. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Product (article) characteristics	
Covers	percentage substance in the product up to 100 %.
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respirator with a half face mask. Inhalation - minimum efficiency of 95 %	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Dermal - minimum efficiency of 95 %

Use eye protection according to EN 166.

Other conditions affecting workers exposure

Indoor or outdoor use : Indoor

Temperature : < 40 °C

3.2.6. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product : liquid

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Covers daily exposures up to < 8 h/day

Technical and organisational conditions and measures

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Inhalation - minimum efficiency of 30 %

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable respiratory protection
Inhalation - minimum efficiency of 95 %

Use eye protection according to EN 166.

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Dermal - minimum efficiency of 95 %

Other conditions affecting workers exposure

Indoor or outdoor use : Indoor

Temperature : < 40 °C

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Use of functional fluid at industrial site (ERC7)

Release route	Release rate	Release estimation method
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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Air	0,05 kg/day	Environmental Release Category (ERC)
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Protection Target	Exposure estimate	RCR
Freshwater	0,000005 mg/L (ECETOC TRA environment v2.0)	0,213
Freshwater sediment	0,0021 mg/kg dry weight (ECETOC TRA environment v2.0)	0,019
Marine water	0,0000008 mg/L (ECETOC TRA environment v2.0)	0,317
Marine sediment	0,0003 mg/kg dry weight (ECETOC TRA environment v2.0)	< 0,01
Soil	0,0007 mg/kg dry weight (ECETOC TRA environment v2.0)	< 0,01
Sewage treatment plant	0 mg/L	< 0,01

Additional information on exposure estimation

Releases to waste:

DIBENZYL BENZENE, AR-METHYL DERIVATIVE is intended for use in closed systems. Leakage or release of heat transfer fluid from the plant during operation and maintenance (including maintenance, cleaning, pressure relief, transfer and raw material/waste storage) must be prevented or captured, contained and managed to prevent release to water and soil.

Wash water should not be released to the environment but collected and disposed of in accordance with all relevant waste management regulations.

Secondary containment in accordance with good industry practice must be provided for transfer and storage areas to prevent release to the environment.

Leakages or spillages should be immediately contained with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). The waste absorbent material must subsequently be managed as a solid waste (see below). Leakages or spillages must not be discharged to wastewater, surface waters, groundwater or soils.

Waste product must be collected and transferred to external waste treatment for recovery or disposal by hazardous waste incineration in accordance with applicable local and/or national regulations. Hazardous waste incineration results in complete combustion of waste material.

Solid waste containing DIBENZYL BENZENE, AR-METHYL DERIVATIVE (including, e.g., absorbent material, disposable PPE) should be transferred to a secure container (using mechanical methods). The waste must be stored in a designated area with adequate secondary containment to prevent release to the environment. Waste material must be labelled and disposed of in accordance with all relevant waste management regulations.

Waste material must be collected and disposed by hazardous waste incineration or external waste treatment for recovery in accordance with applicable local and/or national regulations. Hazardous waste recovery should not result in release to water or soil

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

3.3.2. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	0,444
Dermal	systemic	long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	0,185
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,629
inhalative	systemic	short-term	0,794 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,794 mg/m ³	
Dermal	local	long-term	0,009 mg/cm ²	
Dermal	local, acute		0,009 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

3.3.3. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

		tor	mate	
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,079 mg/m ³ (ECETOC TRA worker v3)	0,307
Dermal	systemic	long-term	0,085 mg/kg bw/day (RISKOFDERM v2.1)	0,23
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,536
inhalative	systemic	short-term	0,079 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,079 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

3.3.4. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indica-	Exposure esti-	RCR
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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

		tor	mate	
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,04 mg/m ³ (ECETOC TRA worker v3)	0,153
Dermal	systemic	long-term	0,151 mg/kg bw/day (RISKOFDERM v2.1)	0,408
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,561
inhalative	systemic	short-term	0,04 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,04 mg/m ³	
Dermal	local	long-term	1 mg/cm ²	
Dermal	local, acute		1 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

3.3.5. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indica-	Exposure esti-	RCR
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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

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inhalative	systemic	long-term	0,04 mg/m ³ (ECETOC TRA worker v3)	0,153
Dermal	systemic	long-term	0,151 mg/kg bw/day (RISKOFDERM v2.1)	0,408
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,561
inhalative	systemic	short-term	0,04 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,04 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

3.3.6. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indica-	Exposure esti-	RCR
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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

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inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,04 mg/m ³ (ECETOC TRA worker v3)	0,153
Dermal	systemic	long-term	0,151 mg/kg bw/day (RISKOFDERM v2.1)	0,408
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,561
inhalative	systemic	short-term	0,04 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,04 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

ES 4: Heat Transfer fluids; Mining, (without offshore industries) (SU2a); Further description of the use:

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

DIBENZYL BENZENE, AR-METHYL DERIVATIVE is used in closed systems as a heat transfer fluid; as such it is handled, decanted to and recovered from heat transfer systems. Fluid within heat transfer systems may have elevated temperature. Follow advice in the product brochure and work in accordance with DIN 4754 (heat transfer systems using organic heat transfer fluids).

Special Notes: During the use as Heat Transfer Fluid (HTF) at elevated temperatures thermal decomposition leads to the formation of low – and high boiling secondary products. During removal of low boiling decomposition products, with potential highly flammable properties from the system, appropriate risk management measures have to be applied, – especially when they are concentrated and collected.

For flammable substances the following measures need to be implemented to control the risks and to show that safe use can be accomplished.

The regulatory framework from managing the risk arising from flammable materials is highly developed. The regulatory framework should be fully complied with and is sufficient to prevent minor accidents which occur at the workplace. Additional measures such as those shown below or their equivalent should be implemented to further control this risk:

- Keep away from heat/sparks/open flames/.../hot surfaces.... No smoking
- Keep container tightly closed.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting/.../ equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Wear protective gloves/eye protection/face protection.

Source of Ignition

- Electrostatic discharge may cause fire (Industrial).
- Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional).
- Do NOT use compressed air for filling, discharging or handling operations (Industrial).

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

- Electrostatic charges may be generated during pumping.
- Restrict line velocity during pumping in order to avoid generation of electrostatic discharge. (Industrial).
- If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial).
- Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional).
- The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial)..**Professional use; Offshore industries (SU2b); Manufacture of bulk, large scale chemicals (including petroleum products) (SU8).**

4.1. Title section

Exposure Scenario name	: Heat Transfer fluids, Professional use
Structured Short Title	: Heat Transfer fluids; Mining, (without offshore industries) (SU2a); Further description of the use: DIBENZYL BENZENE, AR-METHYL DERIVATIVE is used in closed systems as a heat transfer fluid; as such it is handled, decanted to and recovered from heat transfer systems. Fluid within heat transfer systems may have elevated temperature. Follow advice in the product brochure and work in accordance with DIN 4754 (heat transfer systems using organic heat transfer fluids). Special Notes: During the use as Heat Transfer Fluid (HTF) at elevated temperatures thermal decomposition leads to the formation of low – and high boiling secondary products. During removal of low boiling decomposition products, with potential highly flammable properties from the system, appropriate risk management measures have to be applied, – especially when they are concentrated and collected. For flammable substances the following measures need to be implemented to control the risks and to show that safe use can be accomplished. The regulatory framework from managing the risk arising from flammable materials is highly developed. The regulatory framework should be fully complied with and is sufficient to prevent minor accidents which occur at the workplace. Additional measures such as those shown below or their equivalent should be implemented to further control this risk: · Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking · Keep container tightly closed. · Ground/bond container and receiving equipment. · Use explosion-proof electrical/ventilating/lighting/.../ equip-

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

ment.

- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Wear protective gloves/eye protection/face protection.

Source of Ignition

- Electrostatic discharge may cause fire (Industrial).
- Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional).
- Do NOT use compressed air for filling, discharging or handling operations (Industrial).
- Electrostatic charges may be generated during pumping.
- Restrict line velocity during pumping in order to avoid generation of electrostatic discharge. (Industrial).
- If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial).
- Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional).
- The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial)..Professional use; Off-shore industries (SU2b).; Manufacture of bulk, large scale chemicals (including petroleum products) (SU8).

Environment

CS 1 **Use of functional fluid at industrial site** ERC7

Worker

CS 2 **Heat and pressure transfer fluids in dispersive, professional use but closed systems** PROC20

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Use of functional fluid at industrial site (ERC7)

Amount used (or contained in articles), frequency and duration of use/exposure

Daily amount for wide dispersive uses : 0,00275 tonnes/day

Fraction of EU tonnage used in region : 10 %

Fraction of main source to local environment : 0,02

Conditions and measures related to sewage treatment plant

STP type : Municipal sewage treatment plant

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

4.2.2. Control of worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a basic standard of general ventilation (1 to 3 air changes per hour). Inhalation - minimum efficiency of 0 %	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 80 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable respiratory protection Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 90 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Use of functional fluid at industrial site (ERC7)

Protection Target	Exposure estimate	RCR
Freshwater	0,000005 mg/L (EUSES v2.1.2)	0,213
Freshwater sediment	0,0021 mg/kg dry weight (EUSES v2.1.2)	0,019

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Marine water	0,0000008 mg/L (EUSES v2.1.2)	0,317
Marine sediment	0,0003 mg/kg dry weight (EUSES v2.1.2)	< 0,01
Soil	0,00073 mg/kg dry weight (EUSES v2.1.2)	< 0,01
Sewage treatment plant	0 mg/L (EUSES v2.1.2)	< 0,01

Additional information on exposure estimation

Releases to waste:

DIBENZYL BENZENE, AR-METHYL DERIVATIVE is intended for use in closed systems. Leakage or release of heat transfer fluid from the plant during operation and maintenance (including maintenance, cleaning, pressure relief, transfer and raw material/waste storage) must be prevented or captured, contained and managed to prevent release to water and soil.

Wash water should not be released to the environment but collected and disposed of in accordance with all relevant waste management regulations.

Secondary containment in accordance with good industry practice must be provided for transfer and storage areas to prevent release to the environment.

Leakages or spillages should be immediately contained with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). The waste absorbent material must subsequently be managed as a solid waste (see below). Leakages or spillages must not be discharged to wastewater, surface waters, groundwater or soils.

Waste product must be collected and transferred to external waste treatment for recovery or disposal by hazardous waste incineration in accordance with applicable local and/or national regulations. Hazardous waste incineration results in complete combustion of waste material.

Solid waste containing DIBENZYL BENZENE, AR-METHYL DERIVATIVE (including, e.g., absorbent material, disposable PPE) should be transferred to a secure container (using mechanical methods). The waste must be stored in a designated area with adequate secondary containment to prevent release to the environment. Waste material must be labelled and disposed of in accordance with all relevant waste management regulations.

Waste material must be collected and disposed by hazardous waste incineration or external waste treatment for recovery in accordance with applicable local and/or national regulations. Hazardous waste recovery should not result in release to water or soil

4.3.2. Worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,023 mg/m ³ (ECETOC TRA worker v3)	0,088
Dermal	systemic	long-term	0,171 mg/kg bw/day (ECETOC TRA worker v3)	0,462
combined routes	systemic	long-term	(ECETOC TRA	0,55

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

			worker v3)	
inhalative	systemic	short-term	0,023 mg/m ³	
inhalative	local	long-term	0,023 mg/m ³ (measured data)	
inhalative	local, acute		0,023 mg/m ³	
Dermal	local	long-term	0,025 mg/cm ²	
Dermal	local, acute		0,025 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Boundaries of Scaling : RCR not to be exceeded are described in Section above
Effective housekeeping practices

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

ES 5: Formulation of Plasticizer.

5.1. Title section

Exposure Scenario name	: Formulation of Plasticizer
Structured Short Title	: Formulation of Plasticizer.

Environment		
CS 1	Formulation of preparations	ERC2
Worker		
CS 2	Use in closed, continuous process with occasional controlled exposure	PROC2
CS 3	Use in closed batch process (synthesis or formulation)	PROC3
CS 4	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS 5	Use in batch and other process (synthesis) where opportunity for exposure arises	PROC4
CS 6	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a
CS 7	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a
CS 8	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 10	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 11	Use as laboratory reagent	PROC15

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 1 tonnes/day
Annual amount per site	: <= 100 tonnes/year

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Fraction of EU tonnage used in region	: 100 %
Emission days	: 10 days/year
Conditions and measures related to sewage treatment plant	
STP type	: Municipal sewage treatment plant
STP sludge treatment	: Sludge is disposed or recovered.
STP effluent	: 2.000 m3/d
Municipal Sewage Treatment Plant Air - minimum efficiency of 0 % Water - minimum efficiency of 14,4 % Waste - minimum efficiency of 85,6 %	
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Washings from cleaning are collected and disposed of as solvent waste. External treatment and disposal of waste should comply with applicable local and/or national regulations. External recovery and recycling of waste should comply with applicable local and/or national regulations.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18.000 m3/d
Local freshwater dilution factor	: 10
Local marine water dilution factor	: 100
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Use in closed process Prevent leaks and prevent soil / water pollution caused by leaks. Clear spills immediately. Prevent environmental discharge consistent with regulatory requirements.	

5.2.2. Control of worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Inhalation - minimum efficiency of 0 %	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

5.2.3. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Inhalation - minimum efficiency of 0 %	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Wear eye/face protection. Use eye protection according to EN 166.	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Other conditions affecting workers exposure

Indoor or outdoor use	:	Indoor
Temperature	:	< 40 °C

5.2.4. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	liquid
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Amount used (or contained in articles), frequency and duration of use/exposure

Duration	:	Covers use up to < 4 h/day
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Technical and organisational conditions and measures

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Inhalation - minimum efficiency of 30 %

Local exhaust ventilation
Inhalation - minimum efficiency of 90 %

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Dermal - minimum efficiency of 95 %

Wear eye/face protection.
Use eye protection according to EN 166.

Other conditions affecting workers exposure

Indoor or outdoor use	:	Indoor
Temperature	:	< 40 °C

5.2.5. Control of worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product	:	liquid
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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %	
Respirator with a half face mask. Inhalation - minimum efficiency of 90 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

5.2.6. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers use up to < 1h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Dermal - minimum efficiency of 95 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

5.2.7. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Respirator with a half face mask. Inhalation - minimum efficiency of 90 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

5.2.8. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

5.2.9. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers use up to < 4 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Respiratory protection not applicable	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Wear eye/face protection. Use eye protection according to EN 166.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

5.2.10. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respirator with a half face mask. Inhalation - minimum efficiency of 90 %	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

5.2.11. Control of worker exposure: Use as laboratory reagent (PROC15)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Covers daily exposures up to < 8 h/day
Technical and organisational conditions and measures	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Inhalation - minimum efficiency of 30 %	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Use eye protection according to EN 166.	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor
Temperature	: < 40 °C

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Release route	Release rate	Release estimation method
Air	2,5 kg/day	Estimated release factor

Protection Target	Exposure estimate	RCR
Freshwater	0,000005 mg/L (EUSES v2.1.2)	0,213
Freshwater sediment	0,0021 mg/kg dry weight (EUSES v2.1.2)	0,019
Marine water	0,0000008 mg/L (EUSES v2.1.2)	0,317
Marine sediment	0,0003 mg/kg dry weight (EUSES	< 0,01

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

	v2.1.2)	
Soil	0,002 mg/kg dry weight (EUSES v2.1.2)	< 0,01
Sewage treatment plant	0 mg/L (EUSES v2.1.2)	< 0,01

Additional information on exposure estimation

Releases to waste:

DIBENZYL BENZENE, AR-METHYL DERIVATIVE is intended for use in closed systems. Leakage or release of heat transfer fluid from the plant during operation and maintenance (including maintenance, cleaning, pressure relief, transfer and raw material/waste storage) must be prevented or captured, contained and managed to prevent release to water and soil.

Wash water should not be released to the environment but collected and disposed of in accordance with all relevant waste management regulations.

Secondary containment in accordance with good industry practice must be provided for transfer and storage areas to prevent release to the environment.

Leakages or spillages should be immediately contained with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). The waste absorbent material must subsequently be managed as a solid waste (see below). Leakages or spillages must not be discharged to wastewater, surface waters, groundwater or soils.

Waste product must be collected and transferred to external waste treatment for recovery or disposal by hazardous waste incineration in accordance with applicable local and/or national regulations. Hazardous waste incineration results in complete combustion of waste material.

Solid waste containing DIBENZYL BENZENE, AR-METHYL DERIVATIVE (including, e.g., absorbent material, disposable PPE) should be transferred to a secure container (using mechanical methods). The waste must be stored in a designated area with adequate secondary containment to prevent release to the environment. Waste material must be labelled and disposed of in accordance with all relevant waste management regulations.

Waste material must be collected and disposed by hazardous waste incineration or external waste treatment for recovery in accordance with applicable local and/or national regulations. Hazardous waste recovery should not result in release to water or soil

5.3.2. Worker exposure: Use in closed, continuous process with occasional controlled exposure (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	0,444
Dermal	systemic	long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	0,185
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,629
inhalative	systemic	short-term	0,794 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
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SDS Number:
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Date of last issue: 14.12.2020
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			(measured data)	
inhalative	local, acute		0,794 mg/m ³	
Dermal	local	long-term	0,009 mg/cm ²	
Dermal	local, acute		0,009 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.3.3. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (ECETOC TRA worker v3)	0,444
Dermal	systemic	long-term	0,034 mg/kg bw/day (ECETOC TRA worker v3)	0,093
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,537
inhalative	systemic	short-term	0,794 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,794 mg/m ³	
Dermal	local	long-term	0,01 mg/cm ²	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

Dermal	local, acute		0,01 mg/cm2	
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Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.3.4. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,048 mg/m ³ (ECETOC TRA worker v3)	0,184
Dermal	systemic	long-term	0,085 mg/kg bw/day (RISKOFDERM v2.1)	0,23
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,414
inhalative	systemic	short-term	0,079 mg/m ³	
inhalative	local	long-term	0,048 mg/m ³ (ECETOC TRA worker v3)	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

inhalative	local, acute		0,079 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.3.5. Worker exposure: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,008 mg/m ³ (ECETOC TRA worker v3)	0,031
Dermal	systemic	long-term	0,085 mg/kg bw/day (RISKOFDERM v2.1)	0,23
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,26
inhalative	systemic	short-term	0,008 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

inhalative	local, acute		0,007 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.3.6. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,016 mg/m ³ (ECETOC TRA worker v3)	0,061
Dermal	systemic	long-term	0,151 mg/kg bw/day (RISKOFDERM v2.1)	0,408
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,469
inhalative	systemic	short-term	0,079 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

inhalative	local, acute		0,079 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.3.7. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,008 mg/m ³ (ECETOC TRA worker v3)	0,031
Dermal	systemic	long-term	0,151 mg/kg bw/day (RISKOFDERM v2.1)	0,408
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,439
inhalative	systemic	short-term	0,008 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

inhalative	local, acute		0,008 mg/m ³	
Dermal	local	long-term	0,05 mg/cm ²	
Dermal	local, acute		0,05 mg/cm ²	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.3.8. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,04 mg/m ³ (ECETOC TRA worker v3)	0,153
Dermal	systemic	long-term	0,05 mg/kg bw/day (RISKOFDERM v2.1)	0,135
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,289
inhalative	systemic	short-term	0,04 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,04 mg/m ³	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

Dermal	local	long-term	0,05 mg/cm2	
Dermal	local, acute		0,05 mg/cm2	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.3.9. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,048 mg/m ³ (ECETOC TRA worker v3)	0,184
Dermal	systemic	long-term	0,151 mg/kg bw/day (RISKOFDERM v2.1)	0,408
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,592
inhalative	systemic	short-term	0,008 mg/m ³	
inhalative	local	long-term	0,048 mg/m ³	
inhalative	local, acute		0,008 mg/m ³	
Dermal	local	long-term	0,05 mg/cm2	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Dermal	local, acute		0,05 mg/cm2	
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Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.3.10. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,007 mg/m ³ (ECETOC TRA worker v3)	0,031
Dermal	systemic	long-term	0,151 mg/kg bw/day (RISKOFDERM v2.1)	0,408
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,439
inhalative	systemic	short-term	0,007 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,007 mg/m ³	
Dermal	local	long-term	0,05 mg/cm2	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

Dermal	local, acute		0,05 mg/cm2	
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Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.3.11. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,115 mg/m ³ (measured data)	
inhalative	systemic	long-term	0,079 mg/m ³ (ECETOC TRA worker v3)	0,307
Dermal	systemic	long-term	0,017 mg/kg bw/day (RISKOFDERM v2.1)	0,046
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,353
inhalative	systemic	short-term	0,079 mg/m ³	
inhalative	local	long-term	0,115 mg/m ³ (measured data)	
inhalative	local, acute		0,079 mg/m ³	
Dermal	local	long-term	0,004 mg/cm2	
Dermal	local, acute		0,004 mg/cm2	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Additional information on exposure estimation

Risk characterization: Qualitative risk characterization (Inhalation, systemic, acute, Inhalation, local, long term, Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

The substance is associated with a low hazard category for the effects and route of exposure for which DNEL were not derived. The risk management measures driven by the quantitative assessment already provide the conditions requested by the qualitative assessment using gloves and eye protection.

General Risk Management Measures and Operational Conditions:

Minimisation of manual phases/work tasks,

- Work procedures minimising of splashes and spills;
- Avoidance of contact with contaminated tools and objects;
- Regular cleaning of equipment and work area;
- Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed

Personal Protective Equipment (selected as appropriate to the hazard, the likelihood of exposure and the demands of the tasks):

- Chemical goggles
- Substance/task appropriate gloves;
- Full skin coverage with appropriate light-weight barrier material.

5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Boundaries of Scaling : RCR not to be exceeded are described in Section above
Effective housekeeping practices

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

ES 6: Use of Plasticizer in the production of rubber products; Manufacture of rubber products (SU11).

6.1. Title section

Exposure Scenario name	: Use of Plasticizer in the production of rubber products
Structured Short Title	: Use of Plasticizer in the production of rubber products; Manufacture of rubber products (SU11).

Environment		
CS 1	Formulation in materials	ERC3
Worker		
CS 2	Storage, Outdoor	PROC8b
CS 3	Storage, Indoor	PROC8b
CS 4	Storage, Indoor	PROC9
CS 5	Storage, Indoor	PROC9
CS 6	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 7	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 8	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 9	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 10	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	PROC8b
CS 11	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 12	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	PROC5
CS 13	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 14	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 15	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9
CS 16	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC9

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

CS 17	Roller application or brushing	PROC10
CS 18	Roller application or brushing	PROC10
CS 19	Treatment of articles by dipping and pouring	PROC13
CS 20	Roller application or brushing	PROC10
CS 21	Tabletting, compression, extrusion, pelettisation, granulation	PROC14
CS 22	Tabletting, compression, extrusion, pelettisation, granulation	PROC14
CS 23	Tabletting, compression, extrusion, pelettisation, granulation	PROC14
CS 24	Tabletting, compression, extrusion, pelettisation, granulation	PROC14
CS 25	Roller application or brushing	PROC10
CS 26	Roller application or brushing	PROC10
CS 27	Low energy manipulation of substances bound in materials and/ or articles	PROC21
CS 28	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	PROC14
CS 29	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	PROC14
CS 30	Roller application or brushing	PROC10

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Formulation in materials (ERC3)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: <= 0,5 tonnes/day
Annual amount per site	: <= 100 tonnes/year
Conditions and measures related to sewage treatment plant	
STP type	: Municipal sewage treatment plant
STP sludge treatment	: Sludge is disposed or recovered.
STP effluent	: 2.000 m3/d
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: Washings from cleaning are collected and disposed of as solvent waste. External treatment and disposal of waste should comply with applicable local and/or national regulations. External recovery and recycling of waste should comply with

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

applicable local and/or national regulations.	
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18.000 m3/d
Local freshwater dilution factor	: 10
Local marine water dilution factor	: 100
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Use in closed process Prevent leaks and prevent soil / water pollution caused by leaks. Clear spills immediately. Prevent environmental discharge consistent with regulatory requirements.	

6.2.2. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact 60 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Body parts exposed	: Palm of both hands (480 cm²).
Indoor or outdoor use	: Outdoor

6.2.3. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact 60 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.4. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics

Physical form of product : solid

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact 60 min

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.5. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact 60 min

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

6.2.6. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 95 %	
Other conditions affecting workers exposure	
Body parts exposed	: Palm of both hands (480 cm²).
Indoor or outdoor use	: Indoor

6.2.7. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact 60 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Body parts exposed	: Palm of both hands (480 cm²).
Indoor or outdoor use	: Indoor

6.2.8. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics	
Physical form of product	: solid

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact 60 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Body parts exposed	: Palm of both hands (480 cm²).
Indoor or outdoor use	: Indoor

6.2.9. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Product (article) characteristics	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact 60 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Body parts exposed	: Palm of both hands (480 cm²).
Indoor or outdoor use	: Indoor

6.2.10. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact 60 min
Conditions and measures related to personal protection, hygiene and health evaluation	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Respiratory protection not applicable
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.11. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics

Covers percentage substance in the product up to 25 %.

Physical form of product : solid

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact > 240 min

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.12. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics

Covers percentage substance in the product up to 25 %.

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact > 240 min

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.13. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics

Covers percentage substance in the product up to 25 %.

Physical form of product : solid

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact > 240 min

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.14. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics

Covers percentage substance in the product up to 25 %.

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact > 240 min

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.15. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact 60 min

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.16. Control of worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics

Covers percentage substance in the product up to 1 %.

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact 240 min

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

6.2.17. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics	
Covers percentage substance in the product up to 5%.	
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Other conditions affecting workers exposure	
Body parts exposed	: Both hands (960 cm ²).
Indoor or outdoor use	: Indoor

6.2.18. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics	
Covers percentage substance in the product up to 5%.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Other conditions affecting workers exposure	
Body parts exposed	: Both hands (960 cm ²).
Indoor or outdoor use	: Indoor

6.2.19. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: solid

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Body parts exposed	: Palm of both hands (480 cm²).
Indoor or outdoor use	: Indoor

6.2.20. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Other conditions affecting workers exposure	
Body parts exposed	: Both hands (960 cm²).
Indoor or outdoor use	: Indoor

6.2.21. Control of worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.22. Control of worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics

Covers percentage substance in the product up to 25 %.

Physical form of product : solid

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact > 240 min

Conditions and measures related to personal protection, hygiene and health evaluation

Respiratory protection not applicable
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

Other conditions affecting workers exposure

Body parts exposed : Palm of both hands (480 cm²).

Indoor or outdoor use : Indoor

6.2.23. Control of worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics

Covers percentage substance in the product up to 25 %.

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact > 240 min

Conditions and measures related to personal protection, hygiene and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90 %

Other conditions affecting workers exposure

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Body parts exposed	:	Palm of both hands (480 cm²).
Indoor or outdoor use	:	Indoor

6.2.24. Control of worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics
Covers percentage substance in the product up to 25 %.
Physical form of product : solid
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Other conditions affecting workers exposure
Body parts exposed : Palm of both hands (480 cm²).
Indoor or outdoor use : Indoor

6.2.25. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics
Covers percentage substance in the product up to 1 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : Duration of contact > 240 min
Other conditions affecting workers exposure
Body parts exposed : Both hands (960 cm²).
Indoor or outdoor use : Indoor

6.2.26. Control of worker exposure: Roller application or brushing (PROC10)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Product (article) characteristics	
Covers percentage substance in the product up to 1 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Other conditions affecting workers exposure	
Body parts exposed	: Both hands (960 cm ²).
Indoor or outdoor use	: Indoor

6.2.27. Control of worker exposure: Low energy manipulation of substances bound in materials and/ or articles (PROC21)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Body parts exposed	: Hands and forearms
Indoor or outdoor use	: Indoor

6.2.28. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Product (article) characteristics	
Covers	percentage substance in the product up to 25 %.
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable	
Other conditions affecting workers exposure	
Body parts exposed	: Palm of both hands (480 cm²).
Indoor or outdoor use	: Indoor

6.2.29. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Product (article) characteristics	
Covers	percentage substance in the product up to 25 %.
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: Duration of contact > 240 min
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection not applicable Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Body parts exposed	: Palm of both hands (480 cm²).
Indoor or outdoor use	: Indoor

6.2.30. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version	Revision Date:	SDS Number:	Date of last issue: 14.12.2020
2.2	21.04.2021	150000114174	Date of first issue: 03.04.2019
PRD		SDSEU / EN / 0001	

Covers percentage substance in the product up to 1 %.

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : Duration of contact > 240 min

Other conditions affecting workers exposure

Body parts exposed : Both hands (960 cm²).

Indoor or outdoor use : Indoor

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: Formulation in materials (ERC3)

Release route	Release rate	Release estimation method
Air	5 kg/day	Environmental Release Category (ERC)

Protection Target	Exposure estimate	RCR
Freshwater	0,0000062 mg/L (ECETOC TRA environment v2.0)	< 1
Freshwater sediment	0,057 mg/kg dry weight (ECETOC TRA environment v2.0)	0,513
Marine water	0,0000008 mg/L (ECETOC TRA environment v2.0)	< 1
Marine sediment	0,008 mg/kg dry weight (ECETOC TRA environment v2.0)	0,074
Soil	0,03 mg/kg dry weight (ECETOC TRA environment v2.0)	0,03

6.3.2. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,159 mg/m ³ (ECETOC TRA worker v3)	0,045
Dermal	systemic	long-term	0,137 mg/kg bw/day (ECETOC TRA worker v3)	0,274

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,337
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6.3.3. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,227 mg/m ³ (ECETOC TRA worker v3)	0,064
Dermal	systemic	long-term	0,137 mg/kg bw/day (ECETOC TRA worker v3)	0,274
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,356

6.3.4. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,02 mg/m ³ (ECETOC TRA worker v3)	0,006
Dermal	systemic	long-term	0,137 mg/kg bw/day (ECETOC TRA worker v3)	0,274
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,298

6.3.5. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,227 mg/m ³ (ECETOC TRA worker v3)	0,064
Dermal	systemic	long-term	0,137 mg/kg bw/day (ECETOC TRA worker v3)	0,274
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,356

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

6.3.6. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,1 mg/m ³ (ECETOC TRA worker v3)	0,028
Dermal	systemic	long-term	0,343 mg/kg bw/day (ECETOC TRA worker v3)	0,686
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,732

6.3.7. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,014 mg/m ³ (ECETOC TRA worker v3)	0,004
Dermal	systemic	long-term	0,171 mg/kg bw/day (ECETOC TRA worker v3)	0,343
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,365

6.3.8. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,063 mg/m ³ (ECETOC TRA worker v3)	0,018
Dermal	systemic	long-term	0,171 mg/kg bw/day (ECETOC TRA worker v3)	0,343
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,379

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

6.3.9. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,02 mg/m ³ (ECETOC TRA worker v3)	0,006
Dermal	systemic	long-term	0,137 mg/kg bw/day (ECETOC TRA worker v3)	0,274
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,298

6.3.10. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,227 mg/m ³ (ECETOC TRA worker v3)	0,064
Dermal	systemic	long-term	0,137 mg/kg bw/day (ECETOC TRA worker v3)	0,274
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,356

6.3.11. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,03 mg/m ³ (ECETOC TRA worker v3)	0,009
Dermal	systemic	long-term	0,041 mg/kg bw/day (ECETOC TRA worker v3)	0,082
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,109

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

6.3.12. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,068 mg/m ³ (ECETOC TRA worker v3)	0,019
Dermal	systemic	long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	0,137
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,174

6.3.13. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,06 mg/m ³ (ECETOC TRA worker v3)	0,017
Dermal	systemic	long-term	0,082 mg/kg bw/day (ECETOC TRA worker v3)	0,165
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,2

6.3.14. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,069 mg/m ³ (ECETOC TRA worker v3)	0,02
Dermal	systemic	long-term	0,082 mg/kg bw/day (ECETOC TRA worker v3)	0,165
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,203

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

MARLOTHERM® SH Heat Transfer Fluid

Version
2.2
PRD

Revision Date:
21.04.2021

SDS Number:
150000114174
SDSEU / EN / 0001

Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

6.3.15. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,014 mg/m ³ (ECETOC TRA worker v3)	0,004
Dermal	systemic	long-term	0,086 mg/kg bw/day (ECETOC TRA worker v3)	0,172
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,194

6.3.16. Worker exposure: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,068 mg/m ³ (ECETOC TRA worker v3)	0,019
Dermal	systemic	long-term	0,041 mg/kg bw/day (ECETOC TRA worker v3)	0,082
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,119

6.3.17. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,023 mg/m ³ (ECETOC TRA worker v3)	0,007
Dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,549
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,574

6.3.18. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

EASTMAN

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2.2
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Revision Date:
21.04.2021

SDS Number:
150000114174
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Date of last issue: 14.12.2020
Date of first issue: 03.04.2019

		tor	mate	
inhalative	systemic	long-term	0,01 mg/m ³ (ECETOC TRA worker v3)	0,003
Dermal	systemic	long-term	0,055 mg/kg bw/day (ECETOC TRA worker v3)	0,11
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,131

6.3.19. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,06 mg/m ³ (ECETOC TRA worker v3)	0,017
Dermal	systemic	long-term	0,082 mg/kg bw/day (ECETOC TRA worker v3)	0,164
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,199

6.3.20. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,567 mg/m ³ (ECETOC TRA worker v3)	0,161
Dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,549
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,728

6.3.21. Worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,069 mg/m ³ (ECETOC TRA	0,02

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			worker v3)	
Dermal	systemic	long-term	0,206 mg/kg bw/day (ECETOC TRA worker v3)	0,411
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,449

6.3.22. Worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,06 mg/m ³ (ECETOC TRA worker v3)	0,017
Dermal	systemic	long-term	0,041 mg/kg bw/day (ECETOC TRA worker v3)	0,082
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,117

6.3.23. Worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,069 mg/m ³ (ECETOC TRA worker v3)	0,02
Dermal	systemic	long-term	0,206 mg/kg bw/day (ECETOC TRA worker v3)	0,411
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,449

6.3.24. Worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,06 mg/m ³ (ECETOC TRA worker v3)	0,017

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

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Dermal	systemic	long-term	0,041 mg/kg bw/day (ECETOC TRA worker v3)	0,082
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,117

6.3.25. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	1,135 mg/m ³ (ECETOC TRA worker v3)	0,322
Dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,549
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,889

6.3.26. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,05 mg/m ³ (ECETOC TRA worker v3)	0,014
Dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,549
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,581

6.3.27. Worker exposure: Low energy manipulation of substances bound in materials and/ or articles (PROC21)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,06 mg/m ³ (ECETOC TRA worker v3)	0,17
Dermal	systemic	long-term	0,034 mg/kg bw/day (ECETOC TRA worker v3)	0,068

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

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combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,256
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6.3.28. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,006 mg/m ³ (ECETOC TRA worker v3)	0,002
Dermal	systemic	long-term	0,206 mg/kg bw/day (ECETOC TRA worker v3)	0,411
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,431

6.3.29. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,06 mg/m ³ (ECETOC TRA worker v3)	0,017
Dermal	systemic	long-term	0,041 mg/kg bw/day (ECETOC TRA worker v3)	0,082
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,117

6.3.30. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	1,135 mg/m ³ (ECETOC TRA worker v3)	0,322
Dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,549
combined routes	systemic	long-term	(ECETOC TRA worker v3)	0,889

SAFETY DATA SHEET

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6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Not applicable