SAFETY DATA SHEET
according to the OSHA Hazard Communication Standard

MANDARIN OLIFFAC 0612

Version	Revision Date:	SDS Number:	Date of last issue: 09/26/2025
12.0	03/10/2026	300000322392	Date of first issue: 08/06/2012

SECTION 1. IDENTIFICATION

Product name	:	MANDARIN OLIFFAC 0612
Sales Number	:	30R31917
Sales Number	:	30R31917
SDS Number	:	300000322392

Recommended use of the chemical and restrictions on use

Product Use Description	:	Fragrance Compound

Manufacturer or supplier's details

Company name of supplier	:	IFF Inc.
Address	:	600 Highway 36 Hazlet NJ 07730
Telephone	:	(732) 264-4500
Telefax	:	(732) 335-2551
E-mail address	:	sds@iff.com
Emergency telephone number	:	+1 800 424 9300

This telephone number is available 24 hours per day, 7 days per week.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Hazards for the product as supplied

Flammable liquids	:	Category 3
Skin irritation	:	Category 2
Skin sensitisation	:	Category 1
Reproductive toxicity	:	Category 2
Aspiration hazard	:	Category 1

Other hazards

None known.

GHS label elements

Hazard pictograms	:	
Signal word	:	Danger
Hazard statements	:	H226 Flammable liquid and vapour. H304 May be fatal if swallowed and enters airways. H315 Causes skin irritation. H317 May cause an allergic skin reaction. H361 Suspected of damaging fertility or the unborn child.
Precautionary statements	:	**Prevention:** P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P261 Avoid breathing mist or vapours. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection. **Response:** P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor. P302 + P352 IF ON SKIN: Wash with plenty of water. P308 + P313 IF exposed or concerned: Get medical advice/ attention. P331 Do NOT induce vomiting. P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention. P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Chemical nature : Fragrance for consumer product

Components

Chemical name	CAS No./Unique ID	Concentration (% w/w)	Trade secret
(R)-p-mentha-1,8-diene	5989-27-5*	>= 80 - <= 100	TSC
GAMMA-TERPINENE	99-85-4*	>= 7 - <= 13	TSC
thuj-4(10)-ene	3387-41-5*	>= 3 - <= 7	TSC
MYRCENE	123-35-3*	>= 1 - <= 5	TSC

ALPHA-PINENE	80-56-8*	>= 0.5 - <= 1.5	TSC
LINALOOL	78-70-6*	>= 0.1 - <= 1	TSC
1-Hydroxy-3-decanone	67633-95-8*	>= 0.1 - <= 1	TSC
2-Cyclohexen-1-one, 2-methyl-5-(1-methylethenyl)-, (5S)-	99-49-0*	>= 0.1 - <= 1	TSC
9-Undecenal, 2,6,10-trimethyl-	141-13-9*	>= 0.1 - <= 1	TSC
BETA-PINENE	127-91-3*	>= 0.1 - <= 1	TSC
p-mentha-1,4(8)-diene	586-62-9*	>= 0.1 - <= 1	TSC
P-CYMENE	99-87-6*	>= 0.1 - <= 1	TSC
CITRAL	5392-40-5*	>= 0.1 - <= 1	TSC
CITRONELLOL	106-22-9*	>= 0.1 - <= 1	TSC
CITRONELLAL	106-23-0*	>= 0.1 - <= 1	TSC
DELTA-3-CARENE	13466-78-9*	>= 0.1 - <= 1	TSC
P-MENTHA-1,3-DIENE	99-86-5*	>= 0.1 - <= 1	TSC
DODECANENITRILE	2437-25-4*	>= 0 - <= 0.1	TSC

* Indicates that the identifier is a CAS No.
TSC- the actual concentration or concentration range is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

General advice	:	Take Hazard and Precautionary phrases (section 2) into account.
If inhaled	:	Remove from exposure site to fresh air and keep at rest. Obtain medical advice.
In case of skin contact	:	Remove contaminated clothes. Wash thoroughly with water (and soap). Contact physician if symptoms persist.
In case of eye contact	:	Flush immediately with water for at least 15 minutes. Contact physician if symptoms persist.
If swallowed	:	Rinse mouth with water and obtain medical advice.
Most important symptoms and effects, both acute and delayed	:	May be fatal if swallowed and enters airways. Causes skin irritation. May cause an allergic skin reaction. Suspected of damaging fertility or the unborn child.

Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically.
Notes to physician

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Carbondioxide, dry chemical, foam.

Unsuitable extinguishing media : Do not use a direct waterjet on burning material.

Specific hazards during fire-fighting : Water may be ineffective.

Further information : Standard procedure for chemical fires.

Special protective equipment for firefighters : Wear NIOSH approved self-contained breathing apparatus and full protective clothing when fighting fires involving chemicals. Use water spray to cool containers exposed to fire.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Avoid inhalation and contact with skin and eyes. A self-contained breathing apparatus is recommended in case of a major spill.

Environmental precautions : Keep away from drains, surface- and groundwater and soil.

Methods and materials for containment and cleaning up : Clean up spillage promptly. Remove ignition sources. Provide adequate ventilation. Avoid excessive inhalation of vapours. Gross spillages should be contained by use of sand or inert powder and disposed of according to the local regulations.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion : Keep away from ignition sources and naked flame.

Advice on safe handling : Avoid excessive inhalation of concentrated vapors. Follow good manufacturing practices for housekeeping and personal hygiene. Wash any exposed skin immediately after any chemical contact, before breaks and meals, and at the end of each work period. Contaminated clothing and shoes should be

thoroughly cleaned before re-use.

If appropriate, procedures used during the handling of this material should also be used when cleaning equipment or removing residual chemicals from tanks or other containers, especially when steam or hot water is used, as this may increase vapor concentrations in the workplace air. Where chemicals are openly handled, access should be restricted to properly trained employees.
Keep all heated processes at the lowest necessary temperature in order to minimize emissions of volatile chemicals into the air.

Conditions for safe storage : Store in a cool, dry, ventilated area away from heat sources. Keep containers upright and tightly closed when not in use.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
(R)-p-mentha-1,8-diene	5989-27-5	TWA	30 ppm	US WEEL
pin-2(3)-ene	80-56-8	TWA	20 ppm	ACGIH
(-)-pin-2(10)-ene	127-91-3	TWA	20 ppm	ACGIH
citral	5392-40-5	TWA (Inhalable fraction and vapor)	5 ppm	ACGIH

Engineering measures : Where feasible, isolate mixing rooms and other areas where this material is used or openly handled. Maintain these areas under negative air pressure relative to the rest of the plant. Where feasible, use closed systems to transfer and process this material

Personal protective equipment

Respiratory protection : Use local exhaust ventilation around open tanks and other open sources of potential exposures in order to avoid excessive inhalation, including places where this material is openly weighed or measured. In addition, use general dilution ventilation of the work area to eliminate or reduce possible worker exposures.
No respiratory protection is required during normal operations in a workplace where engineering controls such as adequate ventilation, etc. are sufficient.

If engineering controls and safe work practices are not sufficient, an approved, properly fitted respirator with organic vapor cartridges or canisters and particulate filters should be used:

a)while engineering controls and appropriate safe work practices and/or procedures are being implemented; or
b)during short term maintenance procedures when engineering controls are not in normal operation or are not sufficient; or
c)if normal operational workplace vapor concentration in the air is increased due to heat ;
d)during emergencies; or
e)if engineering controls and operational practices are not sufficient to reduce airborne concentrations below an established occupational exposure limit.

Hand protection

Remarks : Avoid skin contact. Use chemically resistant gloves.

Eye protection : Use tight-fitting goggles, face shield or safety glasses with side shields if eye contact might occur.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

Protective measures : In December 2003, the National Institute for Occupational Safety and Health ("NIOSH") published an Alert on preventing lung disease in workers who use or make flavorings [NIOSH Publication Number 2004-110].
In August 2004, the United States Flavor and Extract Manufacturers Association (FEMA) issued a report entitled "Respiratory Safety in the Flavor Manufacturing Workplace".
Both of these reports provide recommendations for reducing employee exposure and for medical surveillance in the workplace. The recommendations in these reports are generally applicable to the use of any chemical in the workplace and you are strongly urged to review both of these reports.
The report published by FEMA also contains a list of "high priority" chemicals. If any of these chemicals are present in this product at a concentration >= 1.0% due to an intentional addition by IFF, the chemical(s) will be identified in this safety data sheet.

Hygiene measures : To the extent deemed appropriate, implement pre-placement and regularly scheduled ascertainment of symptoms and spirometry testing of lung function for workers who are regularly exposed to this material.
To the extent deemed appropriate, use an experienced air sampling expert to identify and measure volatile chemicals that could be present in the workplace air to determine potential exposures and to ensure the continuing effectiveness of engineering controls and operational practices to minimize exposure.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	orange
Odour	:	conforms to standard
Melting point	:	not determined
Boiling point	:	not determined
Flash point	:	124 °F / 51 °C Method: closed cup
Evaporation rate	:	not determined
Upper explosion limit / Upper flammability limit	:	not determined
Lower explosion limit / Lower flammability limit	:	not determined
Vapour pressure	:	1.16 hPa (68 °F / 20 °C) Calculated
Relative vapour density	:	not determined
Relative density	:	0.8430 - 0.8530
Density	:	not determined
Water solubility	:	not determined
Solubility in other solvents	:	not determined
Partition coefficient: n-octanol/water	:	not determined
Auto-ignition temperature	:	not determined
Decomposition temperature	:	not determined
pH	:	not determined
Viscosity, dynamic	:	not determined
Viscosity, kinematic	:	not determined

Oxidizing properties	:	not determined
Molecular weight	:	not determined
Assessment	:	not determined
Particle size	:	not determined
Particle Size Distribution	:	not determined
Specific surface area	:	not determined
Surface charge/Zeta potential	:	not determined
Shape	:	not determined
Crystallinity	:	not determined
Surface treatment /Coatings	:	not determined

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No hazards to be specially mentioned.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Presents no significant reactivity hazard, by itself or in contact with water.
Conditions to avoid	:	Direct sources of heat.
Incompatible materials	:	Avoid contact with strong acids, alkali or oxidizing agents.
Hazardous decomposition products	:	Carbon monoxide and unidentified organic compounds may be formed during combustion.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Not classified based on available information.

Product:

Acute oral toxicity	:	Acute toxicity estimate: 2,561 mg/kg Method: Calculation method
Acute inhalation toxicity	:	Acute toxicity estimate: > 200 mg/l Exposure time: 4 h Test atmosphere: vapour Method: Calculation method

Components:

(R)-p-mentha-1,8-diene:

Acute oral toxicity	:	LD50 (Rat, female): > 2,000 mg/kg Method: OECD Test Guideline 423 GLP: yes Remarks: REACH data
Acute dermal toxicity	:	LD50 (Rabbit): > 5,000 mg/kg Remarks: Based on data from similar materials REACH data

p-mentha-1,4-diene:

Acute oral toxicity	:	LD50 (Rat): 3,650 mg/kg Remarks: RIFM
Acute dermal toxicity	:	LD50 (Rabbit): > 5,000 mg/kg Remarks: RIFM

thuj-4(10)-ene:

Acute oral toxicity	:	LD50 (Rat): 2,000 mg/kg

7-methyl-3-methyleneocta-1,6-diene:

Acute oral toxicity	:	LD50 (Rat, male): > 5,000 mg/kg Method: OECD Test Guideline 401 GLP: no Remarks: REACH data
Acute dermal toxicity	:	LD50 (Rabbit): > 5,000 mg/kg Remarks: REACH data

Reaction mass of 1-hydroxydecan-3-one and3-(hydroxymethyl)nonan-2-one and nonan-2-one:

Acute oral toxicity	:	LD50 (Rat): 2,980 mg/kg Remarks: RIFM
Acute dermal toxicity	:	LD50 (Rabbit): > 5,000 mg/kg

1-isopropyl-4-methylbenzene:

Acute oral toxicity	:	LD50 (Rat, male and female): 4,750 mg/kg GLP: no Remarks: REACH data
Acute dermal toxicity	:	LD50 (Rabbit): > 5,000 mg/kg GLP: no Remarks: REACH data

citral:

Acute oral toxicity	:	LD50 (Rat, male and female): 6,800 mg/kg GLP: no Remarks: REACH data
Acute inhalation toxicity	:	(Rat, male and female): Exposure time: 7 h GLP: no Assessment: No data available Remarks: REACH data
Acute toxicity (other routes of administration)	:	see user defined free text (Mouse): Application Route: see user defined free text GLP: no

3,7,7-trimethylbicyclo[4.1.0]hept-3-ene:

Acute oral toxicity	:	LD50 (Rat): 4,800 mg/kg Remarks: RIFM
Acute inhalation toxicity	:	Acute toxicity estimate (Rat): 1.5 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Expert judgement
Acute dermal toxicity	:	LD50 (Rabbit): > 5,000 mg/kg

Skin corrosion/irritation

Causes skin irritation.

Components:

(R)-p-mentha-1,8-diene:

Species	:	Rabbit
Exposure time	:	4 h
Assessment	:	Causes skin irritation.
Method	:	OECD Test Guideline 404
Result	:	Skin irritation
GLP	:	yes
Test substance	:	(undiluted)
Remarks	:	REACH data

p-mentha-1,4-diene:

Species	:	reconstructed human epidermis (RhE)
Exposure time	:	1 h
Assessment	:	No skin irritation
Method	:	OECD Test Guideline 439
Result	:	No skin irritation
GLP	:	yes
Remarks	:	REACH data

7-methyl-3-methyleneocta-1,6-diene:

Species	:	human

Exposure time	:	15 min
Assessment	:	Irritating to skin.
Method	:	EPISKIN Human Skin Model Test
Result	:	Skin irritation
GLP	:	yes
Remarks	:	REACH data

Reaction mass of 1-hydroxydecan-3-one and3-(hydroxymethyl)nonan-2-one and nonan-2-one:

Result	:	irritating
Exposure time	:	18 h
Result	:	No skin irritation

1-isopropyl-4-methylbenzene:

Species	:	reconstructed human epidermis (RhE)
Exposure time	:	1 h
Assessment	:	No skin irritation
Method	:	OECD Test Guideline 439
Result	:	No skin irritation
GLP	:	yes
Test substance	:	(undiluted)
Remarks	:	REACH data
Species	:	Rabbit
Exposure time	:	24 h
Result	:	Skin irritation

citral:

Species	:	Rabbit
Assessment	:	Causes skin irritation.
Result	:	irritating
GLP	:	no
Remarks	:	REACH data

3,7,7-trimethylbicyclo[4.1.0]hept-3-ene:

Species	:	human
Method	:	closed patch test
Result	:	No skin irritation
Species	:	Rabbit
Result	:	irritating

p-mentha-1,3-diene:

Species	:	Rabbit
Exposure time	:	4 h
Assessment	:	No skin irritation
Method	:	OECD Test Guideline 404
Result	:	No skin irritation

GLP	:	No information available.
Remarks	:	REACH data

Serious eye damage/eye irritation

Not classified based on available information.

Components:

(R)-p-mentha-1,8-diene:

Species	:	Rabbit
Result	:	No eye irritation
Assessment	:	No eye irritation
Method	:	OECD Test Guideline 405
GLP	:	yes
Test substance	:	(undiluted)
Remarks	:	REACH data

p-mentha-1,4-diene:

Species	:	human
Result	:	No eye irritation
Exposure time	:	28 min
Assessment	:	No eye irritation
Method	:	OECD Test Guideline 492
GLP	:	yes
Remarks	:	REACH data

7-methyl-3-methyleneocta-1,6-diene:

Species	:	Rabbit
Result	:	Irritating to eyes.
Exposure time	:	8 d
Assessment	:	Irritating to eyes.
Method	:	OECD Test Guideline 405
GLP	:	yes
Remarks	:	REACH data

1-isopropyl-4-methylbenzene:

Species	:	human
Result	:	No eye irritation
Assessment	:	No eye irritation
Method	:	OECD Test Guideline 492
GLP	:	yes
Remarks	:	REACH data

Species	:	Bovine cornea
Result	:	No eye irritation
Assessment	:	No eye irritation
Method	:	OECD Test Guideline 437
GLP	:	yes
Remarks	:	REACH data

citral:

Species	:	Rabbit
Result	:	Eye irritation
Assessment	:	Causes serious eye irritation.
Method	:	OECD Test Guideline 405
Test substance	:	(undiluted)
Remarks	:	REACH data

p-mentha-1,3-diene:

Species	:	Rabbit
Result	:	Moderate eye irritation
Assessment	:	Causes serious eye irritation.
GLP	:	No information available.
Remarks	:	REACH data

Respiratory or skin sensitisation

Skin sensitisation

May cause an allergic skin reaction.

Respiratory sensitisation

Not classified based on available information.

Components:

(R)-p-mentha-1,8-diene:

Test Type	:	Local lymph node assay (LLNA)
Species	:	Mouse
Assessment	:	The product is a skin sensitiser, sub-category 1B.
Method	:	OECD Test Guideline 429
Result	:	Causes sensitisation.
GLP	:	yes
Test substance	:	22% in ethanol/DEP (75:25)
Remarks	:	REACH data

p-mentha-1,4-diene:

Test Type	:	Direct Peptide Reactivity Assay (DPRA)
Assessment	:	Does not cause skin sensitisation.
Method	:	OECD Test Guideline 442C
Result	:	Does not cause skin sensitisation.
GLP	:	yes
Remarks	:	REACH data

Test Type	:	KeratinoSens assay
Assessment	:	Does not cause skin sensitisation.
Method	:	OECD Test Guideline 442D
Result	:	Does not cause skin sensitisation.
GLP	:	yes
Remarks	:	REACH data

7-methyl-3-methyleneocta-1,6-diene:

Test Type	:	LLNA
Species	:	Mouse
Assessment	:	Does not cause skin sensitisation.
Method	:	OECD 429
Result	:	Not a skin sensitizer.
GLP	:	yes
Remarks	:	REACH data

Reaction mass of 1-hydroxydecan-3-one and3-(hydroxymethyl)nonan-2-one and nonan-2-one:

Test Type	:	maximisation study
Species	:	human
Result	:	Did not cause sensitisation on laboratory animals.
Test substance	:	0.20% in ethanol

1-isopropyl-4-methylbenzene:

Test Type	:	maximisation study
Species	:	human
Assessment	:	Does not cause skin sensitisation.
Method	:	Maximisation Test
Result	:	Does not cause skin sensitisation.
Test substance	:	4.0% in petrolatum
Remarks	:	REACH data

Test Type	:	Open epicutaneous test
Species	:	Guinea pig
Assessment	:	Does not cause skin sensitisation.
Result	:	Does not cause skin sensitisation.
GLP	:	no
Test substance	:	4.0% in petrolatum
Remarks	:	REACH data

citral:

Test Type	:	Maximisation Test
Species	:	Guinea pig
Assessment	:	May cause sensitisation by skin contact.
Method	:	OECD Test Guideline 406
Result	:	Causes sensitisation.
GLP	:	no
Remarks	:	REACH data

Test Type	:	Local lymph node assay (LLNA)
Species	:	Mouse
Assessment	:	May cause sensitisation by skin contact.
Method	:	OECD Test Guideline 429
Result	:	Causes sensitisation.
Remarks	:	REACH data

3,7,7-trimethylbicyclo[4.1.0]hept-3-ene:

Species	:	Guinea pig
Result	:	Causes sensitisation.
Test substance	:	(undiluted)

p-mentha-1,3-diene:

Test Type	:	Local lymph node assay (LLNA)
Species	:	Mouse
Assessment	:	The product is a skin sensitiser, sub-category 1B.
Method	:	OECD Test Guideline 429
Result	:	positive
Remarks	:	REACH data

Germ cell mutagenicity

Not classified based on available information.

Components:

(R)-p-mentha-1,8-diene:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Remarks: REACH data

Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 479
Result: negative
Remarks: REACH data

Test Type: Microbial mutagenesis assay (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes
Remarks: REACH data

Genotoxicity in vivo : Test Type: comet assay
Species: Rat (male)
Application Route: Oral
Result: negative
Remarks: REACH data

p-mentha-1,4-diene:

Genotoxicity in vitro : Test Type: Microbial mutagenesis assay (Ames test)
Test system: Salmonella typhimurium

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes
Remarks: REACH data

Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 490
Result: negative
GLP: yes
Remarks: REACH data

Test Type: Micronucleus test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 487
Result: negative
GLP: yes
Remarks: REACH data

7-methyl-3-methyleneocta-1,6-diene:

Genotoxicity in vitro : Test Type: gene mutation test
Method: OECD Test Guideline 471
Result: negative
GLP: yes
Remarks: REACH data

Genotoxicity in vivo : Test Type: Micronucleus test
Species: Mouse (male and female)
Application Route: Oral
Method: OECD Test Guideline 474
Result: negative
GLP: yes
Remarks: REACH data

1-isopropyl-4-methylbenzene:

Genotoxicity in vitro : Test Type: Microbial mutagenesis assay (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes
Remarks: REACH data

Test Type: Microbial mutagenesis assay (Ames test)
Test system: Escherichia coli
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes

Remarks: REACH data

Test Type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
GLP: yes
Remarks: REACH data

Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster lung cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
GLP: yes
Remarks: REACH data

citral:

Genotoxicity in vitro : Test Type: Microbial mutagenesis assay (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Remarks: REACH data

Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
GLP: yes
Remarks: REACH data

Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Remarks: REACH data

Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 479
Result: negative
Remarks: REACH data

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse (male and female)
Strain: B6C3F1
Application Route: Ingestion

Method: OECD Test Guideline 474
Result: negative
Remarks: REACH data

p-mentha-1,3-diene:

Genotoxicity in vitro : Test Type: Microbial mutagenesis assay (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Remarks: REACH data

Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Remarks: Based on data from similar materials
REACH data

Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials
REACH data

Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 479
Result: negative
Remarks: Based on data from similar materials
REACH data

Genotoxicity in vivo : Test Type: In vivo mammalian alkaline comet assay
Species: Mouse (male)
Application Route: Oral
Method: OECD Test Guideline 489
Result: negative
GLP: no
Remarks: Based on data from similar materials
REACH data

Test Type: Transgenic rodent somatic cell gene mutation assay
Species: Rat (male)
Application Route: Ingestion
Method: OECD Test Guideline 488
Result: negative
GLP: no

Remarks: Based on data from similar materials
REACH data

Carcinogenicity

Not classified based on available information.

Components:

(R)-p-mentha-1,8-diene:

Species	:	Mouse, male
Application Route	:	Oral
NOAEL	:	250 - 500 mg/kg body weight
Method	:	OECD Test Guideline 451
GLP	:	yes
Remarks	:	REACH data

Species	:	Mouse, female
Application Route	:	Oral
NOAEL	:	500 - 1,000 mg/kg body weight
Method	:	OECD Test Guideline 451
GLP	:	yes
Remarks	:	REACH data

citral:

Species	:	Rat, male and female
Application Route	:	Ingestion
Activity duration	:	735 d
NOAEL	:	100 mg/kg body weight
LOAEL	:	210 mg/kg body weight
Method	:	OECD Test Guideline 453
GLP	:	yes
Remarks	:	REACH data

Species	:	Mouse, male
Application Route	:	Ingestion
Activity duration	:	735 d
NOAEL	:	60 mg/kg body weight
LOAEL	:	120 mg/kg body weight
Method	:	OECD Test Guideline 453
GLP	:	yes
Remarks	:	REACH data

Species	:	Mouse, female
Application Route	:	Ingestion
Activity duration	:	735 d
LOAEL	:	60 mg/kg body weight
Method	:	OECD Test Guideline 453
GLP	:	yes
Remarks	:	REACH data

IARC	Group 2B: Possibly carcinogenic to humans	
	7-methyl-3-methyleneocta-1,6-diene	123-35-3

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Suspected of damaging fertility or the unborn child.

Components:

p-mentha-1,4-diene:

Effects on fertility	:	Test Type: reproductive and developmental toxicity study Species: Rat, male Application Route: Oral General Toxicity - Parent: NOAEL: 250 mg/kg body weight General Toxicity F1: NOAEL: 250 mg/kg body weight Fertility: NOAEL: 250 mg/kg body weight Method: OECD Test Guideline 422 GLP: yes Remarks: REACH data Test Type: reproductive and developmental toxicity study Species: Rat, female Application Route: Oral General Toxicity - Parent: NOAEL: 250 mg/kg body weight General Toxicity F1: NOAEL: 250 mg/kg body weight Fertility: NOAEL: 100 mg/kg body weight Method: OECD Test Guideline 422 GLP: yes Remarks: REACH data
Reproductive toxicity - Assessment	:	Suspected of damaging fertility or the unborn child.

7-methyl-3-methyleneocta-1,6-diene:

Effects on fertility	:	Test Type: reproductive and developmental toxicity study Species: Rat, male and female Application Route: Oral Method: OECD Test Guideline 415 Result: Animal testing did not show any effects on fertility. Remarks: REACH data
Effects on foetal development	:	Test Type: reproductive and developmental toxicity study Species: Rat, male and female Duration of Single Treatment: 20 d Method: OECD Test Guideline 414

1-isopropyl-4-methylbenzene:

Effects on fertility	:	Test Type: reproductive and developmental toxicity study

Species: Rat, male
Application Route: Oral
General Toxicity - Parent: NOAEL: 50 mg/kg body weight
General Toxicity F1: NOAEL: 50 mg/kg body weight
Fertility: NOAEL: 50 mg/kg body weight
Method: OECD Test Guideline 422
GLP: yes
Remarks: REACH data

Test Type: reproductive and developmental toxicity study
Species: Rat, female
Application Route: Oral
General Toxicity - Parent: NOAEL: 100 mg/kg body weight
General Toxicity F1: NOAEL: 50 mg/kg body weight
Fertility: NOAEL: 100 mg/kg body weight
Method: OECD Test Guideline 422
GLP: yes
Remarks: REACH data

Reproductive toxicity - Assessment : Suspected of damaging fertility or the unborn child.

citral:

Effects on fertility : Test Type: reproductive and developmental toxicity study
Species: Rat, male and female
Application Route: Oral
Dose: 1000 mg/kg bw/day
General Toxicity - Parent: NOAEL: 200 mg/kg body weight
Fertility: NOAEL: 1,000 mg/kg body weight
Method: OECD Test Guideline 421
GLP: yes
Remarks: REACH data

Test Type: reproductive and developmental toxicity study
Species: Rat, male and female
Application Route: Oral
Fertility: NOAEL Parent: 250 mg/kg body weight
Method: OECD Test Guideline 443
GLP: yes
Remarks: REACH data

Effects on foetal development : Test Type: Pre-natal
Species: Rabbit
Strain: NZW
Application Route: Oral
Duration of Single Treatment: 23 d
General Toxicity Maternal: NOAEL: 60 mg/kg body weight
Developmental Toxicity: NOAEL: 60 mg/kg body weight
Method: OECD Test Guideline 414
Result: Not classified
GLP: yes
Remarks: REACH data

Test Type: Pre-natal
Species: Rat
Strain: wistar
Application Route: Oral
Duration of Single Treatment: 10 d
General Toxicity Maternal: NOAEL: 60 mg/kg body weight
Developmental Toxicity: NOAEL: 60 mg/kg body weight
Method: OECD Test Guideline 414
Remarks: REACH data

p-mentha-1,3-diene:

Effects on foetal development	:	Test Type: Pre-natal Species: Rat, female Application Route: Oral Duration of Single Treatment: 21 d Frequency of Treatment: 1 daily Developmental Toxicity: NOAEL: 30 mg/kg body weight Method: OECD Test Guideline 414 Remarks: REACH data

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

Not classified based on available information.

Repeated dose toxicity

Components:

(R)-p-mentha-1,8-diene:

Species	:	Rat, male and female
NOAEL	:	600 mg/kg
LOAEL	:	150 mg/kg
Application Route	:	Oral
Exposure time	:	90-day
Method	:	OECD Test Guideline 408
GLP	:	yes
Target Organs	:	Kidney
Remarks	:	REACH data

Species	:	Mouse, male and female
NOAEL	:	500 mg/kg
LOAEL	:	1,000 mg/kg
Application Route	:	Oral
Exposure time	:	90-day
Method	:	OECD Test Guideline 408
GLP	:	yes
Remarks	:	REACH data

p-mentha-1,4-diene:

Species	:	Rat, male and female
NOAEL	:	250 mg/kg
Application Route	:	Oral
Method	:	see user defined free text
GLP	:	yes
Remarks	:	REACH data

7-methyl-3-methyleneocta-1,6-diene:

Species	:	Rat, male and female
LOAEL	:	250 mg/kg bw
Application Route	:	Oral
Exposure time	:	90-day
Number of exposures	:	1x /day
Method	:	OECD 408
GLP	:	yes
Remarks	:	Based on available data, the classification criteria are not met. REACH data

1-isopropyl-4-methylbenzene:

Species	:	Rat, male
NOAEL	:	50 mg/kg
Application Route	:	Oral
Exposure time	:	35 d
Method	:	OECD Test Guideline 422
GLP	:	yes
Remarks	:	REACH data
Species	:	Rat, female
NOAEL	:	100 mg/kg
Application Route	:	Oral
Exposure time	:	63 d
Method	:	OECD Test Guideline 422
GLP	:	yes
Remarks	:	REACH data
Species	:	Rat, male
NOAEL	:	1.23 mg/l
Application Route	:	inhalation (vapour)
Exposure time	:	20 d
Remarks	:	REACH data

citral:

Species	:	Rat, male
LOAEL	:	345 mg/kg
LOAEL	:	345 mg/kg
Application Route	:	Ingestion
Exposure time	:	90 d
Method	:	OECD Test Guideline 408
GLP	:	yes
Remarks	:	REACH data

Species	:	Rat, female
LOAEL	:	335 mg/kg
LOAEL	:	335 mg/kg
Application Route	:	Ingestion
Exposure time	:	90 d
Method	:	OECD Test Guideline 408
GLP	:	yes
Remarks	:	REACH data

Species	:	Mouse, male
LOAEL	:	745 mg/kg
LOAEL	:	745 mg/kg
Application Route	:	Ingestion
Exposure time	:	90 d
Method	:	OECD Test Guideline 408
GLP	:	yes
Remarks	:	REACH data

Species	:	Mouse, female
LOAEL	:	790 mg/kg
LOAEL	:	790 mg/kg
Application Route	:	Ingestion
Exposure time	:	90 d
Method	:	OECD Test Guideline 408
GLP	:	yes
Remarks	:	REACH data

Species	:	Rat, male and female
LOAEL	:	210 mg/kg
NOAEL	:	100 mg/kg
Application Route	:	Ingestion
Exposure time	:	735 d
Method	:	OECD Test Guideline 453
GLP	:	yes
Remarks	:	REACH data

Species	:	Mouse, male
LOAEL	:	120 mg/kg
NOAEL	:	60 mg/kg
LOAEL	:	120 mg/kg
Application Route	:	Ingestion
Exposure time	:	735 d
Method	:	OECD Test Guideline 453
GLP	:	yes
Remarks	:	REACH data

Species	:	Mouse, female
LOAEL	:	60 mg/kg
LOAEL	:	60 mg/kg
Application Route	:	Ingestion
Exposure time	:	735 h
Method	:	OECD Test Guideline 453

GLP	:	yes
Remarks	:	REACH data

p-mentha-1,3-diene:

Species	:	Mouse, male and female
NOAEL	:	500 mg/kg
LOAEL	:	1,000 mg/kg
Application Route	:	Oral
Exposure time	:	90-day
Method	:	OECD Test Guideline 408
GLP	:	yes
Remarks	:	Based on data from similar materials REACH data

Species	:	Mouse, female
NOAEL	:	600 mg/kg
LOAEL	:	1,200 mg/kg
Application Route	:	Oral
Exposure time	:	90-day
Method	:	OECD Test Guideline 408
GLP	:	yes
Remarks	:	Based on data from similar materials REACH data

Species	:	Mouse, male
NOAEL	:	600 mg/kg
LOAEL	:	150 mg/kg
Application Route	:	Oral
Exposure time	:	90-day
Method	:	OECD Test Guideline 408
GLP	:	yes
Remarks	:	Based on data from similar materials REACH data

Species	:	Rat, male
NOAEL	:	5 mg/kg
LOAEL	:	30 mg/kg
Application Route	:	Oral
Exposure time	:	90-day
Remarks	:	Based on data from similar materials REACH data

Species	:	Dog, male and female
NOAEL	:	100 mg/kg
LOAEL	:	1,000 mg/kg
Application Route	:	Oral
Exposure time	:	180 d
Method	:	OECD Test Guideline 409
Remarks	:	Based on data from similar materials REACH data

Aspiration toxicity

May be fatal if swallowed and enters airways.

Components:

(R)-p-mentha-1,8-diene:

May be fatal if swallowed and enters airways.

SECTION 12. ECOLOGICAL INFORMATION

Ecological information

Additional ecological information	:	Avoid contamination of soil, ground and surface water.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of according to local regulations. Avoid disposing into drainage systems and into the environment.
Contaminated packaging	:	Place material into sealed containers and dispose of in accordance with local, state and federal regulations.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	:	UN 1993
Proper shipping name	:	FLAMMABLE LIQUID, N.O.S., Flammable liquid, n.o.s. ((R)-p-mentha-1,8-diene, GAMMA-TERPINENE)
Class	:	3
Packing group	:	III
Labels	:	3
Packing instruction (cargo aircraft)	:	366
Packing instruction (passenger aircraft)	:	355

IMDG-Code

UN number	:	UN 1993
Proper shipping name	:	FLAMMABLE LIQUID, N.O.S. ((R)-p-mentha-1,8-diene, GAMMA-TERPINENE)
Class	:	3
Packing group	:	III
Labels	:	3
EmS Code	:	F-E, S-E
Marine pollutant	:	yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

National Regulations

49 CFR

UN/ID/NA number	:	NA 1993
Proper shipping name	:	Combustible liquid, n.o.s. ((R)-p-mentha-1,8-diene, GAMMA-TERPINENE)
Class	:	CBL
Packing group	:	III
Labels	:	NONE
ERG Code	:	128
Marine pollutant	:	yes((R)-p-mentha-1,8-diene)

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.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

Listed substances in the product are at low enough levels to not be expected to exceed the RQ

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards	:	Flammable (gases, aerosols, liquids, or solids) Respiratory or skin sensitisation Reproductive toxicity Aspiration hazard Skin corrosion or irritation
SARA 313	:	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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

US TSCA	:	All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / TWA	:	8-hour, time-weighted average
US WEEL / TWA	:	8-hr TWA

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; 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; ERG - Emergency Response Guide; GHS - Globally Harmonised System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; 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 Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; 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; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office 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; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

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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.