

DIMETHYLFORMAMIDE (DMF)

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: 06/16/2015 Version: 2.0

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

1.1. Product identifier

Product form : Substance
 Trade name : DIMETHYLFORMAMIDE (DMF)
 CAS No : 68-12-2
 Product code : AB00450
 Formula : C3H7NO

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

Use of the substance/mixture : Laboratory use/Manufacturing component/Research
 Use of the substance/mixture : Reagent
 Catalyst
 Solvent
 Chemical substance for research
 Rodenticide
 Pharmaceutical intermediate

1.3. Details of the supplier of the safety data sheet

AmericanBio, Inc.
 15 Erie Dr.
 Natick, MA 01760 - USA
 T 800.443.0600 - F 508.655.2754
info@americanbio.com - www.americanbio.com

1.4. Emergency telephone number

Emergency number : 855.835.2572 (U.S.) :: 760.602.8703 (Outside U.S.)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Flam. Liq. 3 H226
 Acute Tox. 4 (Dermal) H312
 Acute Tox. 4 (Inhalation:dust,mist) H332

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H226 - Flammable liquid and vapor
 H312 - Harmful in contact with skin
 H319 - Causes serious eye irritation
 H332 - Harmful if inhaled
 H360 - May damage fertility or the unborn child

Precautionary statements (GHS-US) :

P261 - Avoid breathing fume, mist, spray, vapors
 P280 - Wear eye protection, protective gloves, face protection
 P302+P352 - IF ON SKIN: Wash with plenty of soap and water
 P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 P308+P313 - IF exposed or concerned: Get medical advice/attention
 P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing . Seek Medical attention

2.3. Other hazards

No additional information available

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2.4. Unknown acute toxicity (GHS-US)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%	Classification (GHS-US)
DIMETHYLFORMAMIDE (DMF) (Main constituent)	(CAS No) 68-12-2	100	Flam. Liq. 3, H226 Acute Tox. 4 (Dermal), H312 Acute Tox. 4 (Inhalation:dust,mist), H332

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general	: Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with laboured breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain. Depending on the victim's condition: doctor/hospital. Never give alcohol to drink. Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
First-aid measures after inhalation	: Remove the victim into fresh air. Respiratory problems: consult a doctor/medical service. Assure fresh air breathing. Allow the victim to rest. Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER/doctor/physician if you feel unwell.
First-aid measures after skin contact	: Wash immediately with lots of water. Soap may be used. Take victim to a doctor if irritation persists. Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a POISON CENTER or doctor/physician. Specific measures (see Consult a doctor/medical service on this label). Wash with plenty of soap and water. Wash contaminated clothing before reuse.
First-aid measures after eye contact	: Rinse immediately with plenty of water. Do not apply neutralizing agents. Take victim to an ophthalmologist if irritation persists. Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persist.
First-aid measures after ingestion	: Rinse mouth with water. Immediately after ingestion: give lots of water to drink. Do not give milk/oil to drink. Do not induce vomiting. Give activated charcoal. Call Poison Information Centre (www.big.be/antigif.htm). Consult a doctor/medical service if you feel unwell. Ingestion of large quantities: immediately to hospital. Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

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

Symptoms/injuries after inhalation	: EXPOSURE TO HIGH CONCENTRATIONS: Coughing. Nausea. Vomiting. Abdominal pain. Dizziness. Excited/restless. High arterial pressure. Feeling of weakness. Enlargement/affection of the liver. Danger of serious damage to health by prolonged exposure through inhalation. Harmful if inhaled.
Symptoms/injuries after skin contact	: Slight irritation. Dry skin. Symptoms similar to those listed under inhalation. Repeated exposure to this material can result in absorption through skin causing significant health hazard. Harmful in contact with skin.
Symptoms/injuries after eye contact	: Irritation of the eye tissue. Conjunctivitis. Inflammation/damage of the eye tissue.
Symptoms/injuries after ingestion	: No data available.
Chronic symptoms	: ON CONTINUOUS/REPEATED EXPOSURE/CONTACT: Tingling/irritation of the skin. Skin rash/inflammation. Headache. Gastrointestinal complaints. Loss of appetite. Risk of testicular tumors. Possible premature birth. Cardiac and blood circulation effects. Promotes the clotting of blood.

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

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

suitable extinguishing media	: Preferably: alcohol resistant foam. Water spray. Polyvalent foam. BC powder. Carbon dioxide. Foam. Dry powder. Carbon dioxide. Water spray. Sand.
Unsuitable extinguishing media	: Solid water jet ineffective as extinguishing medium. Do not use a heavy water stream.

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5.2. Special hazards arising from the substance or mixture

- Fire hazard : DIRECT FIRE HAZARD. Material presenting a fire hazard. INDIRECT FIRE HAZARD. Temperature above flashpoint: higher fire/explosion hazard. Reactions involving a fire hazard: see "Reactivity Hazard". Flammable liquid and vapor.
- Explosion hazard : INDIRECT EXPLOSION HAZARD. Reactions with explosion hazards: see "Reactivity Hazard". May form flammable/explosive vapor-air mixture.
- Reactivity : Decomposes slowly on exposure to water (moisture): release of highly flammable gases/vapours (dimethylamine) and release of corrosive products (formic acid). On heating: release of highly flammable gases/vapours (dimethylamine). On burning: release of toxic and corrosive gases/vapours (nitrous vapours, carbon monoxide - carbon dioxide). Violent to explosive reaction with many compounds e.g.: with (strong) oxidizers and with (some) halogens.

5.3. Advice for firefighters

- Precautionary measures fire : Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to fire/heat: seal off low-lying areas. Exposure to fire/heat: have neighbourhood close doors and windows.
- Firefighting instructions : Cool tanks/drums with water spray/remove them into safety. Do not move the load if exposed to heat. Dilute toxic gases with water spray. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Avoid (reject) fire-fighting water to enter environment.
- Protection during firefighting : Heat/fire exposure: compressed air/oxygen apparatus. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Remove ignition sources. Use special care to avoid static electric charges. No naked lights. No smoking.

6.1.1. For non-emergency personnel

- Protective equipment : Gloves. Face-shield. Protective clothing.
- Emergency procedures : Mark the danger area. No naked flames. Avoid ingress of water in the containers. Wash contaminated clothes. Evacuate unnecessary personnel.

6.1.2. For emergency responders

- Protective equipment : Equip cleanup crew with proper protection.
- Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent soil and water pollution. Prevent spreading in sewers. Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

- For containment : Contain released substance, pump into suitable containers. Plug the leak, cut off the supply. Dam up the liquid spill. Heating: dilute combustible gas/vapour with water curtain.
- Methods for cleaning up : Take up liquid spill into inert absorbent material, e.g.: dry sand/earth/vermiculite. Scoop absorbed substance into closing containers. Carefully collect the spill/leftovers. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling. Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Additional hazards when processed : Handle empty containers with care because residual vapors are flammable.

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Precautions for safe handling : Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Keep the substance free from contamination. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Use earthed equipment. Keep away from naked flames/heat. Avoid contact of substance with water. At temperature > flashpoint: use spark-/explosionproof appliances. Finely divided: spark- and explosionproof appliances. Finely divided: keep away from ignition sources/sparks. Observe strict hygiene. Keep container tightly closed. Measure the concentration in the air regularly. Carry operations in the open/under local exhaust/ventilation or with respiratory protection. Wash hands and other exposed areas with mild soap and water before eat, drink or smoke and when leaving work. Provide good ventilation in process area to prevent formation of vapor. No naked lights. No smoking. Take precautionary measures against static discharge. Use only non-sparking tools. Use only outdoors or in a well-ventilated area. Avoid breathing dust/fume/gas/mist/vapors/spray.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof face shield, goggles, protective clothing equipment.

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Direct sunlight. Keep container tightly closed.

Incompatible products : Strong bases. strong acids.

Incompatible materials : Sources of ignition. Direct sunlight. Heat sources.

Heat-ignition : KEEP SUBSTANCE AWAY FROM: heat sources.

Prohibitions on mixed storage : KEEP SUBSTANCE AWAY FROM: oxidizing agents. (strong) acids. halogens. water/moisture.

Storage area : Store at ambient temperature. Store in a dry area. Ventilation at floor level. Fireproof storeroom. Provide for a tub to collect spills. Keep locked up. Unauthorized persons are not admitted. Detached building. Keep only in the original container. May be stored under inert gas. Meet the legal requirements.

Special rules on packaging : SPECIAL REQUIREMENTS: hermetical. dry. clean. correctly labelled. meet the legal requirements. Secure fragile packagings in solid containers.

Packaging materials : SUITABLE MATERIAL: No data available. MATERIAL TO AVOID: No data available.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

DIMETHYLFORMAMIDE (DMF) (68-12-2)		
USA ACGIH	ACGIH TWA (ppm)	10 ppm
USA ACGIH	ACGIH STEL (ppm)	10 ppm

8.2. Exposure controls

Personal protective equipment : Avoid all unnecessary exposure.

Materials for protective clothing : GIVE EXCELLENT RESISTANCE: butyl rubber. tetrafluoroethylene. GIVE POOR RESISTANCE: natural rubber. neoprene. nitrile rubber. polyethylene. PVA. PVC. viton. nitrile rubber/PVC.

Hand protection : Gloves. Wear protective gloves.

Eye protection : Face shield. Chemical goggles or safety glasses.

Skin and body protection : Protective clothing.

Respiratory protection : Wear gas mask with filter type A if conc. in air > exposure limit. Wear approved mask.

Other information : When using, do not eat, drink or smoke.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Appearance : Liquid.

Molecular mass : 73.09 g/mol

Color : Colourless to light yellow.

Odor : Unpleasant odour. Smell of fish.

Odor threshold : 0.046 ppm
0.14 mg/m³

pH : 6.7 (4.0 %)

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pH solution	: 4.0 %
Relative evaporation rate (butyl acetate=1)	: 0.17
Relative evaporation rate (ether=1)	: 60
Melting point	: -61 °C
Freezing point	: No data available
Boiling point	: 153 °C
Flash point	: 58 °C
Critical temperature	: 370 °C
Self ignition temperature	: 440 °C
Decomposition temperature	: 350 °C
Flammability (solid, gas)	: No data available
Vapor pressure	: 3.8 hPa
Vapor pressure at 50 °C	: 25 hPa
Critical pressure	: 44066 hPa
Relative vapor density at 20 °C	: 2.5
Relative density	: 0.95
Relative density of saturated gas/air mixture	: 1.0
Density	: 950 kg/m ³
Solubility	: Soluble in water. Soluble in ethanol. Soluble in ether. Soluble in acetone. Soluble in aromatic hydrocarbons. Soluble in chloroform. Soluble in tetrachloromethane. Soluble in dimethyl sulfoxide. Water: Complete Ethanol: Complete Ether: Complete Acetone: Complete
Log Pow	: -1.01 (Experimental value)
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: 0.0008 Pa.s (25 °C)
Explosive properties	: No data available
Oxidizing properties	: No data available
Explosive limits	: 2.2 - 16 vol % 70 - 500 g/m ³

9.2. Other information

Specific conductivity	: 6 µS/m
Saturation concentration	: 12 g/m ³
VOC content	: 100 %
Other properties	: Gas/vapour heavier than air at 20°C. Clear. Hygroscopic. Slightly volatile.

SECTION 10: Stability and reactivity

10.1. Reactivity

Decomposes slowly on exposure to water (moisture): release of highly flammable gases/vapours (dimethylamine) and release of corrosive products (formic acid). On heating: release of highly flammable gases/vapours (dimethylamine). On burning: release of toxic and corrosive gases/vapours (nitrous vapours, carbon monoxide - carbon dioxide). Violent to explosive reaction with many compounds e.g.: with (strong) oxidizers and with (some) halogens.

10.2. Chemical stability

Hygroscopic. Not established. Flammable liquid and vapor. May form flammable/explosive vapor-air mixture.

10.3. Possibility of hazardous reactions

Not established.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks.

10.5. Incompatible materials

strong acids. Strong bases.

10.6. Hazardous decomposition products

fume. Carbon monoxide. Carbon dioxide. May release flammable gases.

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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Harmful in contact with skin. Harmful if inhaled.

DIMETHYLFORMAMIDE (DMF) (V) 68-12-2	
LD50 oral rat	> 2000 mg/kg (Rat)
LD50 dermal rat	1100 mg/kg (Rat)
LC50 inhalation rat (mg/l)	5.9 mg/l/4h (Rat)
LC50 inhalation rat (ppm)	1948 ppm/4h (Rat)

Skin corrosion/irritation : Not classified
pH: 6.7 (4.0 %)

Serious eye damage/irritation : Not classified
pH: 6.7 (4.0 %)

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

DIMETHYLFORMAMIDE (DMF) (68-12-2)	
IARC group	3 - Not Classifiable

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met. Harmful in contact with skin. Harmful if inhaled.

Symptoms/injuries after inhalation : EXPOSURE TO HIGH CONCENTRATIONS: Coughing. Nausea. Vomiting. Abdominal pain. Dizziness. Excited/restless. High arterial pressure. Feeling of weakness. Enlargement/affection of the liver. Danger of serious damage to health by prolonged exposure through inhalation. Harmful if inhaled.

Symptoms/injuries after skin contact : Slight irritation. Dry skin. Symptoms similar to those listed under inhalation. Repeated exposure to this material can result in absorption through skin causing significant health hazard. Harmful in contact with skin.

Symptoms/injuries after eye contact : Irritation of the eye tissue. Conjunctivitis. Inflammation/damage of the eye tissue.

Symptoms/injuries after ingestion : No data available.

Chronic symptoms : ON CONTINUOUS/REPEATED EXPOSURE/CONTACT: Tingling/irritation of the skin. Skin rash/inflammation. Headache. Gastrointestinal complaints. Loss of appetite. Risk of testicular tumors. Possible premature birth. Cardiac and blood circulation effects. Promotes the clotting of blood.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Classification concerning the environment: not applicable.

Ecology - air : TA-Luft Klasse 5.2.7.1.3.

Ecology - water : Mild water pollutant (surface water). Affects the self-cleaning capacity of surface water. Ground water pollutant. Not harmful to fishes (LC50(96h) >1000 mg/l). Not harmful to invertebrates (Daphnia) (EC50 (48h) > 1000 mg/l). Practically non-toxic to algae (EC50 >100 mg/l). Not harmful to bacteria (EC50 >1000 mg/l). Not harmful to activated sludge.

DIMETHYLFORMAMIDE (DMF) (68-12-2)	
LC50 fish 1	9800 mg/l 96 h; Salmo gairdneri (Oncorhynchus mykiss)
EC50 Daphnia 1	1300 mg/l (48 h; Daphnia magna)
LC50 fish 2	6300 mg/l (96 h; Lepomis macrochirus)
TLM fish 1	10.2 ppm 96 h; Salmo gairdneri (Oncorhynchus mykiss)
Threshold limit algae 1	10 mg/l (Scenedesmus quadricauda)
Threshold limit algae 2	0.5 mg/l (Selenastrum capricornutum)

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12.2. Persistence and degradability

DIMETHYLFORMAMIDE (DMF) (68-12-2)	
Persistence and degradability	Readily biodegradable in water. Biodegradable in the soil. Photodegradation in the air. Not established.
Biochemical oxygen demand (BOD)	0.9 g O ₂ /g substance
Chemical oxygen demand (COD)	0.3645 g O ₂ /g substance
ThOD	1.863 g O ₂ /g substance
BOD (% of ThOD)	0.49 % ThOD

12.3. Bioaccumulative potential

DIMETHYLFORMAMIDE (DMF) (68-12-2)	
BCF fish 1	0.3-1.2, Cyprinus carpio; Test duration: 8 weeks
Log Pow	-1.01 (Experimental value)
Bioaccumulative potential	Bioaccumulation: not applicable. Not established.

12.4. Mobility in soil

DIMETHYLFORMAMIDE (DMF) (68-12-2)	
Surface tension	0.036 N/m (25 °C)

12.5. Other adverse effects

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Recycle by distillation. Remove to an authorized waste incinerator for solvents with energy recovery. Do not discharge into surface water. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to local, federal regulations.

Additional information : Hazardous waste according to Directive 2008/98/EC. Handle empty containers with care because residual vapors are flammable.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

In accordance with DOT

No dangerous good in sense of transport regulations

Additional information

Other information : No supplementary information available.

State during transport (ADR-RID) : as liquid.

ADR

Transport document description : UN 2265, 3, III, (D/E)
Packing group (ADR) : III
Class (ADR) : 3 - Flammable liquid
Hazard identification number (Kemler No.) : 30
Classification code (ADR) : F1
Danger labels (ADR) : 3 - Flammable liquids



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Orange plates



Tunnel restriction code

: D/E

Transport by sea

UN-No. (IMDG)

: 2265

Class (IMDG)

: 3 - Flammable liquids

EmS-No. (1)

: F-E

EmS-No. (2)

: S-D

Air transport

UN-No.(IATA)

: 2265

Class (IATA)

: 3 - Flammable Liquids

Packing group (IATA)

: III - Minor Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

DIMETHYLFORMAMIDE (DMF) (68-12-2)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Listed on SARA Section 313 (Specific toxic chemical listings)

RQ (Reportable quantity, section 304 of EPA's

100 lb

List of Lists) :

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

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

Flam. Liq. 3

H226

Repr. 1B

H360D

Acute Tox. 3 (Inhalation)

H331

Acute Tox. 4 (Dermal)

H312

Eye Irrit. 2

H319

Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC or 1999/45/EC

Repr.Cat.2; R61

Xn; R20/21

Xi; R36

Full text of R-phrases: see section 16

15.2.2. National regulations

No additional information available

15.3. US State regulations

DIMETHYLFORMAMIDE (DMF)(68-12-2)

State or local regulations

U.S. - Massachusetts - Right To Know List

U.S. - New Jersey - Right to Know Hazardous Substance List

U.S. - Pennsylvania - RTK (Right to Know) List

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SECTION 16: Other information

Other information : None.

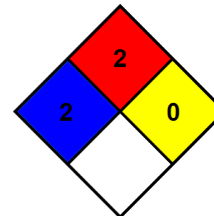
Full text of H-phrases: see section 16:

Acute Tox. 4 (Dermal)	Acute toxicity (dermal) Category 4
Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Flam. Liq. 3	Flammable liquids Category 3
H226	Flammable liquid and vapor
H312	Harmful in contact with skin
H332	Harmful if inhaled

NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard : 2 - Must be moderately heated or exposed to relatively high temperature before ignition can occur.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



SDS US (GHS HazCom 2012)

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