

1. Identification

Product identifier DIMETHYLFORMAMIDE - DMF

Other means of identification

CAS number 68-12-2

Recommended use General purpose solvent.

Recommended restrictions Uses other than the recommended use.

Manufacturer/Importer/Supplier/Distributor information

Company Name Greenfield Global USA Inc. (The technical data referenced below applies to products sold by Greenfield Global Inc., under the names Greenfield Global, Pharmco, and Commercial Alcohols.)

Address 58 Vale Road
Brookfield, CT 06804
USA

Telephone 203.740.3471

Fax 203.740.3481

Company Name Greenfield Global USA Inc.

Address 1101 Isaac Shelby Drive
Shelbyville, KY 40065
USA

Telephone 502.232.7600

Emergency phone number

USA CHEMTREC: +1.800.424.9300 (CCN 17213)

International CHEMTREC: +1.703.527.3887 (CCN 17213)

2. Hazard(s) identification

Hazards for the product as sold

Physical hazards Flammable liquids Category 3

Hazards for the product as sold

Health hazards

| | |
|-----------------------------------|-------------|
| Acute toxicity, dermal | Category 4 |
| Acute toxicity, inhalation | Category 4 |
| Serious eye damage/eye irritation | Category 2 |
| Carcinogenicity | Category 2 |
| Reproductive toxicity | Category 1B |

Hazards for the product as sold

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement Flammable liquid and vapor. Harmful in contact with skin. Causes serious eye irritation. Harmful if inhaled. Suspected of causing cancer. May damage fertility or the unborn child.

Precautionary statement

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use non-sparking tools. Take action to prevent static discharges. Avoid breathing vapors. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

Response

If on skin: Wash with plenty of water. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed or concerned: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. In case of fire: Use appropriate media to extinguish.

Storage

Store in a well-ventilated place. Keep cool. Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)

No additional hazards are known to be associated with the expected conditions of use at the time of publication. This document does not address hazards that may arise from uses not reasonably anticipated by the manufacturer.

Supplemental information

None.

3. Composition/information on ingredients

Substances

| Chemical name | Common name and synonyms | CAS number | % |
|-------------------|--------------------------|------------|-----|
| Dimethylformamide | | 68-12-2 | 100 |

Composition comments

All concentrations are in percent by weight.

4. First-aid measures

Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. Call a poison center or doctor/physician if you feel unwell.

Skin contact

Take off immediately all contaminated clothing. Rinse skin with water/shower. Get medical advice/attention if you feel unwell. Get medical attention if irritation develops and persists. Wash contaminated clothing before reuse.

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion

Rinse mouth. Get medical advice/attention if you feel unwell.

Most important symptoms/effects, acute and delayed

Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information

Take off all contaminated clothing immediately. IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media

Water fog. Alcohol resistant foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media

Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical

Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.

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| Special protective equipment and precautions for firefighters | Self-contained breathing apparatus and full protective clothing must be worn in case of fire. |
| Fire fighting equipment/instructions | In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. |
| Specific methods | Use standard firefighting procedures and consider the hazards of other involved materials. |
| General fire hazards | Flammable liquid and vapor. |

6. Accidental release measures

| | |
|--|---|
| Personal precautions, protective equipment and emergency procedures | Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of vapors and spray mists. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS. |
| Methods and materials for containment and cleaning up | Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. This product is miscible in water. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS. |
| Environmental precautions | Avoid discharge into drains, water courses or onto the ground. |

7. Handling and storage

| | |
|---|---|
| Precautions for safe handling | Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Avoid inhalation of vapors and spray mists. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Wash contaminated clothing before reuse. Observe good industrial hygiene practices. |
| Conditions for safe storage, including any incompatibilities | Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see Section 10 of the SDS). |

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Permissible Exposure Limits (PEL) for Air Contaminants (29 CFR 1910.1000)

| Material | Type | Value |
|---------------------------------|------|------------------------|
| Dimethylformamide (CAS 68-12-2) | PEL | 30 mg/m3 10 ppm |

US. ACGIH Threshold Limit Values (TLV)

| Material | Type | Value |
|---------------------------------|------|-------|
| Dimethylformamide (CAS 68-12-2) | TWA | 5 ppm |

NIOSH. Immediately Dangerous to Life or Health (IDLH) Values, as amended

| Material | Type | Value |
|---------------------------------|------|---------|
| Dimethylformamide (CAS 68-12-2) | IDLH | 500 ppm |

US. NIOSH: Pocket Guide to Chemical Hazards

| Material | Type | Value |
|---------------------------------|------|----------|
| Dimethylformamide (CAS 68-12-2) | TWA | 30 mg/m3 |
| | | 10 ppm |

Biological limit values**ACGIH Biological Exposure Indices (BEI)**

| Material | Value | Determinant | Sampling Time |
|---------------------------------|---------|--|---------------|
| Dimethylformamide (CAS 68-12-2) | 40 mg/l | N-Acetyl-S-(N-methylcarbamoyl) cysteine | * |
| | 30 mg/l | Sum of N-Methylformamide and N-(Hydroxymethyl)-N-Methylformamide | Urine * |
| | 30 mg/l | N-Acetyl-S-(N-methylcarbamoyl) cysteine | Urine * |
| | 15 mg/l | N-Methylformamide | * |

* - For sampling details, please see the source document.

Exposure guidelines**US - California OELs: Skin designation**

Dimethylformamide (CAS 68-12-2) Can be absorbed through the skin.

US - Tennessee OELs: Skin designation

Dimethylformamide (CAS 68-12-2) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Dimethylformamide (CAS 68-12-2) Danger of cutaneous absorption

US. NIOSH: Pocket Guide to Chemical Hazards

Dimethylformamide (CAS 68-12-2) Can be absorbed through the skin.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Dimethylformamide (CAS 68-12-2) Can be absorbed through the skin.

Appropriate engineering controls

Explosion-proof general and local exhaust ventilation. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station.

Individual protection measures, such as personal protective equipment

Eye/face protection Chemical goggles and face shield are recommended.

Skin protection

Hand protection Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Skin protection

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection

In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA 29 CFR 1910.134. Appropriate respirator selection should be made by a qualified professional.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Observe any medical surveillance requirements. When using do not smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

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|--|-----------------------------|
| Physical state | Liquid. |
| Form | Liquid. |
| Color | Clear. |
| Odor | Not available. |
| Melting point/freezing point | -77.8 °F (-61 °C) |
| Boiling point or initial boiling point and boiling range | 307.4 °F (153 °C) |
| Flammability | Flammable liquid. |
| Upper/lower flammability or explosive limits | |
| Explosive limit - lower (%) | 2.2 % |
| Explosive limit - upper (%) | 15.2 % |
| Flash point | 136 °F (57.78 °C) |
| Auto-ignition temperature | 833 °F (445 °C) |
| Decomposition temperature | Not available. |
| pH | 6.7 |
| Kinematic viscosity | Not available. |
| Solubility | |
| Solubility (water) | Miscible |
| Vapor pressure | 3.6 hPa (68 °F (20 °C)) |
| Density and/or relative density | |
| Density | 0.948 g/cm3 (77 °F (25 °C)) |
| Vapor density | 2.52 |
| Particle characteristics | Not available. |
| Other information | |
| Explosive properties | Not explosive. |
| Oxidizing properties | Not oxidizing. |

10. Stability and reactivity

| | |
|------------------------------------|--|
| Reactivity | The product is stable and non-reactive under normal conditions of use, storage and transport. |
| Chemical stability | Material is stable under normal conditions. |
| Possibility of hazardous reactions | No dangerous reaction known under conditions of normal use. |
| Conditions to avoid | Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials. |
| Incompatible materials | Strong oxidizing agents. |
| Hazardous decomposition products | No hazardous decomposition products are known. |

11. Toxicological information

Information on likely routes of exposure

| | |
|--------------|------------------------------------|
| Inhalation | Harmful if inhaled. |
| Skin contact | Harmful in contact with skin. |
| Eye contact | Causes serious eye irritation. |
| Ingestion | May cause discomfort if swallowed. |

Symptoms related to the physical, chemical and toxicological characteristics

Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.

Information on toxicological effects**Acute toxicity**

Harmful if inhaled. Harmful in contact with skin.

Product**Species****Test Results**

Dimethylformamide (CAS 68-12-2)

Acute**Oral**

LD50

Rat

3040 mg/kg

Skin corrosion/irritation

Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation

Causes serious eye irritation.

Respiratory or skin sensitization**Respiratory sensitization**

Not a respiratory sensitizer.

Skin sensitization

This product is not expected to cause skin sensitization.

Germ cell mutagenicity

No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity

Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Dimethylformamide (CAS 68-12-2)

2A Probably carcinogenic to humans.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Reproductive toxicity

May damage fertility or the unborn child.

Specific target organ toxicity - single exposure

Not classified.

Specific target organ toxicity - repeated exposure

Not classified.

Aspiration hazard

Not an aspiration hazard.

Chronic effects

Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information**Ecotoxicity**

The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product**Species****Test Results**

Dimethylformamide (CAS 68-12-2)

Aquatic*Acute*

Algae

EC50

Scenedesmus subspicatus

> 1000 mg/l, 96 Hours

Crustacea

EC50

Daphnia magna

> 100 mg/l, 48 Hours

Fish

LC50

Lepomis macrochirus

7100 mg/l, 96 Hours

Chronic

Crustacea

NOEC

Daphnia magna

1500 mg/l, 21 days

Persistence and degradability

No data is available on the degradability of this substance.

Bioaccumulative potential**Mobility in soil**

No data available.

Other adverse effects

No data available.

13. Disposal considerations

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|--|--|
| Disposal instructions | Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations. |
| Local disposal regulations | Dispose in accordance with all applicable regulations. |
| Hazardous waste code | The waste code should be assigned in discussion between the user, the producer and the waste disposal company. |
| Waste from residues / unused products | Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner. |
| Contaminated packaging | Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal. |

14. Transport information

DOT

| | |
|-------------------------------------|---|
| UN number | UN2265 |
| UN proper shipping name | N,N-Dimethylformamide |
| Transport hazard class(es) | |
| Class | 3 |
| Subsidiary hazard | - |
| Label(s) | 3 |
| Packing group | III |
| Environmental hazards | |
| Marine pollutant | No. |
| Special precautions for user | Read safety instructions, SDS and emergency procedures before handling. |
| Special provisions | B1, IB3, T2, TP2 |
| Packaging exceptions | 150 |
| Packaging non bulk | 203 |
| Packaging bulk | 242 |

IATA

| | |
|-------------------------------------|---|
| UN number | UN2265 |
| UN proper shipping name | N,N-Dimethylformamide |
| Transport hazard class(es) | |
| Class | 3 |
| Subsidiary hazard | - |
| Packing group | III |
| Environmental hazards | No. |
| ERG Code | 3L |
| Special precautions for user | Read safety instructions, SDS and emergency procedures before handling. |

IMDG

| | |
|-------------------------------------|---|
| UN number | UN2265 |
| UN proper shipping name | N,N-DIMETHYLFORMAMIDE |
| Transport hazard class(es) | |
| Class | 3 |
| Subsidiary hazard | - |
| Packing group | III |
| Environmental hazards | |
| Marine pollutant | No. |
| EmS | F-E, S-D |
| Special precautions for user | Read safety instructions, SDS and emergency procedures before handling. |

Transport in bulk according to IMO instruments Not established.

15. Regulatory information

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|--|--|
| US federal regulations | This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. |
| Toxic Substances Control Act (TSCA) | This substance is on the TSCA 8(b) inventory and is designated "active". |

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Dimethylformamide (CAS 68-12-2)

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)**SARA 302 Extremely hazardous substance**

Not listed.

SARA 311/312 Hazardous chemical

Yes

Classified hazard categories

Flammable (gases, aerosols, liquids, or solids)
Acute toxicity (any route of exposure)
Serious eye damage or eye irritation
Carcinogenicity
Reproductive toxicity

SARA 313 (TRI reporting)

| Chemical name | CAS number | % by wt. |
|-------------------|------------|----------|
| Dimethylformamide | 68-12-2 | 100 |

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Dimethylformamide (CAS 68-12-2)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)

Not regulated.

US state regulations**US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))**

Dimethylformamide (CAS 68-12-2)

US. Massachusetts RTK - Substance List

Dimethylformamide (CAS 68-12-2)

US. New Jersey Worker and Community Right-to-Know Act

Dimethylformamide (CAS 68-12-2)

US. Pennsylvania Worker and Community Right-to-Know Law

Dimethylformamide (CAS 68-12-2)

US. Rhode Island RTK

Dimethylformamide (CAS 68-12-2)

California Proposition 65

WARNING: This product can expose you to Dimethylformamide, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Dimethylformamide (CAS 68-12-2)

Listed: October 27, 2017

International Inventories

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|----------------------|--|------------------------|
| Australia | Australian Inventory of Industrial Chemicals (AICIS) | Yes |
| Canada | Domestic Substances List (DSL) | Yes |
| Canada | Non-Domestic Substances List (NDSL) | No |
| China | Inventory of Existing Chemical Substances in China (IECSC) | Yes |
| Europe | European Inventory of Existing Commercial Chemical Substances (EINECS) | Yes |

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|-----------------------------|---|------------------------|
| Europe | European List of Notified Chemical Substances (ELINCS) | No |
| Japan | Inventory of Existing and New Chemical Substances (ENCS) | Yes |
| Korea | Existing Chemicals List (ECL) | Yes |
| New Zealand | New Zealand Inventory | Yes |
| Philippines | Philippine Inventory of Chemicals and Chemical Substances (PICCS) | Yes |
| Taiwan | Taiwan Chemical Substance Inventory (TCSI) | Yes |
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory | Yes |

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

| | |
|----------------------|---|
| Issue date | 22-August-2018 |
| Revision date | 21-November-2025 |
| Version # | 02 |
| HMIS® ratings | Health: 2* Flammability: 3 Physical hazard: 0 |
| Disclaimer | This product is subject to Greenfield Global USA Inc.'s terms and conditions, which can be found at http://www.greenfield.com/tc-po-us/ . Greenfield cannot anticipate all conditions under which this information and this product, or the products of other manufacturers in combination with this product, may be used. The user is responsible for the proper and safe use, handling, storage and disposal of the product, and assumes liability for any loss, injury, damage or expense arising from any failure to do so. The data in this sheet is based on information and experience available at the time of writing. |