

1. Identification

Product identifier CYCLOHEXANE

Other means of identification

CAS number 110-82-7

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 2

Hazards for the product as sold

Health hazards Skin corrosion/irritation Category 2
Specific target organ toxicity, single exposure Category 3 narcotic effects
Aspiration hazard Category 1

Hazards for the product as sold

Environmental hazards Hazardous to the aquatic environment, acute hazard Category 1
Hazardous to the aquatic environment, long-term hazard Category 1

Hazards for the product as sold

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement Highly flammable liquid and vapor. May be fatal if swallowed and enters airways. Causes skin irritation. May cause drowsiness or dizziness. Very toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention 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. Wash hands thoroughly after handling. Avoid breathing mist/vapors. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. 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 skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. In case of fire: Use appropriate media to extinguish. Collect spillage.

Storage Keep cool. Store in a well-ventilated place. Keep container tightly closed. Store locked up.

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

Hazard(s) not otherwise classified (HNOC) Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire or explosion. 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 | % |
|---------------|--------------------------|------------|-----|
| Cyclohexane | | 110-82-7 | 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. Call a poison center or doctor/physician if you feel unwell.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. 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. Get medical attention if irritation develops and persists.

Ingestion Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms/effects, acute and delayed Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness or dizziness. Headache. Nausea, vomiting. Direct contact with eyes may cause temporary irritation. Skin irritation. May cause redness and pain.

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 under observation. Symptoms may be delayed.

General information Take off all contaminated clothing immediately. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Carbon dioxide (CO2). Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

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. This product is a poor conductor of electricity and can become electrostatically charged. If sufficient charge is accumulated, ignition of flammable mixtures can occur. To reduce potential for static discharge, use proper bonding and grounding procedures. This liquid may accumulate static electricity when filling properly grounded containers. Static electricity accumulation may be significantly increased by the presence of small quantities of water or other contaminants. Material will float and may ignite on surface of water. During fire, gases hazardous to health may be formed.

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. Water runoff can cause environmental damage.

Specific methods

Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards

Highly 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 breathing mist/vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Use appropriate containment to avoid environmental contamination. Transfer by mechanical means such as vacuum truck to a salvage tank or other suitable container for recovery or safe disposal. 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. The product is immiscible with water and will spread on the water surface. Prevent product from entering drains.

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. For waste disposal, see section 13 of the SDS. The product is insoluble in water.

Environmental precautions

Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Use appropriate containment to avoid environmental contamination.

7. Handling and storage

Precautions for safe handling

Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. When using do not smoke. Explosion-proof general and local exhaust ventilation. Minimize fire risks from flammable and combustible materials (including combustible dust and static accumulating liquids) or dangerous reactions with incompatible materials. Handling operations that can promote accumulation of static charges include but are not limited to: mixing, filtering, pumping at high flow rates, splash filling, creating mists or sprays, tank and container filling, tank cleaning, sampling, gauging, switch loading, vacuum truck operations. 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 breathing mist/vapors. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

For additional information on equipment bonding and grounding, refer to the Canadian Electrical Code in Canada, (CSA C22.1), or the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity" or National Fire Protection Association (NFPA) 70, "National Electrical Code".

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. Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. 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 |
|----------------------------|------|------------|
| Cyclohexane (CAS 110-82-7) | PEL | 1050 mg/m3 |
| | | 300 ppm |

US. ACGIH Threshold Limit Values (TLV)

| Material | Type | Value |
|----------------------------|------|---------|
| Cyclohexane (CAS 110-82-7) | TWA | 100 ppm |

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

| Material | Type | Value |
|----------------------------|------|----------|
| Cyclohexane (CAS 110-82-7) | IDLH | 1300 ppm |

US. NIOSH: Pocket Guide to Chemical Hazards

| Material | Type | Value |
|----------------------------|------|------------|
| Cyclohexane (CAS 110-82-7) | TWA | 1050 mg/m3 |
| | | 300 ppm |

Biological limit values

ACGIH Biological Exposure Indices (BEI)

| Material | Value | Determinant | Specimen | Sampling Time |
|----------------------------|---------|--------------------------------------|---------------------|---------------|
| Cyclohexane (CAS 110-82-7) | 50 mg/g | 1,2-Cyclohexanediol, with hydrolysis | Creatinine in urine | * |

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

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|--|---|
| 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 and safety shower. |
| 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. |
| 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 | 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 | Colorless, clear. |
| Odor | Not available. |
| Melting point/freezing point | 44.6 °F (7 °C) |
| Boiling point or initial boiling point and boiling range | 179.6 °F (82 °C) |
| Flammability | Highly flammable liquid |
| Upper/lower flammability or explosive limits | |
| Explosive limit - lower (%) | 9 |
| Explosive limit - upper (%) | 1 |
| Flash point | -4 °F (-20 °C) |
| Auto-ignition temperature | 473 °F (245 °C) |
| Decomposition temperature | Property has not been measured. |
| pH | Property has not been measured. |
| Kinematic viscosity | Property has not been measured. |
| Solubility | |
| Solubility (water) | < 1 % Insoluble |
| Partition coefficient (n-octanol/water) | Property has not been measured. |
| Vapor pressure | 102.7 hPa |
| Density and/or relative density | |
| Density | Property has not been measured. |
| Relative density | 0.779 |
| Vapor density | 2.9 |
| Particle characteristics | Not applicable, material is a liquid. |
| Other information | |
| Explosive properties | Not explosive. |
| Oxidizing properties | Not oxidizing. |

10. Stability and reactivity

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|---|--|
| 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 | May cause drowsiness or dizziness. Headache. Nausea, vomiting. Prolonged inhalation may be harmful. |
| Skin contact | Causes skin irritation. |
| Eye contact | Direct contact with eyes may cause temporary irritation. |
| Ingestion | Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia. |

| | |
|---|---|
| Symptoms related to the physical, chemical and toxicological characteristics | Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness or dizziness. Headache. Nausea, vomiting. Skin irritation. May cause redness and pain. |
|---|---|

Information on toxicological effects

Acute toxicity

| Product | Species | Test Results |
|----------------------------|---------|-----------------------|
| Cyclohexane (CAS 110-82-7) | | |
| Acute | | |
| Dermal | | |
| LD50 | Rabbit | > 2000 mg/kg |
| Inhalation | | |
| <i>Vapor</i> | | |
| LC50 | Rat | > 19.07 mg/l, 4 Hours |
| Oral | | |
| LD50 | Rat | > 5000 mg/kg |

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|----------------------------------|-------------------------|
| Skin corrosion/irritation | Causes skin irritation. |
|----------------------------------|-------------------------|

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|--|--|
| Serious eye damage/eye irritation | Direct contact with eyes may cause temporary irritation. |
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Respiratory or skin sensitization

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|----------------------------------|---|
| Respiratory sensitization | Not a respiratory sensitizer. |
| Skin sensitization | This product is not expected to cause skin sensitization. |

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| Germ cell mutagenicity | No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic. |
|-------------------------------|--|

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|------------------------|---|
| Carcinogenicity | Not classifiable as to carcinogenicity to humans. |
|------------------------|---|

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

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|------------------------------|--|
| Reproductive toxicity | This product is not expected to cause reproductive or developmental effects. |
|------------------------------|--|

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|---|---|
| Specific target organ toxicity - single exposure | May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure | Not classified. |
| Aspiration hazard | May be fatal if swallowed and enters airways. |
| Chronic effects | Prolonged inhalation may be harmful. |

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

| Product | Species | | Test Results |
|----------------------------|---------|--------------------------------|---------------------|
| Cyclohexane (CAS 110-82-7) | | | |
| Aquatic | | | |
| Acute | | | |
| Crustacea | EC50 | Daphnia magna | 0.9 mg/l, 48 hours |
| Fish | LC50 | Pimephales promelas | 4.53 mg/l, 96 hours |
| Chronic | | | |
| Algae | EC50 | Pseudokirchnerella subcapitata | 9.32 mg/l, 72 Hours |
| | NOEC | Pseudokirchnerella subcapitata | 0.94 mg/l, 72 Hours |

Persistence and degradability No data is available on the degradability of this substance.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No data available.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. 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.

US RCRA Hazardous Waste U List: Reference

Cyclohexane (CAS 110-82-7) U056

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 | UN1145 |
| UN proper shipping name | Cyclohexane (RQ = 1000 LBS) |
| Transport hazard class(es) | |
| Class | 3 |
| Subsidiary hazard | - |
| Label(s) | 3 |
| Packing group | II |
| Environmental hazards | |
| Marine pollutant | Yes |
| Special precautions for user | Read safety instructions, SDS and emergency procedures before handling. |
| Special provisions | IB2, T4, TP1 |
| Packaging exceptions | 150 |
| Packaging non bulk | 202 |

| | |
|---|---|
| Packaging bulk | 242 |
| IATA | |
| UN number | UN1145 |
| UN proper shipping name | Cyclohexane |
| Transport hazard class(es) | |
| Class | 3 |
| Subsidiary hazard | - |
| Packing group | II |
| Environmental hazards | Yes |
| ERG Code | 3H |
| Special precautions for user | Read safety instructions, SDS and emergency procedures before handling. |
| IMDG | |
| UN number | UN1145 |
| UN proper shipping name | CYCLOHEXANE |
| Transport hazard class(es) | |
| Class | 3 |
| Subsidiary hazard | - |
| Packing group | II |
| Environmental hazards | |
| Marine pollutant | Yes |
| 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) | | Cyclohexane (CAS 110-82-7) | |
| 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) Skin corrosion or irritation Specific target organ toxicity (single or repeated exposure) Aspiration hazard Hazard not otherwise classified (HNOC) | | |
| SARA 313 (TRI reporting) | | | |
| Chemical name | CAS number | % by wt. | |
| Cyclohexane | 110-82-7 | 100 | |
| Other federal regulations | | | |
| Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List | | Not regulated. | |

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

Not regulated.

Clean Water Act (CWA) Hazardous substance
Section 112(r) (40 CFR
68.130)

Safe Drinking Water Act Not regulated.
(SDWA)

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

Cyclohexane (CAS 110-82-7)

US. Massachusetts RTK - Substance List

Cyclohexane (CAS 110-82-7)

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

Cyclohexane (CAS 110-82-7)

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

Cyclohexane (CAS 110-82-7)

US. Rhode Island RTK

Cyclohexane (CAS 110-82-7)

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

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 |
| 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 | 24-August-2018 |
| Revision date | 02-January-2026 |
| Version # | 03 |
| HMIS® ratings | Health: 3 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.