01 - IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

PRODUCT NAME 1,2-DICHLOROETHANE

MANUFACTURER Qatar Vinyl Company Ltd.
P. O. Box 24440, Doha, State of Qatar

EMERGENCY TELEPHONE No. For Spill, Leak, Fire, Exposure or Accident
Call CHEMTRAC Day or Night
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: +1-703-741-5970 and +1-703-527-3887
(collect calls accepted)

02 - COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL NAME OF THE SUBSTANCE 1,2-DICHLOROETHANE

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>1,2-Dichloroethane</td>
<td>Ethylene Dichloride</td>
<td>203-458-1</td>
<td>107-06-2</td>
<td>&gt; 98.5%</td>
<td>F; R11 Xn; R20/22 Xi; R36/37/38 Carc. Cat. 2; R45</td>
<td>Flam. Liq. 2; H225 Acute Tox. 4 (Oral); H302 Acute Tox. 3 (Inhalation); H331 Skin Irrit. 2; H315 Eye Irrit. 2; H319 Carc. IB (Oral); H350 STOT SE 3; H335</td>
</tr>
</tbody>
</table>

03 - HAZARDS IDENTIFICATION

SAFETY INFORMATION : PLEASE READ THIS SHEET CAREFULLY

MOST IMPORTANT HAZARDS

HEALTH EFFECTS
May cause cancer

PHYSICAL AND CHEMICAL HAZARDS
Thermal decomposition giving toxic and corrosive products.

SPECIFIC HAZARDS / EC
Toxic
May cause cancer, 1B, H350
Inhalation ; Acute toxicity, 3, H331
Harmful if swallowed, 4, H302
Eye Irritant, 2, H319 and Skin irritant, 2, H315
Specific target organ toxicity - single exposure, 3, Respiratory tract, H335

LABEL ELEMENTS (REGULATION (EC) NO 1272/2008) IN ACCORDANCE WITH GHS

Name:
1, 2-dichloroethane; ethylene dichloride
**QVC MSDS CODE : D3.0.2-2**

**MATERIAL SAFETY DATA SHEET**

**Product:**
1,2-DICHLOROETHANE (EDC)

**MSDS No. : 001**
**Version : 05**
**Date : 12.10.17**

**Signal Word :** Danger

**Hazard Statement :**
- Highly flammable liquid and vapor.
- Harmful if swallowed.
- Toxic if inhaled.
- Causes skin irritation.
- Causes serious eye irritation.
- May cause cancer if swallowed.
- May cause respiratory irritation.

**Precautionary Statements :**

**Prevention:**
- Obtain special instructions before use.
- Keep away from open flames/hot surfaces. - No smoking.
- Avoid breathing gas/mist/vapors/spray.
- Use personal protective equipment as required.

**Response:**
- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- 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.

**Storage:**
- Store in a well-ventilated place. Keep container tightly closed.

**Special labeling:**
- Restricted to professional users.

**Other hazards :**

**Potential health effects:**
- Harmful by inhalation. Ingestion may cause irritation to mucous membranes.
- Irritating to nose, throat and respiratory system.
- Direct contact with product: Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product. Burns of the cornea possible.
- Inhalation: At high vapor/fog concentrations: Neurological disorders.
- Difficulty in breathing Stomach/intestinal disorders.
- Chronic exposure: May cause cancer.

**Environmental Effects:**
- Not readily biodegradable. Practically not bioaccumulable.

**Physical and chemical hazards:**
- Highly flammable liquid.
- Thermal decomposition giving toxic and corrosive products.
- Decomposition products: See chapter 10.

**Other:**
- Results of PBT and vPvB assessment: This substance is not considered to be persistent, bioaccumulating, toxic (PBT), nor very persistent, very bioaccumulating (vPvB).

**EMERGENCY OVERVIEW**

**04 – FIRST AID MEASURES**

**GENERAL ADVICE**
- Take off immediately all contaminated clothing (including shoes).

**INHALATION**
- Move to fresh air. Oxygen or artificial respiration. If needed, hospitalize.

**SKIN CONTACT**
- Wash immediately, abundantly and thoroughly with water.
**05 - FIRE-FIGHTING MEASURES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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<tbody>
<tr>
<td>LEL (Lower Explosive Limit)</td>
<td>6.2%</td>
</tr>
<tr>
<td>UEL (Upper Explosive Limit)</td>
<td>15.9%</td>
</tr>
<tr>
<td>Flash point (°C)</td>
<td>13 (56 °F)</td>
</tr>
<tr>
<td>Auto-Ignition Temperature (°C)</td>
<td>413 (775 °F)</td>
</tr>
<tr>
<td>Suitable Extinguishing Media</td>
<td>Carbon dioxide (CO2)</td>
</tr>
<tr>
<td></td>
<td>Foam</td>
</tr>
<tr>
<td></td>
<td>Dry powder</td>
</tr>
<tr>
<td></td>
<td>Water spray</td>
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**SPECIFIC HAZARDS**

- Highly flammable
- Vapors form explosive mixture with air.
- Thermal decomposition giving toxic and corrosive products
- At high temperature: formation of Hydrogen chloride gas
- At high temperature: formation of Phosgene

**ADVICE FOR FIREFIGHTERS**

- Specific methods: In case of fire nearby, remove exposed containers. Use water spray to cool unopened containers. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Prohibit all sources of sparks and ignition - Do not smoke.
- Special protective actions for fire-fighters: In the event of fire, wear self-contained breathing apparatus. Complete suit protecting against chemicals.

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**06 - ACCIDENTAL RELEASE MEASURES**

**PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES:**

- Use personal protective equipment. Ensure adequate ventilation. Evacuate non-essential staff and those not equipped with individual protection apparatus. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Prohibit contact with skin and eyes and inhalation of vapors. Prohibit all sources of sparks and ignition - Do not smoke.

**ENVIRONMENTAL PROTECTION**

- Do not release into the environment
- Do not let the product enter into drains
- Contain by damming

**METHODS FOR CLEANING UP**

- Recovery: Pump into an inert labeled emergency container
- Absorb the remainder with an inert absorbent material - Sand
- Disposal: Destroy the product by incineration

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**07 - HANDLING AND STORAGE**

**HANDLING**

- Technical measures/Precautions: Storage and handling precautions applicable to products:
  - TOXIC, HIGHLY FLAMMABLE, WITH VAPOURS EXPLOSIVE IN AIR
  - Ensure appropriate exhaust and ventilation at machinery
  - Provide showers, eye-baths
  - Provide self-contained breathing apparatus nearby
  - Provide water supplies near the point of use.
  - Provide fire-blanket nearby.
  - Provide electrical earthing of equipment.
Safe handling advice
Strictly limit the quantities of product in the work area to those which are absolutely necessary for the work in hand. Avoid exposure – obtain special instructions before use. Open drum carefully as content may be under pressure. Avoid splashing and emission of vapors when handling. In case of insufficient ventilation, wear suitable respiratory equipment. Take precautionary measures against static discharges. Do not use air for transfers. Do not use air to dry the equipment. Keep well away from naked flames. Use only explosion-proof equipment. In case of entry into storage areas: Well ventilate empty vats and tanks before entering.

Hygiene measures:
Take off immediately all contaminated clothing. Prohibit contact with skin and eyes and inhalation of vapors. When using do not eat, drink or smoke.
Wash hands after handling. Remove contaminated clothing and protective equipment before entering eating areas.

STORAGE
Technical measures/Storage conditions
Keep tightly closed in a dry, cool and well-ventilated place.
Keep away from heat and sources of ignition. Do not smoke
Protect from light
Store protected from moisture and heat
Provide a catch-tank in a dyke area
Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres

Incompatible products
Acids and bases
Oxygen - Oxidizing agents
Finely divided metals

PACKAGING MATERIALS
Recommended
Iron
Steel
Prohibited
Light metals and alloys in the presence of moisture, including parts of the installation in contact with the product

08 - EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE PROVISIONS
Ensure sufficient air exchange and/or exhaust in work areas. Frequently monitor and control the working atmosphere.

CONTROL PARAMETERS
Exposure limits
PEL at QVC site : 1 ppm ; STEL : 2 ppm
(based on 1989 OSHA PELs Final Rule, NIOSH RELs and QVC design specifications)
FRANCE 1993 : VME= 10 ppm
USA-ACGIH 1994 : TLV-TWA = 10 ppm = 40 mg/m3

PERSONAL PROTECTION EQUIPMENT
Respiratory protection
Low concentrations or short activity: Full mask. (Respiratory protection complying with EN 141)
High concentrations or prolonged activity: Self contained Breathing Apparatus

Hand protection
Splash contact, intermittent and prolonged PVC gloves
According to permeation index EN 374: 1 (time elapsed > 10 mins)

Eye protection
Safety glasses/goggles

Skin and body protection:
At the workplace: Combination with delayed penetration, Safety shoes Intervention at incident: Complete chemical protection suit, Complete suit, Rubber or plastic boots

Specific hygiene measures
Prohibit contact with skin and eyes and inhalation of vapors
Do not smoke
09 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE (20°C) Liquid
COLOUR Colorless to yellow
ODOUR Chloroform (approximately)

pH : No data available

BOILING POINT/RANGE 83.6 °C
MELTING POINT/RANGE -36 °C
DECOMPOSITION TEMPERATURE 300 °C
FLASH POINT Closed cup: 13 °C. (DIN 51755 Part 1)
AUTOIGNITION TEMPERATURE 440 °C

EXPLOSIVE LIMITS
Lower 6.2% in volume
Higher 15.9% in volume

VAPOUR PRESSURE 102.47 hPa, at 25 °C
VAPOUR DENSITY (20°C) : 4.1 kg/m³
DENSITY Liquid (20°C) : 1253 kg/m³
RELATIVE DENSITY (water=1) 1.2455 at 20 °C

SOLUBILITY
Water 7.9 g/l at 25 °C

VISCOSITY, Dynamic 0.829 mPa.s (cP), at 20 °C
0.775 mPa.s (cP), at 25 °C

EXPLOSIVE PROPERTIES Not relevant (due to the chemical structure)

OXIDIZING PROPERTIES Not relevant (due to the chemical structure)

Solvents Soluble in:
Alcohols
Acetone
Ethyl Ether
Carbon Tetrachloride
Aromatic Hydrocarbons

PARTITION COEFFICIENT (n-octanol/water) log Kow : 1.45 , at 20 °C (OECD Guideline 117)

OTHER DATA
Product sensitive to light
Water solubility : 7.9 g/l at 25 °C
Olfactory threshold : 10-400 mg/m³
Henry’s constant : 97.7 Pa.m³/mol
Surface tension : 32.45 mN/m at 20 °C ; 31.75 mN/m at 25 °C
Molecular Weight: 98.96 g/mol

10 - STABILITY AND REACTIVITY

REACTIVITY AND CHEMICAL STABILITY Stable under recommended storage conditions.

CONDITIONS TO AVOID Heat, flames and sparks
Protect from light
Store protected from moisture and heat

MATERIALS TO AVOID Acids and bases
Oxygen - Oxidizing agents ; possible formation of : Explosive compounds or those sensitive to impact
Finely divided metals
Aluminum - Magnesium - Zinc - Titanium
Risk of : Explosive reaction

THERMAL DECOMPOSITION 300°C

HAZARDOUS DECOMPOSITION PRODUCTS At high temperature:
Thermal decomposition giving toxic and corrosive products ; Hydrogen chloride gas, Phosgene
11 - TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Inhalation

- in man: Harmful by inhalation. Effects of breathing high concentrations of vapor may include:
  - Neurological disorders, Stomach/intestinal disorders, Difficulty in breathing, Risk of pulmonary edema, Possible hepato-renal (liver & kidney) problems, Risk of mortality
  - LC50/4 h/rat: 7.8 mg/l

- in animals:

Ingestion

- in man: Harmful if swallowed. Ingestion may cause irritation to mucous membranes.
  - Stomach/intestinal disorders, Neurological disorders, Difficulty in breathing, Possible hepato-renal (liver & kidney) problems, Risk of pulmonary edema, Risk of mortality
  - LD50/rat: 413 mg/kg

- in animal

Skin-contact

- in man: Slightly harmful in contact with skin. Skin penetration is possible
  - LD50/rabbit: 4.890 mg/kg

LOCAL EFFECTS (Corrosion / Irritation / Serious eye damage):

Skin-contact

- Irritating to skin.
  - In man: Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing Properties of the product. (Direct contact with product)
  - In animals: Skin irritation (rabbit)

Eye-contact

- Irritating to eyes.
  - In man: Possible irritation of eyes, Burns of the cornea possible (Direct contact with product)
  - In animals: Eye irritation (rabbit)

Respiratory or skin sensitization:

Inhalation:

No data is available

Skin contact:

Not a skin sensitizer
  - In animals: Not a skin sensitizer (Method: OECD Test Guideline 406 LLNA: Local Lymph Node Assay, guinea pig)

CMR EFFECTS

Mutagenicity:

Several in vivo and in vitro tests indicate potential genotoxicity

In vitro
  - Ames test in vitro: Inconclusive results
  - Chromosome aberration test in vitro: Inconclusive results
  - In vitro gene mutations test on mammalian cells: positive

In vivo
  - Micronucleus test in vivo mouse: negative
  - Sister chromatid exchange assay: positive

Carcinogenicity:

Possible cancer hazard
  - According to limited available data in animals:
  - At high dose:
    - Several localized tumors. (rat, mouse, Different methods of administration)
Reproductive toxicity:

Fertility:
According to limited available data in animals:
Absence of toxic effects on fertility
NOAEL: 50 mg/kg bw/d (By oral route)
NOAEL: 617 mg/m³ (By inhalation)

Foetal development:
According to available experimental data:
Absence of congenital malformations and embryotoxic effects in rodents at non-toxic doses for the mothers
NOAEL: 158 mg/kg bw/d (By oral route)
NOAEL: 1200 mg/m³ (By inhalation)

SPECIFIC TARGET ORGAN TOXICITY

Single Exposure:

Inhalation: Irritating to nose, throat and respiratory system
Olfactory threshold: 3 - 100 ppm

Repeated exposure:
• In man:
  Oral / Inhalation: Nervous problems, Liver disorders, Kidney disorders, Stomach/intestinal disorders
• In animals:
  By inhalation: NOAEL= 41.1 mg/m³ (mouse, Several years)
  By oral route: NOAEL= 37.5 mg/kg (rat, several months)

12 - ECOLOGICAL INFORMATION

MOBILITY
Rapid evaporation: t½ life = 3.8 h (calculated)

Distribution among environmental compartments:
Water: 4.85 %
Air: 95.0 %
(Method: Calculation according Mackay, Level I)

Henry constant: 97.7E+00 Pa.m³/mol
Surface tension: 32.45 mN/m 20 °C; 31.75 mN/m 25 °C

Absorption / desorption: In soils and sediments: Slight adsorption, log Koc: 1.5 - 1.6, Koc: 33 (Method: calculated)

PERSISTENCE/DEGRADABILITY

Biodegradation (In water): Not readily biodegradable.
Photodegradation (In air):
Degradation by radicals OH: Overall half-life time: 42 - 73 d

BIOACCUMULATION
Practically not bioaccumulable
Bioconcentration factor (BCF): 2 (21 d, Method: OECD Guideline 305, Lepomis macrochirus (Bluegill sunfish))

ECOTOXICITY

AQUATIC TOXICITY
QVC MSDS CODE : D3.0.2-2

MATERIAL SAFETY DATA SHEET

1,2-DICHLOROETHANE (EDC)

Acute toxicity
Fish: Slightly harmful to fish
LC50, 96 h (Pimephales promelas (fathead minnow)) : 136 mg/l (Method: OECD Guideline 203)

Aquatic invertebrates: Slightly harmful to daphnia
EC(l)50, 48 h (Daphnia magna (Water flea)) : 155 mg/l (Method: OECD Test Guideline 202)

Aquatic plants: Slightly harmful to algae
ECb50, 72 h (Selenastrum capricornutum) : 166 mg/l (Method: OECD Test Guideline 201, test of inhibition of growth)

Microorganisms:
EC50, 3 h (Activated sludge) : 2.780 mg/l (Method: OECD Guideline 209, Respiration inhibition)

Long term toxicity
Fish:
NOEC, 32 d (Pimephales promelas (fathead minnow)) : 29 - 59 mg/l

Aquatic invertebrates:
EC0, 28 d (Daphnia) : 10,7 mg/l (Reproduction inhibition)

NON AQUATIC TOXICITY
Acute toxicity
LC50, 48 h (Eisenia fetida (earthworms)) : 0,060 mg/cm² (Method: contact test)

RESULTS OF PBT AND VPVB ASSESSMENT : This substance is not considered to be persistent, bioaccumulating, toxic (PBT), nor very persistent, very bioaccumulating (vPvB).

13 - DISPOSAL CONSIDERATIONS

DISPOSAL OF PRODUCT

Waste treatment:
Disposal of product: Do not dispose of waste into sewer. Dispose of in accordance with local regulations.

Disposal of packaging: Do not release into the environment.

14 - TRANSPORT INFORMATION

UN Number 1184
PROPER SHIPPING NAME ETHYLENE DICHLORIDE

ADR Class : 3 ; Label : 3 (6.1) ; PG : II ; environmentally hazardous : no
RID Class : 3 ; Label : 3 (6.1) ; PG : II ; environmentally hazardous : no
IMDG Class : 3 ; Label : 3 (6.1) ; PG : II ; environmentally hazardous : no; EmS Number: F-E, S-D
IATA (Cargo or Passenger) Class : 3 ; Label : 3 (6.1) ; PG : II ; environmentally hazardous : no

15 - REGULATORY INFORMATION

SAFETY DATA SHEETS According to Regulation (EC) No. 1907/2006
EC CLASSIFICATION / LABELLING (EC) No 1272/2008 (GHS)
Additional regulations (European Union) EU. Regulation EC No. 689/2008, concerning the export and import of dangerous chemicals
Regulation EC N°1907/2006, (REACH Regulation), Annex XVII, entry 28
LISTED IN
Hazardous Waste Regulation 2005
Young workers 94/33/EC Banned and/or restricted.
Pregnant workers 92/85/EEC Banned and/or restricted.
Major Accident Hazard Legislation, Highly flammable.

HAZARDOUS SUBSTANCES
F_Highly flammable
T_TOXIC
R45_May cause cancer
R11_Highly flammable
R22_Harmful if swallowed
R36/37/38_Irritating to eyes, respiratory system and skin
S53_Avoid exposure - obtain special instructions before use
S45_In case of accident or if you feel unwell, seek medical advice immediately (show the label when possible)
Restricted to professional users

INVENTORIES
EINECS: Conforms to
TSCA (USA): Conforms to
DSL (Canada): All components of this product are on the Canadian DSL list.
ENCS (Japan): Conforms to
AICS (Australia): Conforms to
KECI (KR): Conforms to
PICCS (PH): Conforms to
IECSC (CN): Conforms to
NZIOC: Does not conform

16 - OTHER INFORMATION
Full text of R, H, EUH-phrases referred to under sections 2 and 3
R11_Highly flammable.
R20/22_Harmful by inhalation and if swallowed.
R36/37/38_Irritating to eyes, respiratory system and skin.
R45_May cause cancer.
H225_Highly flammable liquid and vapor.
H302_Harmful if swallowed.
H315_Causes skin irritation.
H319_Causes serious eye irritation.
H331_Toxic if inhaled.
H335_May cause respiratory irritation.
H350_May cause cancer if swallowed.

RECOMMENDED USES
Restricted to professional users
Organic synthesis
Stripping: Paints and varnishes, Inks
Degreasing: Metals
Extraction agent (solvent)

BIBLIOGRAPHY REFERENCES
Fiche toxicologique INRS: No 54: 1,2-DICHLOROETHANE

FURTHER INFORMATION
Restricted to professional users.

THESAURUS:
NOAEL: No Observed Adverse Effect Level (NOAEL)
LOAEL: Lowest Observed Adverse Effect Level (LOAEL)
bw: Body weight
food: Oral feed
dw: Dry weight
This information applies to the PRODUCT AS SUCH and conforming to specifications of QVC. In case of formulations or mixtures, it is necessary to ascertain that a new danger will not appear. The information contained is based on our knowledge of the product, at the date of publishing and it is given quite sincerely. However the revision of some data is in progress. Users are advised of possible additional hazards when the product is used in applications for which it was not intended. This sheet shall only be used and reproduced for prevention and security purposes. The references to legislative, regulatory and codes of practice documents cannot be considered as exhaustive. It is the responsibility of the person receiving the product to refer to the totality of the official documents concerning the use, the possession and the handling of the product. It is also the responsibility of the handlers of the product to pass on to any subsequent persons who will come into contact with the product (usage, storage, cleaning of containers, other processes) the totality of the information contained within this safety data sheet and necessary for safety at work, the protection of health and the protection of environment.