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

PRODUCT NAME: VINYL CHLORIDE MONOMER

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: VINYL CHLORIDE MONOMER (VCM)

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Synonyms</th>
<th>EC-No.</th>
<th>CAS-No.</th>
<th>Concentration</th>
<th>Classification Directive</th>
<th>Classification Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinyl Chloride Monomer</td>
<td>Chloroethylene</td>
<td>200-831-0</td>
<td>75-01-4</td>
<td>&gt; 99.9%</td>
<td>F+; R12 Carc. Cat. 1; R45</td>
<td>Flam. Gas 1; H220 Press. Gas LG; H280 Carc. IA; H350</td>
</tr>
</tbody>
</table>

03 - HAZARDS IDENTIFICATION

MOST IMPORTANT HAZARDS

SAFETY INFORMATION: PLEASE READ THIS SHEET CAREFULLY

HEALTH EFFECTS
Toxic; May cause cancer; Carcinogenicity, 1A, H350

PHYSICAL AND CHEMICAL HAZARDS
Extremely flammable, 1, H220
Gases under pressure, LG, H280
Thermal decomposition giving toxic and corrosive products

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

Name: Vinyl Chloride Monomer

Hazard pictograms:  

Signal word: Danger

Hazard statements: Extremely Flammable Gas
Contains gas under pressure, may explode if heated (Liquefied Gas, LG)
May cause cancer

Precautionary statements:
**Prevention:** Do not handle until all safety precautions have been read and understood. Keep away from open flames/hot surfaces. - No smoking.
Use personal protective equipment as required.

**Response:** Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
IF exposed or concerned: Get medical advice/attention.

**Storage:** Protect from sunlight. Store in a well-ventilated place.
Restricted to professional users.

**OTHER HAZARDS**

**Potential health effects:**
- Ejection of liquefied gas: frostbite possible
- Overall genotoxic
- At high vapor/fog concentrations: headache Vertigo Drowsiness

**Environmental effects:**
- Not readily biodegradable. Slightly bioaccumulable.

**Others:**
- 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**
- Colorless gas: pleasant ethereal odor. Compressed gas can cause frostbite. Toxic.
- Other Acute Effects: CNS depression. Chronic Effects: reproductive effects, skin/blood changes, arthralgias, bone effects (hand), vascular disorder (finger/toes). Cancer Hazard. Flammable

**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
- Keep under neurological and hepatic surveillance

**SKIN CONTACT**
- Wash immediately and abundantly with water
- Frostbite: treat as thermal burns

**EYE CONTACT**
- Wash immediately and abundantly with water for at least 15 minutes
- If irritation persists, consult an ophthalmologist

**PROTECTION OF FIRST-AIDERS**
- In case of insufficient ventilation, wear suitable respiratory equipment

**INFORMATION FOR DOCTORS**
- Do not administer catecholamine because of the cardiac effect caused by the product

**05 - FIRE-FIGHTING MEASURES**

**EXPLOSIVE LIMITS (vol. % in air)**
- LEL: 3.6 % v/v ; UEL: 33 % v/v

**FLASH POINT**
- -78 °C (-108.4 °F)

**AUTO - IGNITION TEMPERATURE**
- 472 °C (882 °F)

**SUITSABLE EXTINGUISHING MEDIA**
- Foam; Dry powder; Carbon dioxide (CO2)

**UNSUITABLE EXTINGUISHING MEDIA**
- Water

**SPECIFIC HAZARDS**
- Extremely flammable liquefied gas.
- Vapors are heavier than air and may spread along floors.
- A large amount of heat can be generated when monomers are exposed to a fire.

**SPECIFIC METHODS**
- Prohibit all sources of sparks and ignition - Do not smoke
- 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.
SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear a self-contained breathing apparatus and protective suit.

06 - ACCIDENTAL RELEASE MEASURES

PERSONAL PROTECTION
Evacuate personnel to safe areas. If safe to do so, plug or seal off leak
In case of leak, wear a self-contained breathing apparatus
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
Restrict evaporation of the product by using foam
Contain by damming

METHODS FOR CLEANING UP
Recovery
Pump into an inert labeled emergency container (if possible)

07 - HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING
Technical measures/Precautions
Storage and handling precautions applicable to products:
LIQUEFIED GAS, EXTREMELY FLAMMABLE, TOXIC WITH VAPOURS
EXPLOSIVE IN AIR
Ensure appropriate exhaust and ventilation at machinery
Provide showers, eye-baths
Provide fire blanket nearby
Provide self-contained breathing apparatus nearby

Safe handling advice
Avoid exposure – obtain special instructions before use.
Take precautionary measures against static charges
Keep well away from naked flames
Use only explosion-proofed equipment
Use product only in a closed system
Prohibit sources of sparks and ignition - Do not smoke

Hygiene measures
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 away from heat and sources of ignition.
Do not smoke. Protect from heat.
Store under vinyl chloride monomer atmosphere. (1050 hPa(mbar) approximately)
Store between -16°C to -14°C (approximately)
Store in chilled steel containers.
Provide a catch-tank in a dyke area
Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres

Incompatible products
Oxidizing agents

PACKAGING MATERIALS
Recommended
Ordinary steel, Stainless steel
To be avoided
Aluminum, Copper and Copper alloys

08 - EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE PROVISIONS
Ensure sufficient air exchange and/or exhaust in work areas

CONTROL PARAMETERS
Exposure limits
PEL at QVC Site: 1 ppm for 8 hours (1991 OSHA PELs)
OSHA Ceiling: 5 ppm
Class C1 (confirmed human carcinogenic)
QVC MSDS CODE : V3.0.2-1

MATERIAL SAFETY DATA SHEET – MSDS

VINYL CHLORIDE MONOMER

ACGIH (US) TWA: 1ppm (2007)
EU OEL III TWA: 3ppm; 7.77 mg/m³ (08 2007)

Acute Toxicity: Vapor inhalation causes varying degrees of Central Nervous System depression with noticeable anesthetic effects at levels of 1% (10,000ppm)

PERSONAL PROTECTION EQUIPMENT

Respiratory protection
Low concentration or short term activity: Full mask;
High concentration or prolonged activity: Self contained breathing apparatus

Hand protection
Intermittent contact: PVC or other plastic material gloves, VITON is best selection
Prolonged contact: Fluorinated rubber

Eye/face protection
Safety glasses / face shield

Skin and body protection
At work place: Acid resistant clothing, Heavy duty work shoes
Intervention at incident: Complete chemical protection suits

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) gaseous
FORM Liquefied gas
COLOUR colorless
ODOUR ether-like
OLFACtorY THRESHOLD 3,000ppm
BOILING POINT/RANGE -14 °C
MELTING POINT/RANGE -153.7 °C
FLASH POINT Closed cup : -78 °C
AUTOIGNITION TEMPERATURE 472 °C
EXPLOSIVE LIMITS
Lower 3.6% v/v
Higher 33% v/v
VAPOUR PRESSURE
(0°C) : 1750 hPa (mbar)
(20°C) : 3400 hPa (mbar)
(48°C) : 7600 hPa (mbar)
VAPOUR DENSITY
(15°C), (2900 hPa) : 8 kg/m³
DENSITY
liquid :
(20°C) : 910 kg/m³
(-14°C) : 970 kg/m³
SOLUBILITY
Water 9.15 g/l @ 20.5°C
Solvents Soluble in most organic solvents
PARTITION COEFFICIENT (n-octanol/water) log Kow = 1.58 @ 22°C
OTHER DATA
Relative vapor density/air : 2.15
Refractive index (20°C) : 1.37
Critical temperature: Tc=156°C
Critical pressure: Pc = 55900 hPa
Henry’s constant : 2.82E+03 Pa.m³/mole @ 24.8°C
Viscosity (20°C) : 0.0011 mPa.s

10 - STABILITY AND REACTIVITY

REACTIVITY & CHEMICAL STABILITY
Stable under recommended storage condition.
Presence of a polymerization inhibitor (Inhibitor: p-Methoxyphenol (Hydroquinone monomethyl Ether))

CONDITIONS TO AVOID
Keep away from heat and sources of ignition

MATERIALS TO AVOID
Oxidizing agents (risk of exothermic polymerization)

HAZARDOUS DECOMPOSITION PRODUCTS
Thermal decomposition giving toxic and corrosive products:
Hydrogen chloride gas
11 - TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Inhalation
Effects of breathing high concentrations of vapor may include:
- Headache, sleepiness
- Dizziness

As with other volatile aliphatic halogenated compounds, through vapor accumulation and/or inhalation of large quantities, the product can cause:
- Loss of consciousness and cardiac disorders aggravated by stress and lack of oxygen: risk of mortality

Reported in animals:
- Slightly harmful by inhalation.

LC50/2h/rat = 390 mg/l.

Ingestion
Reported in animals:
- Harmful if swallowed

LD50/oral/rat = 500 mg/kg

LOCAL EFFECTS

- Inhalation
  - Vapor at high concentrations:
  - Irritating to respiratory system

- Skin-contact
  - Ejection of liquefied gas:
    - Frostbite possible

- Eye-contact
  - Ejection of liquefied gas:
    - Superficial lesion of cornea
    - Effect reversible within a few days

CMR EFFECT

Mutagenicity
According to available experimental data: **Overall genotoxic**

- In Vitro
  - Ames test: positive; In vitro gene mutations test on mammalian cells: positive
  - In Vivo
    - Micronucleus test: positive; Test for chromosome in vivo in germ cells: negative; Chromosome aberration test in vivo: Overall genotoxic

Carcinogenicity

**Known human carcinogen**

- Effects related to past significant exposures, Target organs: angiosarcoma of the liver, other localized tumours not confirmed

In animal:
- Target organs: Several localized tumours. (various animal species, 1 year, By inhalation) (0.13 mg/l)
- Target organs: Several localized tumours. (rat, lifetime, dietary administration) (1.7 mg/kg of body weight)

Reproductive toxicity

- Fertility: According to the available experimental data: Absence of toxic effects on
- Foetal development: Absence of toxic effects for foetal development (at non toxic concentration for the mothers)

Specific target organ toxicity

Single exposure

- Inhalation:
  - Irritating to respiratory system

Repeated exposure:

- The substance or mixture is not classified as specific target organ toxicant, repeated exposure.
<table>
<thead>
<tr>
<th>12 - ECOLOGICAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOBILITY</td>
</tr>
<tr>
<td>Evaporation : t½ life = 0.8 h</td>
</tr>
<tr>
<td>PERSISTENCE/DEGRADABILITY</td>
</tr>
<tr>
<td>Not hydrolysable</td>
</tr>
<tr>
<td>In water</td>
</tr>
<tr>
<td>Not readily biodegradable: 100% after 108 d (Method: simulation study).</td>
</tr>
<tr>
<td>Biodegradable under anaerobic conditions: 98% after 70 d (Method: simulation study).</td>
</tr>
<tr>
<td>In air</td>
</tr>
<tr>
<td>Degradation by OH radicals : t½ life = 1.5 d (calculated)</td>
</tr>
<tr>
<td>In soils and sediments</td>
</tr>
<tr>
<td>Slight adsorption : ( \log K_{oc} = 1.4 )</td>
</tr>
<tr>
<td>BIOACCUMULATION</td>
</tr>
<tr>
<td>Low potential to bioaccumulate : ( \log K_{ow} = 1.58 @ 22^\circ C ) (Method OECD guideline 107)</td>
</tr>
<tr>
<td>ECOTOXICITY</td>
</tr>
<tr>
<td>AQUATIC TOXICITY</td>
</tr>
<tr>
<td>Acute toxicity (*)</td>
</tr>
<tr>
<td>Practically not harmful to fish : ( LC_{50} , 48 ) h (Leuciscus idus melanotus) = 356 mg/l</td>
</tr>
<tr>
<td>Bacteria under anaerobic conditions : toxicity threshold, ( IC_{50} , 3.5 ) d = 40 mg/l</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13 - DISPOSAL CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISPOSAL OF PRODUCT</td>
</tr>
<tr>
<td>If recycling is not possible, dispose of in compliance with local regulations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14 - TRANSPORT INFORMATION</th>
</tr>
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<tbody>
<tr>
<td>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</td>
</tr>
<tr>
<td>UN Number</td>
</tr>
<tr>
<td>1086</td>
</tr>
<tr>
<td>PROPER SHIPPING NAME</td>
</tr>
<tr>
<td>Vinyl Chloride, Stabilized</td>
</tr>
</tbody>
</table>

| LABEL                          |
| NA (IGC)                      |
| Ship type:                     |
| NA (IGC)                      |
| Pollution Category            |
| NA (IGC)                      |
| ADR                            |
| Class : 2; Label: 2.1; Environmentally hazardous: No |
| ADNR                           |
| Class : 2; Label: 2.1+INST; Environmentally hazardous: No |
| RID                            |
| Class : 2; Label: 2.1; Environmentally hazardous: No |
| IMDG                           |
| Class : 2.1; Label : 2.1 ; Environmentally hazardous: No; EmS Number: F-D, S-U |
| IATA                           |
| Not permitted for transport    |

<table>
<thead>
<tr>
<th>15 - REGULATORY INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY DATA SHEETS</td>
</tr>
<tr>
<td>EC CLASSIFICATION / LABELLING</td>
</tr>
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<td>(EC) No 1272/2008 (GHS)</td>
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**QVC MSDS CODE : V3.0.2-1**

**MATERIAL SAFETY DATA SHEET – MSDS**

**VINYL CHLORIDE MONOMER**

<table>
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<th>Product:</th>
<th>Vinyl Chloride Monomer</th>
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<tbody>
<tr>
<td>SDS No. :</td>
<td>003</td>
</tr>
<tr>
<td>Version :</td>
<td>05</td>
</tr>
<tr>
<td>Date :</td>
<td>12-10-2017</td>
</tr>
</tbody>
</table>

**LISTED IN**

- EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC), Number 2
- EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC), Number 28
- UK REGULATION Chip3: Chemical (Hazard Information and Packaging for Supply) Regulations 2002
- UK Regulation Safety Data Sheet Supply
- Chip3: Chemical (Hazard Information and Packaging for Supply) Regulations 2002
- Major Accident Hazard Legislation Extremely flammable 8
- UK Regulation Safety Data Sheet Supply
- Chip3: Chemical (Hazard Information and Packaging for Supply) Regulations 2002

**Nr in ANNEX**

- 602-023-00-7
- 200-864-0

**EC Nr (EINECS)**

- EINECS (EU) : Conforms to
- TSCA (USA) : Conforms to
- DSL (Canada) : All component of this product are on the Canadian DSL list
- NZIOC : Conforms to
- ENCS (JP) : Conforms to
- KECI (KR) : Conforms to
- AICS: Conforms to
- PICCS (PH) : Conforms to
- IECS(CN): Conforms to

**INVENTORIES**

- ENCS (JP) : Conforms to
- KECI (KR) : Conforms to
- AICS: Conforms to
- PICCS (PH) : Conforms to
- IECS(CN): Conforms to

**Safety, health and environment regulations/legislation specific for the substance of mixture**

- Additional regulations ( European Union ) :
  - Hazardous Waste Regulations 2005 Applies
  - Young workers 94/33/EC Banned and/or restricted
  - Pregnant workers 92/85/EEC Banned and/or restricted

**16 - OTHER INFORMATION**

**Full text of R, H, EUH-phrases referred to under sections 2 and 3**

- **R12** Extremely flammable.
- **R45** May cause cancer.
- **H220** Extremely flammable gas.
- **H280** Contains gas under pressure; may explode if heated.
- **H350** May cause cancer.

**FURTHER INFORMATION**

- THIS PRODUCT MUST BE HANDLED ONLY BY PERSONNEL WELL INFORMED OF SAFETY CONDITIONS WHEN USED IN FORMULATIONS, CONTACT US FOR LABELLING.

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.