

## 1 Identification

**· Product identifier****· Trade name:** Virent BioForm™ Bz Benzene**· CAS Number:**

71-43-2

**· EC number:**

200-753-7

**· Index number:**

601-020-00-8

**· Relevant identified uses of the substance or mixture and uses advised against**

No further relevant information available.

**· Application of the substance / the mixture**

This material is only to be used for research and development, under the direct supervision of a technically qualified person. The toxicological properties have not been thoroughly investigated.

**· Details of the supplier of the safety data sheet****· Manufacturer/Supplier:**

Virent, Inc.

3571 Anderson Street

Madison, WI USA 53704

**· Information department:** Product safety department: [dave\\_runnels@virent.com](mailto:dave_runnels@virent.com)**· Emergency telephone number:**

For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident, Call CHEMTREC (Day or Night)

CHEMTREC: NORTH AMERICA: 800-424-9300

CHEMTREC: INTERNATIONAL: CALL 703-527-3887 (collect calls accepted)

## 2 Hazard(s) identification

**· Classification of the substance or mixture**

GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.



GHS08 Health hazard

Muta. 1B H340 May cause genetic defects.

Carc. 1A H350 May cause cancer.

STOT RE 1 H372 Causes damage to the blood through prolonged or repeated exposure. Route of exposure:  
Oral, Inhalative, Dermal.

Asp. Tox. 1 H304 May be fatal if swallowed and enters airways.



GHS07

Skin Irrit. 2 H315 Causes skin irritation.

Eye Irrit. 2A H319 Causes serious eye irritation.

**· Label elements****· GHS label elements**

The substance is classified and labeled according to the Globally Harmonized System (GHS).

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**Trade name: Virent BioForm™ Bz Benzene**

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· **Hazard pictograms**



GHS02    GHS07    GHS08

· **Signal word** *Danger*

· **Hazard-determining components of labeling:**

*benzene*

· **Hazard statements**

*H225 Highly flammable liquid and vapor.*

*H315 Causes skin irritation.*

*H319 Causes serious eye irritation.*

*H340 May cause genetic defects.*

*H350 May cause cancer.*

*H372 Causes damage to the blood through prolonged or repeated exposure. Route of exposure: Oral, Inhalative, Dermal.*

*H304 May be fatal if swallowed and enters airways.*

· **Precautionary statements**

*P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.*

*P241 Use explosion-proof electrical/ventilating/lighting/equipment.*

*P260 Do not breathe dust/fume/gas/mist/vapors/spray.*

*P280 Wear protective gloves / eye protection / face protection.*

*P280 Wear protective gloves.*

*P280 Wear protective gloves / protective clothing.*

*P280 Wear eye protection / face protection.*

*P240 Ground/bond container and receiving equipment.*

*P233 Keep container tightly closed.*

*P242 Use only non-sparking tools.*

*P243 Take precautionary measures against static discharge.*

*P264 Wash thoroughly after handling.*

*P270 Do not eat, drink or smoke when using this product.*

*P201 Obtain special instructions before use.*

*P202 Do not handle until all safety precautions have been read and understood.*

*P301+P310 If swallowed: Immediately call a poison center/doctor.*

*P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.*

*P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*

*P321 Specific treatment (see on this label).*

*P308+P313 IF exposed or concerned: Get medical advice/attention.*

*P332+P313 If skin irritation occurs: Get medical advice/attention.*

*P337+P313 If eye irritation persists: Get medical advice/attention.*

*P314 Get medical advice/attention if you feel unwell.*

*P331 Do NOT induce vomiting.*

*P370+P378 In case of fire: Use for extinction: CO2, powder or water spray.*

*P362+P364 Take off contaminated clothing and wash it before reuse.*

*P405 Store locked up.*

*P403+P235 Store in a well-ventilated place. Keep cool.*

*P501 Dispose of contents/container in accordance with local/regional/national/international regulations.*

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Trade name: Virent BioForm™ Bz Benzene

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- **Classification system:**
- **NFPA ratings (scale 0 - 4)**



- **HMIS-ratings (scale 0 - 4)**

HEALTH	2	Health = 2
FIRE	3	Fire = 3
REACTIVITY	0	Reactivity = 0

- **Hazards Not Otherwise Classified** May cause leukemia (AML - acute myelogenous leukaemia)
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.

### 3 Composition/information on ingredients

- **Chemical characterization: Substances**
- **CAS No. Description**  
71-43-2 benzene
- **Identification number(s)**
- **EC number:** 200-753-7
- **Index number:** 601-020-00-8

### 4 First-aid measures

- **Description of first aid measures**
- **General information:**  
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
- **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:**  
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- **After swallowing:** If symptoms persist consult doctor.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**  
No further relevant information available.

### 5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:** CO<sub>2</sub>, sand, extinguishing powder. Do not use water.
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture** No further relevant information available.

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- **Advice for firefighters**
- **Protective equipment:** No special measures required.

## 6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**  
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**  
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).  
Dispose contaminated material as waste according to item 13.  
Ensure adequate ventilation.  
Do not flush with water or aqueous cleansing agents
- **Reference to other sections**  
See Section 7 for information on safe handling.  
See Section 8 for information on personal protection equipment.  
See Section 13 for disposal information.

## 7 Handling and storage

- **Handling:**
- **Precautions for safe handling**  
Ensure good ventilation/exhaustion at the workplace.  
Open and handle receptacle with care.  
Prevent formation of aerosols.
- **Information about protection against explosions and fires:**  
Keep ignition sources away - Do not smoke.  
Protect from heat.  
Protect against electrostatic charges.  
Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** Store in a cool location.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:**  
Keep receptacle tightly sealed.  
Store in cool, dry conditions in well sealed receptacles.  
Protect from heat and direct sunlight.
- **Specific end use(s)** No further relevant information available.

## 8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.

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· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**

**71-43-2 benzene (50-100%)**

PEL	Short-term value: 15* mg/m <sup>3</sup> , 5* ppm Long-term value: 3* mg/m <sup>3</sup> , 1* ppm *table Z-2 for exclusions in 29CFR1910.1028(d)
REL	Short-term value: 1 ppm Long-term value: 0.1 ppm See Pocket Guide App. A
TLV	Short-term value: 8 mg/m <sup>3</sup> , 2.5 ppm Long-term value: 1.6 mg/m <sup>3</sup> , 0.5 ppm Skin; BEI

· **Ingredients with biological limit values:**

**71-43-2 benzene (50-100%)**

BEI	25 µg/g creatinine Medium: urine Time: end of shift Parameter: S-Phenylmercapturic acid (background)
	500 µg/g creatinine Medium: urine Time: end of shift Parameter: t,t-Muconic acid (background)

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**

· **Personal protective equipment:**

· **General protective and hygienic measures:**

- Keep away from foodstuffs, beverages and feed.
- Immediately remove all soiled and contaminated clothing.
- Wash hands before breaks and at the end of work.
- Store protective clothing separately.
- Avoid contact with the eyes and skin.

· **Breathing equipment:**

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

· **Protection of hands:**



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.  
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.  
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· **Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

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· **Eye protection:**



Tightly sealed goggles

## 9 Physical and chemical properties

· **Information on basic physical and chemical properties**

· **General Information**

· **Appearance:**

<b>Form:</b>	Liquid
<b>Color:</b>	Colorless to yellow
· <b>Odor:</b>	Characteristic
· <b>Odour threshold:</b>	Not determined.

· **pH-value:** Not determined.

· **Change in condition**

<b>Melting point/Melting range:</b>	6 °C (43 °F)
<b>Boiling point/Boiling range:</b>	80 °C (176 °F)

· **Flash point:** -11 °C (12 °F)

· **Flammability (solid, gaseous):** Not applicable.

· **Ignition temperature:** 555 °C (1031 °F)

· **Decomposition temperature:** Not determined.

· **Auto igniting:** Not determined.

· **Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

· **Explosion limits:**

<b>Lower:</b>	1.2 Vol %
<b>Upper:</b>	8 Vol %

· **Vapor pressure at 20 °C (68 °F):** 100 hPa (75 mm Hg)

· **Density at 20 °C (68 °F):** 0.87912 g/cm<sup>3</sup> (7.336 lbs/gal)

· **Relative density** Not determined.

· **Vapour density** Not determined.

· **Evaporation rate** Not determined.

· **Solubility in / Miscibility with**

**Water at 20 °C (68 °F):** 0.7 g/l

· **Partition coefficient (n-octanol/water):** Not determined.

· **Viscosity:**

<b>Dynamic at 20 °C (68 °F):</b>	0.66 mPas
<b>Kinematic:</b>	Not determined.

· **Solvent content:**

<b>Organic solvents:</b>	100.0 %
	Not tested

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**VOC content:** 100.0 %  
879.1 g/l / 7.34 lb/gl

· **Other information** No further relevant information available.

## 10 Stability and reactivity

- **Reactivity**
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

## 11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

- **LD/LC50 values that are relevant for classification:**

### 71-43-2 benzene

Oral	LD50	4894 mg/kg (rat)
Dermal	LD50	48 mg/kg (mouse)
Inhalative	LC50/4 h	9980 mg/l (mouse)

- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**

- **Carcinogenic categories**

- **IARC (International Agency for Research on Cancer)**

71-43-2	benzene	1
108-88-3	toluene	3
123-91-1	1,4-dioxane	2B
100-41-4	ethylbenzene	2B

- **NTP (National Toxicology Program)**

71-43-2	benzene	K
123-91-1	1,4-dioxane	R

- **OSHA-Ca (Occupational Safety & Health Administration)**

71-43-2	benzene	
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## 12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.

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- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**  
Water hazard class 3 (Assessment by list): extremely hazardous for water  
Do not allow product to reach ground water, water course or sewage system, even in small quantities.  
Danger to drinking water if even extremely small quantities leak into the ground.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

### 13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**  
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

### 14 Transport information

· <b>UN-Number</b>	UN1114
· <b>DOT, ADR, IMDG, IATA</b>	
· <b>UN proper shipping name</b>	Benzene solution
· <b>DOT</b>	1114 Benzene solution
· <b>ADR</b>	BENZENE solution
· <b>IMDG, IATA</b>	
· <b>Transport hazard class(es)</b>	
· <b>DOT</b>	
	
· <b>Class</b>	3 Flammable liquids
· <b>Label</b>	3
<hr style="border-top: 1px dashed #000;"/>	
· <b>ADR, IMDG, IATA</b>	
	
· <b>Class</b>	3 Flammable liquids
· <b>Label</b>	3
· <b>Packing group</b>	II
· <b>DOT, ADR, IMDG, IATA</b>	

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· <b>Environmental hazards:</b>	
· <b>Marine pollutant:</b>	No
· <b>Special precautions for user</b>	Warning: Flammable liquids
· <b>Danger code (Kemler):</b>	33
· <b>EMS Number:</b>	F-E,S-D
· <b>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</b>	Not applicable.
· <b>Transport/Additional information:</b>	
· <b>DOT</b>	
· <b>Quantity limitations</b>	On passenger aircraft/rail: 5 L On cargo aircraft only: 60 L
· <b>ADR</b>	
· <b>Excepted quantities (EQ)</b>	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· <b>IMDG</b>	
· <b>Limited quantities (LQ)</b>	1L
· <b>Excepted quantities (EQ)</b>	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· <b>UN "Model Regulation":</b>	UN1114, Benzene solution, 3, II

### 15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

· **Section 355 (extremely hazardous substances):**

Substance is not listed.

· **Section 313 (Specific toxic chemical listings):**

71-43-2	benzene
108-88-3	toluene
110-82-7	cyclohexane
123-91-1	1,4-dioxane
100-41-4	ethylbenzene

· **TSCA (Toxic Substances Control Act):**

Substance is listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

71-43-2	benzene
123-91-1	1,4-dioxane
100-41-4	ethylbenzene

· **Chemicals known to cause reproductive toxicity for females:**

108-88-3	toluene
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**Trade name: Virent BioForm™ Bz Benzene**

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 · **Chemicals known to cause reproductive toxicity for males:**

71-43-2 benzene

 · **Chemicals known to cause developmental toxicity:**

71-43-2 benzene

108-88-3 toluene

 · **Carcinogenicity categories**

 · **EPA (Environmental Protection Agency)**

71-43-2	benzene	A, K/L
108-88-3	toluene	II
110-82-7	cyclohexane	I
123-91-1	1,4-dioxane	L
100-41-4	ethylbenzene	D

 · **TLV (Threshold Limit Value established by ACGIH)**

71-43-2	benzene	A1
108-88-3	toluene	A4
123-91-1	1,4-dioxane	A3
100-41-4	ethylbenzene	A3

 · **NIOSH-Ca (National Institute for Occupational Safety and Health)**

71-43-2	benzene
123-91-1	1,4-dioxane

 · **GHS label elements**

The substance is classified and labeled according to the Globally Harmonized System (GHS).

 · **Hazard pictograms**


GHS02 GHS07 GHS08

 · **Signal word Danger**

 · **Hazard-determining components of labeling:**

benzene

 · **Hazard statements**

H225 Highly flammable liquid and vapor.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H340 May cause genetic defects.

H350 May cause cancer.

H372 Causes damage to the blood through prolonged or repeated exposure. Route of exposure: Oral, Inhalative, Dermal.

H304 May be fatal if swallowed and enters airways.

 · **Precautionary statements**

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P241 Use explosion-proof electrical/ventilating/lighting/equipment.

P260 Do not breathe dust/fume/gas/mist/vapors/spray.

P280 Wear protective gloves / eye protection / face protection.

P280 Wear protective gloves.

P280 Wear protective gloves / protective clothing.

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# Safety Data Sheet

acc. to OSHA HCS

Printing date 05/01/2015

Reviewed on 05/01/2015

**Trade name: Virent BioForm™ Bz Benzene**

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- P280 Wear eye protection / face protection.
- P240 Ground/bond container and receiving equipment.
- P233 Keep container tightly closed.
- P242 Use only non-sparking tools.
- P243 Take precautionary measures against static discharge.
- P264 Wash thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P301+P310 If swallowed: Immediately call a poison center/doctor.
- P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P321 Specific treatment (see on this label).
- P308+P313 IF exposed or concerned: Get medical advice/attention.
- P332+P313 If skin irritation occurs: Get medical advice/attention.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P314 Get medical advice/attention if you feel unwell.
- P331 Do NOT induce vomiting.
- P370+P378 In case of fire: Use for extinction: CO2, powder or water spray.
- P362+P364 Take off contaminated clothing and wash it before reuse.
- P405 Store locked up.
- P403+P235 Store in a well-ventilated place. Keep cool.
- P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· **National regulations:**

· **Information about limitation of use:**

Workers are not allowed to be exposed to this hazardous material. Exceptions can be made by the authorities in certain cases.

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

## 16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Date of preparation / last revision** 05/01/2015 / -

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

Flam. Liq. 2: Flammable liquids, Hazard Category 2

Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2

Eye Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A

Muta. 1B: Germ cell mutagenicity, Hazard Category 1B

Carc. 1A: Carcinogenicity, Hazard Category 1A

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US



**Safety Data Sheet**  
*acc. to OSHA HCS*

Printing date 05/01/2015

Reviewed on 05/01/2015

**Trade name: Virent BioForm™ Bz Benzene**

*STOT RE 1: Specific target organ toxicity - Repeated exposure, Hazard Category 1*  
*Asp. Tox. 1: Aspiration hazard, Hazard Category 1*

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US