SAFETY DATA SHEET
according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Revision Date 07/01/2019 Version 1.6

SECTION 1.Identification

Product identifier

Product number	BX0220
Product name	Benzene GR ACS
CAS-No.	71-43-2

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

Identified uses	Reagent for analysis

Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation | 400 Summit Drive | Burlington | Massachusetts 01803 | United States of America | General Inquiries: +1 800-645-5476 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) MilliporeSigma is a business of Merck KGaA, Darmstadt, Germany.
Emergency telephone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS Classification

Flammable liquid, Category 2, H225
Skin irritation, Category 2, H315
Eye irritation, Category 2A, H319
Germ cell mutagenicity, Category 1B, H340
Carcinogenicity, Category 1A, H350
Specific target organ systemic toxicity - repeated exposure, Category 1, Blood, H372
Aspiration hazard, Category 1, H304

For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS-Labeling

Hazard pictograms

Signal Word
Danger

Hazard Statements
H340 May cause genetic defects.
H350 May cause cancer.
H225 Highly flammable liquid and vapor.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H372 Causes damage to organs (Blood) through prolonged or repeated exposure.

Precautionary Statements
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
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.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P321 Specific treatment (see supplemental first aid instructions on this label).
P331 Do NOT induce vomiting.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235 Store in a well-ventilated place. Keep cool.

P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. Composition/information on ingredients

Formula	C_6H_6 (Hill)
Molar mass	78.11 g/mol

Hazardous ingredients

Chemical name (Concentration)
CAS-No.
benzene (>= 90 % - <= 100 %)
71-43-2
Exact percentages are being withheld as a trade secret.

SECTION 4. First aid measures

Description of first-aid measures

General advice
First aider needs to protect himself.

Inhalation
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

Skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

Eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

Ingestion
After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Call a physician immediately. Pulmonary failure possible after aspiration of vomit.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

irritant effects, respiratory arrest, Dizziness, narcosis, inebriation, euphoria, agitation, Nausea, Headache, Tiredness, CNS disorders
Drying-out effect resulting in rough and chapped skin.

Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media
Foam, Carbon dioxide (CO2), Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

Special hazards arising from the substance or mixture
Combustible.
Forms explosive mixtures with air at ambient temperatures.
Vapors are heavier than air and may spread along floors.
Pay attention to flashback.
Development of hazardous combustion gases or vapors possible in the event of fire.

Advice for firefighters

Special protective equipment for fire-fighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information
Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

Environmental precautions
Do not let product enter drains. Risk of explosion.

Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

SECTION 7. Handling and storage

Precautions for safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapors/aerosols.

Observe label precautions.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

Store at room temperature.

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Components

Basis	Value	Threshold limits	Remarks
benzene 71-43-2			
ACGIH	Time Weighted Average (TWA):	0.5 ppm	
	Short Term Exposure Limit (STEL):	2.5 ppm	
	Skin designation:		Can be absorbed through the skin.
NIOSH/GUIDE	Recommended exposure limit (REL):	0.1 ppm	
	Short Term Exposure Limit (STEL):	1 ppm	
Z1A	Time Weighted Average (TWA):	1 ppm	
	Short Term Exposure Limit (STEL):	5 ppm	
OSHA/Z2	Time Weighted Average (TWA):	10 ppm	
	Ceiling Limit Value:	25 ppm	
	Maximum concentration:	50 ppm	Ceiling Limit Value 10 minutes

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures

Immediately change contaminated clothing. Apply skin- protective barrier cream.
Wash hands and face after working with substance.

Eye/face protection

Safety glasses

Hand protection

full contact:

Glove material:	Viton (R)
Glove thickness:	0.70 mm
Break through time:	> 480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0.40 mm
Break through time:	> 10 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 890 Vitoject® (full contact), KCL 730 Camatril® -Velours (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment:
Flame retardant antistatic protective clothing.

Respiratory protection
required when vapors/aerosols are generated.
Recommended Filter type: Filter A-(P3)
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are performed according to the instructions of the producer.
These measures have to be properly documented.

SECTION 9. Physical and chemical properties

Physical state	liquid
Color	colorless
Odor	characteristic
Odor Threshold	0.5 - 277.1 ppm
pH	No information available.
Melting point	41.9 °F (5.5 °C)
Boiling point/boiling range	176.2 °F (80.1 °C) at 1,013 hPa

Flash point	12 °F (-11 °C) Method: DIN 51755 Part 1
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	1.4 %(V)
Upper explosion limit	8.0 %(V)
Vapor pressure	101 hPa at 68 °F (20 °C)
Relative vapor density	2.7
Density	0.88 g/cm3 at 68 °F (20 °C)
Relative density	No information available.
Water solubility	1.88 g/l at 74.3 °F (23.5 °C)
Partition coefficient: n-octanol/water	log Pow: 2.13 (experimental) (Lit.) Bioaccumulation is not expected.
Autoignition temperature	928 °F(498 °C) at 1,013.25 hPa
Decomposition temperature	No information available.
Viscosity, dynamic	No information available.
Explosive properties	Not classified as explosive.
Oxidizing properties	none
Viscosity, kinematic	0.78 mm2/s at 68 °F (20 °C)

SECTION 10. Stability and reactivity

Reactivity

steam-volatile
Vapors may form explosive mixture with air.

Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

Possibility of hazardous reactions

Exothermic reaction with:

halogens

Halogenated hydrocarbon, in the presence of:, Light metals

Risk of explosion with:

halogen-halogen compounds, Nitric acid, Boranes, Ozone, peroxi compounds, perchlorates, permanganic acid, perchloryl fluoride, Strong oxidizing agents, Chlorine, fluorides, uranium hexafluoride

Oxygen, liquid

Risk of ignition or formation of inflammable gases or vapors with:

chromium(VI) oxide, Fluorine, nitryl compounds, Oxygen, oxyhalogenic compounds

Violent reactions possible with:

mineral acids, sulfur

Conditions to avoid

Warming.

Incompatible materials

rubber, various plastics

Hazardous decomposition products

no information available

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure
Inhalation, Eye contact, Skin contact

Target Organs
Eyes
Skin

Respiratory system
Blood
Central nervous system
Bone

Acute oral toxicity
LD50 Rat: 5,970 mg/kg
OECD Test Guideline 401

Symptoms: Nausea

Acute inhalation toxicity
LC50 Rat: 43.7 mg/l13700 ppm; 4 h ; vapor
OECD Test Guideline 403

Symptoms: Possible damages:, mucosal irritations

Acute dermal toxicity
LD50 Rabbit: > 8,260 mg/kg
OECD Test Guideline 402

Skin irritation
Rabbit
Result: Irritations
OECD Test Guideline 404

Drying-out effect resulting in rough and chapped skin.
Causes skin irritation.

Eye irritation
Rabbit
Result: Eye irritation
(ECHA)

Causes serious eye irritation.

Sensitization
Maximization Test Guinea pig
Result: Does not cause skin sensitization.
Method: OECD Test Guideline 406

Repeated dose toxicity
Subchronic toxicity

Subchronic toxicity

Genotoxicity in vivo
Chromosome aberration test
Mouse
Result: positive
Method: OECD Test Guideline 474

Genotoxicity in vitro
Ames test
Salmonella typhimurium
Result: negative
Method: OECD Test Guideline 471

In vitro mammalian cell gene mutation test
Result: positive
Method: US-EPA

CMR effects
Mutagenicity:May cause genetic defects.
Carcinogenicity:May cause cancer.

Specific target organ systemic toxicity - single exposure
The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ systemic toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.
Target Organs: Blood

Aspiration hazard
Aspiration hazard, Aspiration may cause pulmonary edema and pneumonitis.

Carcinogenicity

IARC	Group 1: Carcinogenic to humans	
	benzene	71-43-2
OSHA		
	benzene	71-43-2
NTP	Known carcinogen.	
	benzene	71-43-2
ACGIH	A1: Confirmed human carcinogen	
	benzene	71-43-2

Further information
Systemic effects:
After absorption:
agitation, euphoria, Headache, Dizziness, inebriation, Tiredness, CNS disorders, narcosis, respiratory arrest

Subacute toxicity
After a latency period:
Changes in the blood count, hemolysis
Other dangerous properties can not be excluded.
This substance should be handled with particular care.

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish
flow-through test LC50 Oncorhynchus mykiss (rainbow trout): 5.3 mg/l; 96 h
Analytical monitoring: yes
OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates
static test EC50 Daphnia magna (Water flea): 10 mg/l; 48 h
OECD Test Guideline 202

Toxicity to algae
static test IC50 Pseudokirchneriella subcapitata (green algae): 32 mg/l; 72 h
Analytical monitoring: yes
OECD Test Guideline 201

Toxicity to bacteria
EC10 Pseudomonas putida: 168 mg/l(Lit.)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
semi-static test NOEC Ceriodaphnia dubia (water flea): 3 mg/l; 7 d

US-EPA

Persistence and degradability

Biodegradability
96 %; 28 d; aerobic
OECD Test Guideline 301F
Readily biodegradable.

Theoretical oxygen demand (ThOD)
3,100 mg/g
(Lit.)

Ratio BOD/ThBOD
BOD5 71 %
(Lit.)

BOD20 80 %
(Lit.)

Ratio COD/ThBOD
19 %
(Lit.)

Bioaccumulative potential
Partition coefficient: n-octanol/water
log Pow: 2.13
(experimental)
(Lit.) Bioaccumulation is not expected.

Mobility in soil
Distribution among environmental compartments
Adsorption/Soil
log Koc: 1.93
(experimental)
Mobile in soils (Lit.)

Other adverse effects
Henry constant
562 Pa*m³/mol
at 77 °F(25 °C)
Method: (experimental)
(Lit.) Distribution preferentially in air.

Additional ecological information
Endangers drinking-water supplies if allowed to enter soil or water.
Discharge into the environment must be avoided.

SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

UN number	UN 1114
Proper shipping name	BENZENE
Class	3
Packing group	II
Environmentally hazardous	--

Air transport (IATA)

UN number	UN 1114
Proper shipping name	BENZENE
Class	3
Packing group	II
Environmentally hazardous	--
Special precautions for user	no

Sea transport (IMDG)

UN number	UN 1114
Proper shipping name	BENZENE
Class	3
Packing group	II
Environmentally hazardous	--
Special precautions for user	yes
EmS	F-E S-D

SECTION 15. Regulatory information

United States of America

SARA 313

The following components are subject to reporting levels established by SARA Title III, Section 313:

Components

benzene	71-43-2	*100 %*

SARA 302

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

Clean Water Act
The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:
Components
benzene
The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:
Components
benzene
This product contains the following toxic pollutants listed under the U.S. Clean Water Act Section 307
Components
benzene

DEA List I
Not listed

DEA List II
Not listed

US State Regulations

Massachusetts Right To Know
Components
benzene
Pennsylvania Right To Know
Components
benzene
New Jersey Right To Know
Components
benzene
California Prop 65 Components
WARNING: This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.
Components
benzene
California Prop 65 Components
WARNING: this product contains a chemical known in the State of California to cause cancer.
Components
benzene

Notification status

TSCA:	All components of the product are listed in the TSCA-inventory.
DSL:	All components of this product are on the Canadian DSL

SECTION 16. Other information

Training advice
Provide adequate information, instruction and training for operators.

Labeling
Hazard pictograms

Signal Word
Danger

Hazard Statements
H225 Highly flammable liquid and vapor.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H340 May cause genetic defects.
H350 May cause cancer.
H372 Causes damage to organs (Blood) through prolonged or repeated exposure.
H412 Harmful to aquatic life with long lasting effects.

Precautionary Statements
Prevention
P201 Obtain special instructions before use.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240 Ground/bond container and receiving equipment.
P273 Avoid release to the environment.
Response
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314 Get medical advice/ attention if you feel unwell.
Storage
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

Restricted to professional users.

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.

Key or legend to abbreviations and acronyms used in the safety data sheet
Used abbreviations and acronyms can be looked up at www.wikipedia.org.

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