



# United States Steel Corporation

## BLAST FURNACE GAS Safety Data Sheet (SDS)

USS IHS Number: IHS 82495  
(Replaces USS Code Number IHS 39)

Locations: Fairfield Works, Gary Works, Great Lakes Works, Hamilton Works, Lake Erie Works, Mon Valley Works, U. S. Steel Kosice

Original: 12/16/2010

Revision: 09/02/2020

### Section 1 – Identification

1(a) Product Identifier used on Label: Blast Furnace Gas

1(b) Other Means of Identification: None

1(c) Recommended use of the chemical and restrictions on use: Fuel gas; none

1(d) Name, Address, and Telephone Number:

United States Steel Corporation Phone number: (412) 433-6840 (8:00 am to 5:00 pm)  
600 Grant Street, Room 1662 FAX: (412) 433-5019  
Pittsburgh, PA 15219-2800

1(e) Emergency Phone Number: 1-800-262-8200 (CHEMTREC)

### Section 2 – Hazard(s) Identification

2(a) Classification of the Chemical: Blast Furnace Gas is considered a hazardous material according to the criteria specified in REACH [REGULATION (EC) No 1907/2006] and CLP [REGULATION (EC) No 1272/2008] and OSHA 29 CFR 1910.1200 Hazard Communication Standard. The categories of Health Hazards as defined in "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3" United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

2(b) Signal Word, Hazard Statement(s), Symbols and Precautionary Statement(s):

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)
	Flammable Gases	WARNING	Extremely flammable gas May displace oxygen and cause rapid suffocation May damage fertility or the unborn child. Causes damage to the heart through prolonged or repeated exposures. Harmful if inhaled.
	Toxic to Reproduction-1A Single Target Organ Toxicity (STOT) Repeated Exposure - 1		
	Acute Toxicity-Inhalation - 4		
None	Simple Asphyxiant - Single Category		

Precautionary Statement(s):

Prevention	Response	Storage/Disposal
Keep away from heat/sparks/open flames/hot surfaces. No smoking. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so. Store in well-ventilated place. Do not breathe gas. Use only outdoors or in a well-ventilated area. Wear protective gloves / protective clothing / eye protection / face protection. Wash thoroughly after handling.	If inhaled: Remove person to fresh air and keep comfortable for breathing. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product. If exposed, concerned or feel unwell: Get medical advice/attention.	Store locked up. Dispose of contents in accordance with federal, state and local regulations.

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## Section 2 – Hazard(s) Identification (continued)

**2(c) Hazards not Otherwise Classified:** None Known

**2(d) Unknown Acute Toxicity Statement (Mixture):** None Known

## Section 3 – Composition/Information on Ingredients

**3(a-c) Chemical Name, Common Name (Synonyms), CAS Number and Other Identifiers, and Concentration:**

Chemical Name	CAS Number	EC Number	% Volume
Nitrogen	7727-37-9	231-783-9	47-60
Carbon Monoxide	630-08-0	211-128-3	19-25
Carbon Dioxide	124-38-9	204-696-9	17-25
Hydrogen	1333-74-0	215-605-7	2-9.6

EC- European Community

CAS- Chemical Abstract Service

## Section 4 – First-aid Measures

**4(a) Description of Necessary Measures:** If exposed concerned or feel unwell: Get medical advice/attention.

- **Inhalation:** Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention, if needed.
- **Eye Contact:** In case of contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing if eye irritation persists: Get medical advice/attention, if needed.
- **Skin Contact:** This material is a gas under normal atmospheric conditions. If exposed or concerned get medical advice/attention, if needed.
- **Ingestion:** This material is a gas under normal atmospheric conditions and ingestion is unlikely.

**4(b) Most Important Symptoms/Effects, Acute and Delayed (Chronic):**

**Acute effects:**

- **Inhalation:** When exposed at high concentrations will act as a simple asphyxiant. Simple asphyxiant displace the oxygen in the air and can cause symptoms of oxygen deprivation.
- **Eye:** None Expected
- **Skin:** None Expected
- **Ingestion:** This material is a gas under normal atmospheric conditions and ingestion is unlikely.

**Chronic Effects:**

May cause heart problems with prolonged or repeat exposures.

**4(c) Immediate Medical Attention and Special Treatment:** Treat symptomatically.

## Section 5 – Fire-fighting Measures

**5(a) Suitable (and unsuitable) Extinguishing Media:** Leaking gas fire: Do not extinguish, unless leak can be stopped safely or fire is immediately impacting human life. Eliminate all ignition sources if safe to do so. Extinguish with foam, carbon dioxide, dry powder or water fog, once leak is stopped. Do not use a solid stream of water as it may scatter and spread the fire.

**5(b) Specific Hazards Arising from the Chemical:** Not applicable for gas.

**5(c) Special Protective Equipment and Precautions for Fire-fighters** Self-contained NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used. Evacuate area. Remove pressurized gas cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

## Section 6 - Accidental Release Measures

**6(a) Personal Precautions, Protective Equipment and Emergency Procedures:** If leakage cannot be stopped, evacuate area. Contact Gas Services to perform testing before entering the area.

**6(b) Methods and Materials for Containment and Clean Up:** Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

## Section 7 - Handling and Storage

**7(a) Precautions for Safe Handling** Keep away from heat/sparks/open flames/hot surfaces. No smoking. Eliminate all ignition sources if safe to do so. Practice good housekeeping.

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### Section 7 - Handling and Storage (continued)

**7(b) Conditions for Safe Storage, Including Any Incompatibilities:** Store in well-ventilated place. If feasible, store locked up.

### Section 8 - Exposure Controls / Personal Protection

**8(a) Occupational Exposure Limits (OELs):** The following exposure limits are offered as reference, for an experience industrial hygienist to review.

Ingredients	OSHA PEL <sup>1</sup>	ACGIH TLV <sup>2</sup>	NIOSH REL <sup>3</sup>	IDLH <sup>4</sup>
Nitrogen	NE	Simple Asphyxiant *	NE	NE
Carbon Monoxide	50 ppm	25 ppm	35 ppm "C" 200 ppm	1,200 ppm
Carbon Dioxide	5000 ppm	5000 ppm "STEL" 30,000 ppm	5000 ppm "STEL" 30,000 ppm	40,000 ppm
Hydrogen	NE	NE (Simple Asphyxiant)	NE	NE

NE - None Established

- OSHA PELs (Permissible Exposure Limits) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday. An Action level (AL) is used by OSHA and NIOSH to express a health or physical hazard. They indicate the level of a harmful or toxic substance/activity, which requires medical surveillance, increased industrial hygiene monitoring, or biological monitoring. Action Levels are generally set at one half of the PEL but the actual level may vary from standard to standard. The intent is to identify a level at which the vast majority of randomly sampled exposures will be below the PEL.
- Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes. DSEN – May cause dermal sensitization. This notation is used to indicate the potential for dermal sensitization resulting from the interaction of an absorbed agent and ultraviolet light (i.e. photosensitization). RSEN – May cause respiratory sensitization.
- The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL)- Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
- The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994. Ca is designated as carcinogen.

\* Simple Asphyxiant may not be assigned a TLV because the limiting factor is the available oxygen without other significant physiologic effects.

**8(b) Appropriate Engineering Controls:** Local exhaust ventilation should be used to control the emission of air contaminants. General dilution ventilation may assist with the reduction of air contaminant concentrations. Emergency eye wash stations and deluge safety showers should be available in the work area.

**8(c) Individual Protection Measures:**

- Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Use a positive-pressure-demand, full-face, supplied air respirator or SCBA for concentrations above 50 times the exposure limit. If exposure is above the IDLH for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

**Warning!** Air-purifying respirators both negative-pressure and powered-air do not protect workers in oxygen-deficient atmospheres.

- Eyes:** Wear appropriate eye protection to prevent eye contact.
- Skin:** Wear appropriate personal protective clothing to prevent skin contact. This may include fire retardant clothing.
- Other Protective Equipment:** An eyewash fountain and deluge shower should be readily available in the work area.

### Section 9 - Physical and Chemical Properties

<b>9(a) Appearance (physical state, color, etc.):</b> colorless gas	<b>9(j) Lower/Upper Flammability or Explosive Limits:</b> 27%-75%
<b>9(b) Odor:</b> May have a slight sulfur odor, but this should not be relied upon as a warning of its presence	<b>9(k) Vapor Pressure:</b> NA
<b>9(c) Odor Threshold:</b> NA	<b>9(l) Vapor Density (Air = 1):</b> 1.02
<b>9(d) pH:</b> NA	<b>9(m) Relative Density:</b> NA
<b>9(e) Melting Point/Freezing Point:</b> NA	<b>9(n) Solubility(ies):</b> NA
<b>9(f) Initial Boiling Point and Boiling Range:</b> NA	<b>9(o) Partition Coefficient n-octanol/water:</b> NA
<b>9(g) Flash Point:</b> NA	<b>9(p) Auto-ignition Temperature:</b> ND
<b>9(h) Evaporation Rate:</b> NA	<b>9(q) Decomposition Temperature:</b> ND
<b>9(i) Flammability (solid, gas):</b> Flammable	<b>9(r) Viscosity:</b> ND

NA - Not Applicable

ND - Not Determined for product as a whole



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## Section 11 - Toxicological Information (continued)

**Delayed (chronic) Effects by Component:**

- **NITROGEN:** Not Reported
- **CARBON MONOXIDE:** Human Fetal Death has resulted from exposure of CO to mothers bearing
- **CARBON DIOXIDE:** Not Reported
- **HYDROGEN:** Not Reported

## Section 12 - Ecological Information

**12(a) Ecotoxicity (aquatic & terrestrial):** No data available for the product, **BF Gas** as a whole.

**12(b) Persistence & Degradability:** No Data Available

**12(c) Bioaccumulative Potential:** No Data Available

**12(d) Mobility (in soil):** No Data Available

**12(e) Other Adverse Effects:** None Known

**Additional Information:**

**Hazard Category:** No Category

**Signal Word:** No Signal Word

**Hazard Symbol:** No Hazard Symbol

**Hazard Statement:** No Hazard Statement

## Section 13 - Disposal Considerations

**Disposal:** Waste code D001: Waste Flammable material with a flash point <140°F. This material and its container must be disposed of as hazardous waste. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

**Container Cleaning and Disposal:** Dispose of contents in accordance with federal, state and local regulations. Observe safe handling precautions. EWC: 16-05-04 (gases in pressure containers (including halons) containing dangerous substances; hazardous waste)

**Please note this information is for Blast Furnace Gas in its original form. Any alterations can void this information.**

## Section 14 - Transport Information

**14 (a-g) Transportation Information:**

**US Department of Transportation (DOT)** under 49 CFR 172.101 regulates **Blast Furnace Gas** as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

<p><b>Shipping Name:</b> Compressed gas, flammable, n.o.s. (Blast Furnace Gas)</p> <p><b>Shipping Symbols:</b> NA</p> <p><b>Hazard Class:</b> 2.1</p> <p><b>UN No:</b> UN1954</p> <p><b>Packing Group:</b> NA</p> <p><b>DOT/IMO Label:</b> 2.1</p> <p><b>Special Provisions (172.102):</b> NA</p>	<p><b>Packaging Authorizations</b></p> <p>a) <b>Exceptions:</b> 306</p> <p>b) <b>Bulk:</b> 302, 305</p> <p>c) <b>Non-bulk:</b> 314, 315</p>	<p><b>Quantity Limitations</b></p> <p>a) <b>Passenger, Aircraft, or Railcar:</b> Forbidden</p> <p>b) <b>Cargo Aircraft Only:</b> 150 kg</p> <p><b>Vessel Stowage Requirements</b></p> <p>a) <b>Vessel Stowage:</b> D</p> <p>b) <b>Other:</b> 40</p> <p><b>DOT Reportable Quantities:</b></p>
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**International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID)** classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

**Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR)** regulates **Blast Furnace Gas** as a hazardous material.

<p><b>Shipping Name:</b> Compressed gas, flammable, n.o.s. (Blast Furnace Gas)</p> <p><b>Classification Code:</b> 1F</p> <p><b>UN No.:</b> UN1954</p> <p><b>Packing Group:</b> NA</p> <p><b>ADR Label:</b> 2.1</p> <p><b>Special Provisions:</b> 274</p> <p><b>Limited Quantities:</b> LQ0, E0</p>	<p><b>Packaging</b></p> <p>a) <b>Packing Instructions:</b> P200</p> <p>b) <b>Special Packing Provisions:</b> NA</p> <p>c) <b>Mixed Packing Provisions:</b> MP9</p>	<p><b>Portable Tanks &amp; Bulk Containers</b></p> <p>a) <b>Instructions:</b> (M)</p> <p>b) <b>Special Provisions:</b> NA</p>
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## Section 14 - Transport Information (continued)

**International Air Transport Association (IATA)** regulates **Blast Furnace Gas** as a hazardous material.

<b>Shipping Name:</b> Compressed gas, flammable, n.o.s. (Blast Furnace Gas) <b>Class/Division:</b> 2.1 <b>Hazard Label (s):</b> Flammable Gas <b>UN No.:</b> 1954 <b>Packing Group:</b> NA <b>Excepted Quantities (EQ):</b> E0	<b>Passenger &amp; Cargo Aircraft</b>		<b>Cargo Aircraft Only</b> <b>Pkg Inst:</b> 200  <b>Max Net Qty/Pkg:</b> 150 kg	<b>Special Provisions:</b> A1  <b>ERG Code:</b> 10L
	<b>Limited Quantity (EQ)</b>			
	<b>Pkg Inst:</b> Forbidden	<b>Pkg Inst:</b> Forbidden		
	<b>Max Net Qty/Pkg:</b> Forbidden	<b>Max Net Qty/Pkg:</b> Forbidden		

Pkg Inst – Packing Instructions

Max Net Qty/Pkg – Maximum Net Quantity per Package

ERG – Emergency Response Drill Code

**Blast Furnace Gas** has a **Transport Dangerous Goods (TDG)** classification as **Compressed gas, flammable, n.o.s.**

## Section 15 - Regulatory Information

**Regulatory Information:** *The following listing of regulations relating to a U. S. Steel product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.*

This product and/or its constituents are subject to the following regulations:

**SARA Potential Hazard Categories:** Immediate Acute Health Hazard, Delayed Chronic Health Hazard

**SARA 313 Supplier Notification:** This product does not contain any of the toxic chemicals subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

**State Regulations:** The product, **Blast Furnace Gas** as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

California Prop.  
65:



This product can expose you to carbon monoxide, which is known to the State of California to cause reproductive toxicity. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**Other Regulations:**

**WHMIS Classification (Canadian):** The product, **Blast Furnace Gas** is not listed as a whole. However individual components are listed.

Ingredients	WHMIS Classification
Nitrogen	Gases under pressure - Compressed gas; Simple asphyxiants - Category 1
Carbon Monoxide	Flammable gases – Category 2 (Flammable limit - concentration range = 12 - 75 %); Gases under pressure - Compressed gas; Acute toxicity - inhalation - Category 3; Reproductive toxicity - Category 1A (Adverse effects on the development of the offspring); Specific target organ toxicity - single exposure - Category 1
Hydrogen	Flammable gases - Category 1 [Flammable limit - concentration range = 4 - 75 % (71%)]; Gases under pressure - Compressed gas * Simple asphyxiants - Category 1 (Gas that is liable to cause asphyxiation by the displacement of air)

\* Compressed gas listed in: UN Recommendations on the TDG – Model Regulations Vol II.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

## Section 16 - Other Information

**Prepared By:** United States Steel Corporation

**Revision History:**

- 09/02/2020 – Revisions to sections 2, 8, 11, & 15
- 06/23/2017 – Update WHMIS 2015
- 02/10/2014 - Update to OSHA HAZ COM 2012

**Expiration Date:** 9/02/2023

**Additional Information:**

**Hazardous Material Identification System (HMIS) Classification**

<b>Health Hazard</b>	<b>2</b>
<b>Fire Hazard</b>	<b>4</b>
<b>Physical Hazard</b>	<b>0</b>

**National Fire Protection Association (NFPA)**



HEALTH = 2 Temporary or minor injury may occur.

FIRE = 4, Flammable gases, or very volatile flammable liquids with flash points below 73 °F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class IA).

PHYSICAL HAZARD = 0, Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

HEALTH = 2, Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

FIRE = 4, Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

INSTABILITY = 0, Normally stable, even under fire exposure conditions, and are not reactive with water.

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### Section 16 - Other Information (continued)

#### ABBREVIATIONS/ACRONYMS

<b>ACGIH</b>	American Conference of Governmental Industrial Hygienists	<b>NIF</b>	No Information Found
<b>BEIs</b>	Biological Exposure Indices	<b>NIOSH</b>	National Institute for Occupational Safety and Health
<b>CAS</b>	Chemical Abstracts Service	<b>NTP</b>	National Toxicology Program
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act	<b>ORC</b>	Organization Resources Counselors
<b>CFR</b>	Code of Federal Regulations	<b>OSHA</b>	Occupational Safety and Health Administration
<b>CNS</b>	Central Nervous System	<b>PEL</b>	Permissible Exposure Limit
<b>GI, GIT</b>	Gastro-Intestinal, Gastro-Intestinal Tract	<b>PNOR</b>	Particulate Not Otherwise Regulated
<b>HMIS</b>	Hazardous Materials Identification System	<b>PNOC</b>	Particulate Not Otherwise Classified
<b>IARC</b>	International Agency for Research on Cancer	<b>PPE</b>	Personal Protective Equipment
<b>LC50</b>	Median Lethal Concentration	<b>ppm</b>	parts per million
<b>LD50</b>	Median Lethal Dose	<b>RCRA</b>	Resource Conservation and Recovery Act
<b>LD<sub>Lo</sub></b>	Lowest Dose to have killed animals or humans	<b>RTECS</b>	Registry of Toxic Effects of Chemical Substances
<b>LEL</b>	Lower Explosive Limit	<b>SARA</b>	Superfund Amendment and Reauthorization Act
<b>µg/m<sup>3</sup></b>	microgram per cubic meter of air	<b>SCBA</b>	Self-contained Breathing Apparatus
<b>mg/m<sup>3</sup></b>	milligram per cubic meter of air	<b>STEL</b>	Short-term Exposure Limit
<b>mppcf</b>	million particles per cubic foot	<b>TLV</b>	Threshold Limit Value
<b>SDS</b>	Safety Data Sheet	<b>TWA</b>	Time-weighted Average
<b>MSHA</b>	Mine Safety and Health Administration	<b>UEL</b>	Upper Explosive Limit
<b>NFPA</b>	National Fire Protection Association		

**Disclaimer:** This information is taken from sources or based upon data believed to be reliable. However, United States Steel Corporation makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.