

UPF JOB HAZARD ANALYSIS

My signature on the corresponding CFN-1251, UPF Construction Attendance Sheet, indicates that I have read the JHA and have received answers to any questions I had relative to the JHA. My signature further indicates my willingness to comply with the provisions and requirements of the JHA.

JHA NO.:		JHA-00713	REV:	1	ISSUE DATE:	1-16-25
JHA TITLE:		Compressed Gas, LPG, and Inert Gas	WORK PACKAGE NUMBER:	N/A	SPECIFIC LOCATION:	N/A
Activity	Sub-Activity	Hazard	Control			
Compressed Gas Cylinder Use	General Requirements	Improper Use of Compressed Gas Cylinders	· Follow the equipment manufacturer's operating instructions at all times			
		Hazardous Atmosphere	· Damaged or defective CGC shall not be used (e.g., valves, safety relief devices). The cylinder shall be tagged with a "DANGER – Defective Equipment/Tool, Do Not Use" tag and removed from service and arrangements made for returning them immediately to the vendor			
			· No person shall:			
			o Attempt to mix gases in a cylinder other than the gas supplier			
			o Refill a cylinder except the owner of the cylinder or person authorized by the owner			
			o Use a cylinder's contents for purposes other than those intended by the supplier			
			· The cylinder valve shall be closed when:			
			o Work is finished			
			o Cylinders are empty			
			o Cylinders are moved at any time			
			· Cylinders, whether full or empty, shall not be used as rollers or supports			
			· Cylinders will not be dragged or slid. The user shall use a suitable hand truck, fork truck, roll platform, or similar device with the cylinder secured for transporting in an upright position. Cylinders may be manually manipulated over a short distance for repositioning/adjusting to transport carts or storage areas by tilting and rolling them on their bottom edges			
			· Unless cylinders are firmly secured on a special carrier intended for the purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved			
			· CGC will not be hoisted by the valve cap or by means of magnets or slings			
			· Cylinders will be transported in an upright position and will not be hauled in equipment beds or truck beds on their side			

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			· When using a crane, forklift or similar equipment to lift cylinders from one elevation to another, a rack, or container designed for the purpose of lifting and carrying cylinders must be used			
			· Trucks equipped with lift gates will be utilized for loading and unloading cylinders. A crane, forklift, or similar equipment may also be used. Cylinders shall not be dropped when being unloaded from or loaded onto trucks or loading docks			
			· Manifold systems on wheeled carts must have the wheels chocked and secured to prevent motion when not being repositioned			
			· CGC will be protected against shock, especially falling, or high temperature extremes.			
			-CGC will not be used as, or placed where they may become part of an electrical circuit or grounding path			
			· Bars will not be used to pry or loosen protective caps. Use warm water to loosen caps when frozen			
			· Cylinders will be returned to the main storage area when empty			
			· Cylinders are uniquely threaded (by cylinder type) to minimize contamination. The use of adaptors or systems that compromise this safeguard is prohibited			
			· Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces			
Compressed Gas Cylinder Use	Identification	Improper Hazard Communication	· Verify gas cylinders are properly labeled. Generally, gas identification is stenciled or stamped on the cylinder however, a manufacturer label is acceptable			
			· Cylinders on which the identification is missing or illegible shall not be used and shall be tagged out of service. Contact supervision to have these items returned to the supplier			
			· Do not rely on the color of the cylinder for identification. Color-coding is not reliable because cylinder colors can vary with supplier. Also, never rely on labels on caps because they are interchangeable.			

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Compressed Gas Cylinder Use	Cylinder Storage	Improper Storage of Compressed Gas Cylinders	· CGC shall be secured in an upright position and be properly secured by means of substantial chain, cable, strap, or equivalent method. Valve protection caps shall be in place			
			· Storage areas/cages shall be clearly posted as to contents (e.g., Oxygen, Acetylene, etc.)			
			· CGC locations shall be configured to protect cylinders from being struck, toppled, or damaged by passing vehicles or falling objects			
			· Cylinders shall be stored in a well-ventilated, dry location and away from elevators, stairs, gangways, or egress routes. To prevent bottom corrosion, cylinders shall be protected from direct contact with soil or surfaces where water may accumulate			
			· LPG containers can only be stored outside			
			· CGC will be stored/located out of direct sunlight and away from sources of heat and ignition so as to avoid exposure to sparks, hot slag, or flames. If these cannot be avoided, fire-resistant shields shall be provided			
			· Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one hour			
			· Storage areas shall be segregated by types of gas, full or empty			
			· Inside of buildings, cylinders shall be stored at least 20 feet from highly combustible materials such as oil or excelsior			
Liquefied Petroleum Gas Use	Equipment and System Approval	Improper Use of Liquefied Petroleum Gas	· Each system shall have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type			
			· All cylinders shall meet the Department of Transportation specification identification requirements published in 49 CFR Part 178, <i>Shipping Container Specifications</i>			
			· Onsite transportation and storage of compressed gas cylinders shall be in accordance with applicable Department of Transportation (DOT) regulations and Y-12 requirements.			



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Activity	Sub-Activity	Hazard	Control			
Liquefied Petroleum Gas Use	Welding on LPG Containers	Fire	Welding on containers is PROHIBITED			
Liquefied Petroleum Gas Use	Container Valves and Container Accessories	Spill	<ul style="list-style-type: none"> Valves, fittings, and accessories connected directly to the container, including primary shut off valves, shall have a rated working pressure of at least 250 p.s.i.g. and shall be of material and design suitable for LPG service 			
			<ul style="list-style-type: none"> Connections to containers, except safety relief connections, liquid level gauging devices, and plugged openings, shall have shutoff valves located as close to the container as practicable. 			
Liquefied Petroleum Gas Use	Safety Devices	Defeating a Safety Device	<ul style="list-style-type: none"> Every container and every vaporizer shall be provided with one or more approved safety relief valves or devices 			
		Spill	<ul style="list-style-type: none"> These valves shall be arranged to afford free vent to the outer air with discharge not less than 5 feet horizontally away from any opening into a building which is below such discharge 			
			<ul style="list-style-type: none"> Shutoff valves shall not be installed between the safety relief devices and the container, or the equipment or piping to which the safety relief device is connected, except that a shutoff valve may be used where the arrangement of this valve is such that full required capacity flow through the safety relief device is always afforded 			
			<ul style="list-style-type: none"> Container safety relief devices and regulator relief vents shall be located not less than 5 feet in any direction from air openings into sealed combustion system appliances or mechanical ventilation air intakes. 			
Liquefied Petroleum Gas Use	Dispensing	Spill	<ul style="list-style-type: none"> Filling of fuel containers for trucks or motor vehicles from bulk storage containers shall be performed: 			
		Fire	<ul style="list-style-type: none"> o Not less than 10 feet from the nearest masonry-walled building 			



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			o Or not less than 25 feet from the nearest building or other construction, and			
			o In any event, not less than 25 feet from any building opening			
			· Filling of portable containers or containers mounted on skids from storage containers shall be performed not less than 50 feet from the nearest building.			
Liquefied Petroleum Gas Use	Requirements for Appliances	Improper Use of Tools and Equipment	· LP-Gas consuming appliances shall be approved types.			
		Property Damage	· Any appliance that was originally manufactured for operation with a gaseous fuel other than LP-Gas, and is in good condition, can be used with LP-Gas only after it is properly converted, adapted, and tested for performance with LP-Gas before the appliance is placed in use.			
Liquefied Petroleum Gas Use	Containers and Equipment Used Outside of Buildings or Structures	Spill	· Containers shall be upright upon firm foundations or otherwise firmly secured. The possible effect on the outlet piping of settling shall be guarded against by a flexible connection or special fitting.			
Liquefied Petroleum Gas Use	Containers and Equipment Used Inside of Buildings or Structures	Spill	When operational requirements make portable use of containers necessary, and their location outside of buildings or structures is impracticable, containers and equipment shall be permitted to be used inside of buildings or structures in accordance with the paragraphs below:			
		Fire	· "Containers in use" means connected for use			
			· Systems utilizing containers having a water capacity greater than 2 1/2 pounds (nominal 1 pound LP-Gas capacity) shall be equipped with excess flow valves. Such excess flow valves shall be either integral with the container valves or in the connections to the container valve outlets			

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			<ul style="list-style-type: none"> Regulators shall be either directly connected to the container valves or to manifolds connected to the container valves. The regulator shall be suitable for use with LPG. Manifolds and fittings connecting containers to pressure regulator inlets shall be designed for at least 250 p.s.i.g. service pressure
			<ul style="list-style-type: none"> Valves on containers, having water capacity greater than 50 pounds (nominal 20 pounds LP-Gas capacity), shall be protected from damage while in use or storage
			<ul style="list-style-type: none"> Aluminum piping or tubing shall not be used
			<ul style="list-style-type: none"> Hose shall be designed for a working pressure of at least 250 p.s.i.g.
			<ul style="list-style-type: none"> Design, construction, and performance of hose, and hose connections shall have their suitability determined by a nationally recognized testing agency
			<ul style="list-style-type: none"> The hose length shall be as short as practicable. Hoses shall be long enough to permit compliance with spacing provisions of this section, without kinking or straining, or causing hose to be so close to a burner as to be damaged by heat
			<ul style="list-style-type: none"> Portable heaters, including salamanders, shall be equipped with an approved automatic device to shut off the flow of gas to the main burner, and pilot if used, in the event of flame failure
			<ul style="list-style-type: none"> Portable heaters, including salamanders, having inputs above 50,000 B.t.u. per hour, shall be equipped with either a pilot, which must be lighted and proved before the main burner can be turned on, or an electrical ignition system
			<p>NOTE: The provisions of paragraph (7) and (8) do not apply to portable heaters under 7,500 B.t.u. per hour input when used with containers having a maximum water capacity of 2 1/2 pounds.</p>
			<ul style="list-style-type: none"> Container valves, connectors, regulators, manifolds, piping, and tubing shall not be used as structural supports for heaters
			<ul style="list-style-type: none"> Containers, regulating equipment, manifolds, pipe, tubing, and hose shall be located to minimize exposure to high temperatures or physical damage

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			· Containers, having a water capacity greater than 2 1/2 pounds (nominal 1 pound LPG capacity) connected for use, shall stand on a firm and substantially level surface and, when necessary, be secured in an upright position			
			· The maximum water capacity of individual containers shall be 245 pounds (nominal 100 pounds LP-Gas capacity)			
			· For temporary heating, heaters (other than integral heater-container units) shall be located at least 6 feet from any LP-Gas container			
			o This shall not prohibit the use of heaters specifically designed for attachment to the container or to a supporting standard, provided they are designed and installed so as to prevent direct or radiant heat application from the heater onto the container			
			o Blower and radiant type heaters shall not be directed toward any LPG container within 20 feet			
			· If two or more heater-container units, of either the integral or non-integral type, are located in a non-partitioned area on the same floor, the container or containers of each unit shall be separated from the container or containers of any other unit by at least 20 feet			
			· When heaters are connected to containers for use in a non-partitioned area on the same floor, the total water capacity of containers, manifolded together for connection to a heater or heaters, cannot be greater than 735 pounds (nominal 300 pounds LPG capacity). Such manifolds shall be separated by at least 20 feet.			
			· Storage of containers awaiting use shall be in accordance with Section 4.2.10			
Liquefied Petroleum Gas Use	Multiple Container Systems	Spill	· Valves in the assembly of multiple container systems shall be arranged so that replacement of containers can be made without shutting off the flow of gas in the system. This provision is not to be construed as requiring an automatic changeover device			
		Fire	· Heaters shall be equipped with an approved regulator in the supply line between the fuel cylinder and the heater unit. Cylinder connectors shall be provided with an excess flow valve to minimize the flow of gas in the event the fuel line becomes ruptured			

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			<ul style="list-style-type: none"> Regulators and or low-pressure relief devices shall be rigidly attached to the cylinder valves, cylinders, supporting standards, the building walls, or otherwise rigidly secured, and shall be so installed or protected from the elements. 			
Liquefied Petroleum Gas Use	Storage of LPG Containers	Improper Storage of Liquefied Petroleum Gas	<ul style="list-style-type: none"> Inside Buildings, Storage of LPG within buildings is prohibited 			
		Fire	<ul style="list-style-type: none"> Storage Outside of Buildings, LPG storage locations are to be established with the following: 			
			<ul style="list-style-type: none"> o Appropriate signs (e.g. – Flammable Propane, No Ignition Sources within 25 feet) 			
			<ul style="list-style-type: none"> o Cylinders secured in an upright position 			
			<ul style="list-style-type: none"> o Be at least 20 ft. from other combustible material 			
			<ul style="list-style-type: none"> o Have at least one approved portable fire extinguisher rated not less than 20 lb. Class B and C and be located no more than 50 feet from the storage location 			
			<ul style="list-style-type: none"> Containers shall be in a suitable ventilated enclosure or otherwise protected against tampering 			
			<ul style="list-style-type: none"> Storage outside of buildings for containers awaiting use, shall be located from the nearest buildings, in accordance with the following LPG storage locations are to be established with the following: 			
			<ul style="list-style-type: none"> o Quantity of LPG - Stored Distance (Feet) 			
			<ul style="list-style-type: none"> o 500 lbs. or less – 0 			
			<ul style="list-style-type: none"> o 501 to 6,000 lbs. – 10 			
			<ul style="list-style-type: none"> 6,001 to 10,000 lbs. – 20 			
			<ul style="list-style-type: none"> o Over 10,000 lbs. – 25 			

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			· Cylinders are to be stored a minimum of 20 ft. from oxygen cylinders, or be protected by a noncombustible barrier of at least five feet height having a fire-resistant rating of one hour or greater
			· Cylinders in storage shall be located to minimize exposure to excessive temperature rises, physical damage, or tampering
			· Cylinders shall not be stored on roofs
			· Cylinder valves shall be protected
			· Screw on caps or collars shall be in place on all cylinders stored and cylinder outlet valves shall be closed
Liquefied Petroleum Gas Use	Industrial Trucks Inside Buildings	Fire	· LP-Gas-fueled industrial trucks are permitted to be used in buildings and structures
			· No more than two LP-Gas containers shall be used on an industrial truck for motor fuel purposes
			· Total water capacity of the fuel cylinders on an individual truck shall not exceed 105 lbs. (nominal 45 lbs. propane capacity)
			· Industrial trucks shall not be parked and left unattended in areas of possible excessive heat or sources of ignition
Liquefied Inert Gas Use	General Requirements	Asphyxiation	WARNING: Breathing argon, nitrogen, or helium enriched air can cause Asphyxiation due to lack of oxygen essential to maintain life. A person can become unconscious without sensing the lack of oxygen and without any warning. Any area in which a liquefied inert gas is used or stored is to be properly ventilated.
		Cryogenic Burn	· Using liquefied inert gases in or around confined spaces can create an oxygen deficient atmosphere in those spaces. Confined space entry activities shall be performed in accordance with Y73-95-802, <i>Confined Space Entry Program</i> . It is prohibited to bring liquefied inert gas cylinders in a confined space
		Spill	· If a cryogenic liquid cylinder (CLC) is not labeled to show what product is contained, return the unit to the supplier unused

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			· Due to the extreme low temperatures of liquefied inert gases, the physical properties of materials with which they come into contact are apt to be greatly altered. This fact must be considered wherever liquefied inert gases are handled			
			· Never attempt to transfer liquefied inert gas into a container or vessel that has not been specifically designed for that product			
			o Never dispose of liquefied inert gas in an indoor work or storage area			
			o CLCs shall be provided with pressure relief devices to Ensure the maximum design pressure of the vessel is not exceeded			
			o Equipment used in liquefied inert gas service is to be kept clean			
Liquefied Inert Gas Use	Cylinder Storage	Asphyxiation	· CLCs shall be stored in a well-ventilated area, preferably outdoors. Heat leakage into the CLCs will gradually increase the internal pressure of a cryogenic liquid cylinder not in use until the relief valve setting is reached. Vapor will then be vented, creating a possible oxygen deficient atmosphere if the area is not well ventilated			
			· Secure CLCs to prevent containers from being struck, toppled, or tipped over			
			· CLCs must not be stored near flammable or combustible materials			
Liquefied Inert Gas Use	Moving Cylinders	Muscle Strain/Sprain	· Prior to moving a CLCs ensure valves are closed and all outlet protection devices are in place			
		Ergonomics	· CLCs have an inner container suspension system designed for minimum heat leak. Never subject cylinders to shocks, falls, or impacts			

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		Asphyxiation	<p>Full CLCs are very heavy and are to be moved only on a two-wheeled or four-wheeled cart designed for that purpose or crane and proper rigging using manufacturer installed rigging points. Rolling liquid cylinders on their side is extremely hazardous because the inner container could be permanently damaged causing loss of insulating vacuum and resulting in uncontrolled venting of the product</p> <p>NOTE: CLCs are not to be lifted by or rigged to the protective ring.</p>			
		Struck-by / pinch point	<ul style="list-style-type: none"> Ensure the travel path is free of obstructions and debris, which can cause the cart to inadvertently stop. When manually transporting CLCs from the building loading/unloading area to the CLC storage area, move one CLC at a time. Maintain adequate distance (e.g., 10 feet) between CLCs when transporting them within the building. 			
Liquefied Inert Gas Use	Use	Improper Use of Liquefied Inert Gases	<p>Before using inert gases, read and understand all the labels and the material safety data sheet</p>			
		Asphyxiation	<p>CLCs are dependent upon the vacuum insulation space between the double walls to provide the required degree of insulation. If this vacuum is lost, excessive amounts of gaseous product will vent through the pressure release devices. In this case, move the CLCs outdoors and notify the CLC supplier</p>			
		Spill	<p>When using a CLC, only regulators, valves, hoses, or other equipment designed and conditioned for that particular service are to be used</p>			
			<p>Some CLCs contain vaporizing and superheating coils in the insulation space to provide gaseous product at near ambient temperature to the user. If the use rate is excessive, the outer shell of the CLC will frost heavily and the gaseous product can be extremely cold</p>			
			<p>NOTE: Some degree of frosting of the outer shell during use is normal. Never apply heat to the CLC in an attempt to correct this condition instead, reduce the use rate</p>			
			<p>A CLC is equipped with a filling valve, a product withdrawal valve, a vent valve, a pressure gage, a liquid level gage, and various regulators and PRDs. Do not operate or adjust any device other than the product withdrawal valve.</p>			

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Liquefied Inert Gas Use	Process	Improper Use of Liquefied Inert Gases	· Before connecting any equipment to the product withdrawal valve, crack open the valve for an instant to clear the opening of particles of dust or dirt being careful to point the valve opening away from any personnel			
		Asphyxiation	· Connect a pressure-reducing regulator to the CLC			
		Spill	NOTE: <i>Never use inert gas from a CLC without reducing the pressure through a suitable regulator attached to the CLC or manifold header outlet</i>			
			· Ensure the threads on the regulator or other unions correspond to those on CLC valve outlets. Never force connections that do not fit			
			WARNING: Never interchange regulators, hoses, or other appliances with equipment intended for use with other gases. Never use adapters. Fatalities have been caused by switching the CGA outlet connections to allow connection of a CL-cylinder to a distribution system containing product different from the product in the CLC.			
			· Before the CL-cylinder valve is opened, ensure the regulator is closed			
			· Ensure all connections are gas tight and remain so and that the connected hose is in good condition and does not have any leaks			
			NOTE: <i>Inert gas should enter the regulator slowly. Stand to one side and away from the regulator gage faces when opening the CL-cylinder valve. Never use wrenches or tools except those provided or approved by the inert gas manufacturer. Never hammer the valve wheel in attempting to open or close the valve. If the valve cannot be opened by hand, notify the supplier.</i>			
Liquefied Inert Gas Use	Empty Cryogenic Liquid Containers	Improper Storage of Liquefied Inert Gas Cylinders	When CLCs are emptied, close all valves and replace all outlet protection devices and return the CLC to supplier.			



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PREPARER:	Nicholas Prewitt	 Printed Name/Signature		01/16/25 Date	
APPROVAL:					
ES&H:	Anton Panev	 Printed Name/Signature		01/16/25 Date	
SITE MANAGER: (DOA-CM-801768-A214)	Dustin Reddick	 Printed Name/Signature		01/16/25 Date	