
	<b>LAR Safety Standing Instruction</b>	<b>HSS-635</b>	
	<b>Welding / Cutting Operations</b>	<b>Page 1 of 9</b>	
		<b>DATE:</b> 5/22/2018	<b>Rev:</b> A01

## Contents

<p><b>1.0 Introduction ..... 2</b></p> <p>1.1 Purpose.....2</p> <p>1.2 Scope.....2</p> <p><b>2.0 References..... 2</b></p> <p>2.1 Andeavor Standards.....2</p> <p>2.2 Industry Codes and Standards .....2</p> <p>2.3 Government Regulations .....2</p> <p><b>3.0 Definitions ..... 3</b></p> <p><b>4.0 Procedures..... 5</b></p> <p>4.1 Welding and Cutting Procedures. ....5</p> <p>4.2 Arc Welding (Shielded Metal, Gas Tungsten and Gas Metal Arc Welding) .....7</p>	<p><b>5.0 Oxy-Fuel Gas Safety.....7</b></p> <p>5.1 Perform the following safety steps when using Oxy-fuel Equipment:.....7</p> <p><b>6.0 Welding Equipment Use and Care ....8</b></p> <p><b>7.0 Electric Powered Welding Machines .....9</b></p> <p><b>8.0 Welding on Alloys ..Error! Bookmark not defined.</b></p> <p><b>9.0 Welding on Chlorinated Solvents .....9</b></p> <p><b>10.0 Revision Log.....9</b></p>
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<b>Revision:</b>	<b>Prepared by:</b>	<b>Approved by:</b>	<b>Date:</b>
A01	Brian Kirby	James Kulakowski	5-22-2018

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	<b>LAR Safety Standing Instruction</b>	<b>HSS-635</b>	
	<b>Welding / Cutting Operations</b>	<b>Page 2 of 9</b>	
		<b>DATE:</b> 5/22/2018	<b>Rev:</b> <b>A01</b>

## 1.0 INTRODUCTION

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### 1.1 Purpose

1.1.1 To ensure safe cutting and welding operation while working in the Andeavor Los Angeles Refinery (LAR) Facilities.

### 1.2 Scope

1.2.1 This instruction applies to all work authorized and/or performed by employees and contractors at Tesoro Los Angeles Refinery Compliance Timing Requirements

## 2.0 REFERENCES

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### 2.1 Andeavor Standards

- 2.1.1 PSM-002 Management of Change
- 2.1.2 TSHS-011 Contractors
- 2.1.3 TSHS-001 Safe Work Permitting Practices
- 2.1.4 TSHS-002 Confined Space Entry
- 2.1.5 TSHG-012 Health Precautions for Welding, Grinding, and Torch Cutting

### 2.2 Industry Codes and Standards

- 2.2.1 API Publication 2007 (Safe Maintenance Practices in Refineries)
- 2.2.2 API Publication 2009 (Safe Welding and Cutting Practices in Refineries, Gas Plants, and Petrochemical Plants)
- 2.2.3 API Publication 2200 (Repairing Crude Oil, Liquefied Petroleum Gas, and Product Pipelines)

### 2.3 Government Regulations

- 2.3.1 8 CCR 4848, "Fire Prevention and Suppression Procedure."
- 2.3.2 8 CCR §1537. Welding, Cutting, and Heating of Coated Metals.
- 2.3.3 8 CCR §4851. Arc Welding and Cutting
- 2.3.4 8 CCR §8445 Fire Prevention and Control (LARIC)

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### 3.0 DEFINITIONS

**Table 1 Definitions**

Term	Description
Administrative Controls	Procedural mechanisms for directing and/or checking human performance.
Designated Hot Work Area	An area where a documented hazard assessment shows the area is safe for daily hot work without expecting the presence of flammable or combustible materials.
Highly Hazardous Chemicals (HHC)	Substances possessing toxic, reactive, flammable, or explosive properties, and found at or above its threshold quantity listed in Appendix A of 29 CFR 1910.119 and Table 1 of 40 CFR 68.130.
Hot Work	Any work that may be a direct source of ignition, including open flames, cutting and welding, grinding, buffing, drilling, chipping, sawing, or other similar operations that create hot metal sparks or hot surfaces from friction or impact.
Hot Work Permit	A written record that authorizes specific work within an operating area for a specified time period. An agreement between the issuing department and the receiver that clearly documents the conditions, preparations, precautions, and limitations that must be understood before work begins.
Internal Combustion Engine	Examples include vehicles, trains, portable compressors, portable generators, welding machines, light stands, etc.
Management of Change (MOC)	Management of Change: manage changes (except for "replacements in kind") to process chemicals, technology, equipment, and procedures; and, changes to facilities that affect a covered process.
Other Ignition Sources	<p>Other Ignition Sources include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Abrasive blasting</li> <li>• Electric, pneumatic, or battery-powered drills</li> <li>• Electric, pneumatic, gasoline, or battery-powered saws</li> <li>• Jack hammers</li> <li>• Non-intrinsically safe devices, such as cell phones, radios, cameras, or battery-operated devices</li> <li>• Open electric or battery heating elements</li> <li>• Other Internal Combustion Engines</li> </ul>

Term	Description
Personal Protective Equipment (PPE)	Equipment (such as protective clothing, respiratory devices, protective shields or barriers) worn or used by individuals to protect eyes, face, head and extremities from hazards of equipment, processes or environment capable of causing injury or functional impairment.
Process (Covered)	A PSM/RMP covered process. Any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities. For purposes of this definition, any group of vessels which are interconnected and separate vessels which are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process.
PSM	Process Safety Management; also known as OSHA 1910.119
Welding Blanket	A heat-resistant fabric designed to be placed in the vicinity of a hot work operation. Intended for use in horizontal applications with light to moderate exposures such as that resulting from chipping, grinding, heat treating, sand blasting, and light horizontal welding. Designed to protect machinery and prevent ignition of combustibles such as wood that are located adjacent to the underside of the blanket.
Welding Curtain	A heat-resistant fabric designed to be placed in the vicinity of a hot work operation. Intended for use in vertical applications with light to moderate exposures such as that resulting from chipping, grinding, heat treating, sand blasting, and light horizontal welding. Designed to prevent sparks from escaping a confined area.
Welding Pads	A heat-resistant fabric designed to be placed directly under a hot work operation such as welding or cutting. Intended for use in horizontal applications with severe exposures such as that resulting from molten substances or heavy horizontal welding. Designed to prevent the ignition of combustibles that are located adjacent to the underside of the pad.

## **4.0 PROCEDURES**

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### **4.1 Welding and Cutting Procedures.**

- 4.1.1 Flash-back arresters and back flow preventers must be in place on both the fuel and oxygen systems at the torch. (New torches must have built in flash-back arresters and back flow preventers.)
- 4.1.2 Damaged hoses and fittings must be replaced with new.
- 4.1.3 Hoses shall be kept clear of traffic aisles, vehicle paths, and doorways or guarded to prevent damage.
- 4.1.4 Regulators must have functional gauges on both the high- and low-pressure side. Covers will be used on both sets of gauges for protection.
- 4.1.5 Boxes used for storing gas hoses shall be ventilated.
- 4.1.6 Torches shall be lit with approved friction-type lighters.
- 4.1.7 All gas welding equipment, hoses, and cylinders shall be kept clear of oil, grease, or other hydro-carbons.
- 4.1.8 Check all fuel lines for leaks.
- 4.1.9 Do not weld or cut in areas where materials of doubtful or unknown flammability exist.
- 4.1.10 Provide fire watch and proper fire extinguisher when there are flammable materials nearby.
- 4.1.11 Combustible materials should be removed from welding areas where possible.
- 4.1.12 Exercise good housekeeping as you work.
  - 4.1.12.1 Provide bucket for electrode stubs.
  - 4.1.12.2 Use sand trap or metal catch pan under cutting to protect concrete and asphalt (as required).
  - 4.1.12.3 Before burning or welding on structure, check blind side and floor below for combustibles.
  - 4.1.12.4 Weld or cut only clean metal, wire brush or grind if necessary.
  - 4.1.12.5 Check all enclosed areas for toxicity hazards before welding or cutting
- 4.1.13 Provide adequate eye protection such as shields or tents, for all individuals in the weld area. For the welder, a range of shades for goggles or hood lenses are listed below:

Welding Operation	Minimum Shading #
Shielded Metal Arc Welding	
Electrode 5/32 or smaller	10
Electrode 3/16 to 1/4	12
Electrode 5/16 or larger	14
All carbon steel welding (carbon arc welding)	14
Gas Metal/Tungsten Arc Welding	
Electrode 5/32 or smaller	12
Soldering	2
Oxy/Acetylene (Cutting Stock)	
Less than 1"	3 or 4
1" to 6"	4 or 5
Over 6"	5 or 6
Torch Brazing	3 or 4
Gas Welding (Welding Stock)	
Less than 1/8"	4 or 5
1/8" to 1/2"	5 or 6
Over 1/2"	6 or 8

- 4.1.14 The lenses in welder's hoods should be NIOSH approved and of a hardened clear plastic, as provided by site tool-room. One (1) clear lens should be in front of shaded protective lens in both welding hoods and oxy-fuel goggles
- 4.1.15 Face-shields and safety glasses shall be worn while grinding or buffing. Personnel within an approximate 10' area around any grinding, buffing or power sawing operation shall use one (1) of two options:
  - Use an approved face shield with safety glasses or
  - Leave the impacted work area
- 4.1.16 Containment shall be made for hot slag or welding sparks in all elevated location.
- 4.1.17 No ground or other cables shall have cuts.
- 4.1.18 Cable connections must be tightly made to machine and electrode holder.
- 4.1.19 Ensure machine is turned off when not in use.
- 4.1.20 Keep dry and unobstructed around machine and holder. Do not stand in water or use wet gloves during welding operations.

## **4.2 Arc Welding (Shielded Metal, Gas Tungsten and Gas Metal Arc Welding)**

- 4.2.1 A proper ground must be used for electric welding. The use of rods, flat steel and homemade grounds are not permitted on this site. Make sure that the proper clamp is used and that the clamp goes from the work to the proper ground. Work with your foreman or Tesoro representative to ensure that the welding machine is grounded properly.
- Do not install weld grounding cable across pump or turbine to prevent damage to equipment.
  - Do not install weld grounding cable to Coker Crane rails or rail structure unless welding on the rail structure and the Coker Crane rail is de-energized.
  - Grounding cable should be as close to the weld as possible.
  - When making weld repairs to vehicles or crane, ensure battery is disconnected prior to welding.
  - Ensure Weld grounding cable is installed as close as practical to work
- 4.2.2 All rented welding machines will be inspected by the welder prior to use. All portable petroleum driven welding machines will be inspected prior to use. All welding machines must be inspected and approved by the Andeavor Environmental department prior to use.

## **5.0 OXY-FUEL GAS SAFETY**

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- 5.0.1 Oxy/Acetylene and other gas-type equipment must be maintained and in good condition. All personnel required to use a cutting torch on this site must be qualified to operate a cutting torch.

### **5.1 Perform the following safety steps when using Oxy-fuel Equipment:**

- 5.1.1 Fully release the adjusting screws and drain the regulator before attaching to cylinder, or before opening cylinder and after use, to prevent fire or explosion.
- 5.1.2 Test regulators and gauges periodically (each quarter).
- 5.1.3 Keep all oil and grease away from cylinder valves, regulators, etc.
- 5.1.4 Open cylinder valve slightly and close it before attaching regulator. This will aid in clearing foreign particles from cylinder connection.
- 5.1.5 Open cylinder valves slowly, so pressure in regulators increases gradually. Always open fuel gas first.
- 5.1.6 Inspect hoses and connections for leaks, burns, worn areas and other defects daily. The operator should visually inspect hoses and connections each day before using.
- 5.1.7 Store cylinders away from heat and in ventilated area.
- 5.1.8 Close valves on empty cylinders. Mark Empty and store separate from full cylinders. Different fuel gas cylinders must be stored at least 20 feet away from oxygen cylinders or have ½-in plate barrier between them.

- 5.1.9 Do not place where cylinder could become a part of an electrical circuit. Do not strike an arc on a cylinder.
- 5.1.10 Do not use cylinders as rollers.
- 5.1.11 Never tamper with valves or attempt to repair them.
- 5.1.12 Use only approved key or wrench to operate valve and leave it in place while cylinder is in service.
- 5.1.13 Cylinders should be transported in an upright position and secured. Use a suitable hand truck, fork truck, roll platform or similar device when transporting cylinders.
- 5.1.14 Make sure valves are tight on torch head.
- 5.1.15 Make sure connections are tight at all locations.
- 5.1.16 Use proper top or head on torch and keep clean.
- 5.1.17 Do not use valve handle as lever or hammer.
- 5.1.18 Always replace protective caps when gauges have been removed.
- 5.1.19 If an Acetylene cylinder is found on its side for any reason, place it in the upright position and secure it. Then, check with the cylinder manufacturer to determine the minimum time needed for the gas to settle out prior to using again.

## **6.0 WELDING EQUIPMENT USE AND CARE**

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### 6.0.1 Daily Care:

- 6.1.1 Welders shall visually inspect leads, whips, and other welding equipment daily. Any defective leads, whips, or equipment shall be removed from service and replaced or repaired.
- 6.1.2 Arc-welding cables shall be kept clear of traffic aisles and shall not be exposed to vehicular traffic unless protected from damage. Welding leads, when strung overhead, shall be maintained at least seven feet (7') above walkways and traffic aisles and be suspended by insulated hangers or rope. Allowing leads to lie on structural steel or process piping should be avoided.
- 6.1.3 Welding leads must be free from defects or damage and have fully insulated connections.
- 6.1.4 When electrode holders are to be left unattended, the electrodes shall be removed. In the event of a gas or vapor release or evacuation, shutdown all spark producing equipment.
- 6.1.5 Welding connections shall not be taped together



## 7.0 VENTILATION

- 7.0.1 If it is determined that mechanical ventilation is required, then:
- 7.1.1 If general dilution ventilation (or general exhaust) is used, a minimum rate of 2,000 ft<sup>3</sup> per minute (cfm) per welder, cutter or gouger is required.
  - 7.1.2 If local exhaust ventilation is used, a minimum velocity of 100 ft/min of local exhaust is required. It should be within 4-12" of the arc to maintain effectiveness.
  - 7.1.3 When welding on fluorine, zinc, lead, beryllium, cadmium, mercury or chromium-stainless steel (Refer to HSS-403 Hexavalent Chromium), then local exhaust ventilation shall be used, and the exhaust system shall be vented in a manner such that workers and others are not exposed to hazardous concentrations of toxic substances.

## 8.0 WELDING ON CHLORINATED SOLVENTS

- 8.0.1 Welding on or near chlorinated solvents can produce phosgene, a toxic gas. The effects of phosgene may not be immediate but can have long term severe health effects.
- Do not use any chlorinated solvents as cleaning agents for welding jobs.
  - Remove all traces of any chlorinated solvents before welding.

## 9.0 ELECTRIC POWERED WELDING MACHINES

- 9.0.1 Power supplied to electric welding machines must be inspected by the Electrical Department before being placed in service. The Electrical Department will operate the electrical breaker supplying power to the welding machine once the installation has been deemed acceptable.

## 10.0 REVISION LOG

<b>Title &amp; Procedure Number:</b>	HSS 635 Welding / Cutting Operations		
<b>Author/Owner:</b>	Brain Kirby	<b>Approver:</b>	Mike Kulakowski
<b>Reviewed By:</b>	Policy & Procedure Committee	<b>Document Administrator:</b>	D. R. Cannon
<b>Issuing Department:</b>	Safety	<b>Issue Date:</b>	5-22-2018
<b>Revision Date:</b>	5-16-2018	<b>Next Review Date:</b>	5-22-2021
<b>Revision Summary</b>			
Integrated and Updated the instruction to comply with Andeavor LAR standard.			