	MARATHON LOS ANGELES REFINERY Health & Safety Standing Instruction	HSS-401	
	Acid & Caustic Handling	Page 1 of 8	
		Reviewed Date: 1/20/23	Next Review Date: 4/24/2025

HSS-401 Acid & Caustic Handling

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1.0 INTRODUCTION

1.1 Purpose

HSS-401 provides requirements for safely working with equipment in acid or caustic service and the safe handling of acid or caustic products.

1.2 Scope

This standard covers all employees and contractors at Marathon Los Angeles Refinery (Carson Refinery, Wilmington Refinery, Cogen, Calciner, and Sulfur Recovery Plant).

Revision: 4	Prepared by: John Sullivan	Approved by: Sharon Callahan	Revised Date: 3/11/21
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2.0 REFERENCES

2.1 Marathon Standards

- RSP-1716-000 Personal Protective Equipment
- HSS 501 Personal Protective Equipment
- SAF -024 PPE Hazard Assessment, Hazard Assessment Table

2.2 Government Regulations

- Title 8, California Code of Regulations, Section 5162, Emergency Eyewash and Shower Equipment

3.0 DEFINITIONS

The following additional definitions are applicable to this Standing Instruction.

Table 1 Definitions

Term	Description
Acid & Caustic Equipment	Includes all equipment (e.g. pumps, pipes, etc.), that contains or has contained acid, ammonia, caustic, concentrated bleach, amines, catacarb or other hazardous substances as determined by the Operations Department.
Acid/ Caustic	Refers to streams with pH of ≤ 4 or ≥ 11
PH Scale	The pH scale is a measure of the acidic or caustic (basic) properties of a chemical material. The pH scale ranges from 0 to 14. Water is considered "neutral" at pH 7. As the pH goes toward "0", the material becomes more acidic; as the pH heads toward "14", the material becomes more caustic. The degree of hazard increases as a material becomes more acidic or more caustic.

4.0 GENERAL REQUIREMENTS

Breaking into corrosive chemical lines shall always be considered hazardous. Therefore, every precaution must be taken to prevent injury to personnel and damage to equipment. Careful planning and thought are necessary before installing blinds, replacing valves or removing sections of lines.

4.1 Basic Requirements

The following requirements apply for caustic or acid handling:

- Safety Showers and Eye Washes must be immediately accessible near the job site. If not available a portable eyewash or potable water must be provided for washing any part of the body which may come in contact with injurious corrosive materials.
- A fresh source of water must be supplied for washing off equipment and washing down any spills.



- c. All material and equipment shall remain clear of access so that access ways to the job or to the safety shower will not be blocked. This will include cranes, trucks, pallets, etc.
- d. All workers in the acid/caustic work area must have on the PPE indicated by the PPE matrix on *Table 2*
- e. The field operator from that operating department shall be present for first break into piping or equipment and monitor tasks until the work is complete.
- f. Each employee is required to wear acid/caustic gear until the total neutralization of the piece of equipment is assured.
 - o Acid/Caustic Gear (protective clothing, face shields, and chemical goggles, boots) is issued at the Warehouse on both LAR-C and LAR-W.

4.1.1 Acid and Caustic Areas

Goggles must be worn in all areas containing acid and caustic equipment in addition to required personal protection outlined for specific activities.

1. These areas are identified by striped lines or other means when there is not pavement.
2. By appropriate visible signs indicating the nature of the hazard or stating at minimum "GOGGLES AREA" in black lettering.
3. In areas where the ground cannot be painted (e.g., tank farm, unpaved areas), the signs must be clearly visible at all pedestrian walkways or next to the equipment.

4.2 Personal Protective Equipment (PPE)

The following PPE requirements apply for caustic or acid handling.

- a. Face shields, when required as outlined in *Table 2*, shall be worn over chemical goggles.
- b. Before using protective clothing, it shall be thoroughly checked by the user to ensure that the condition of the clothing will not allow acid or caustic to leak through the material due to holes, rips, or tears.
- c. Goggles, gloves, pants, jackets, and boots, when required, must be impervious to acids and caustics. The pants shall be worn over the outside of the rubber boots and the jacket shall be worn over the protective pants. (The jacket must be closed at the neck to protect the neck area.)
- d. Rain gear shall not be worn as a substitute for acid and caustic gear.
- e. Corrosive-chemical resistant gloves are to be used for tasks where there is the possibility of exposure to acid or caustic materials. The gloves shall be worn over the outside of the jacket. Cuffs may be rolled one turn when working in an overhead position to help prevent liquid material from running down the arms.
- f. When wearing full acid gear, the gloves shall be taped with chemical tape to the jacket in a manner adequate to prevent acid or caustic from penetrating the joint. In addition, pants shall be taped to the boots.



- g. When acid mist or vapor is present, a full Face air purifying respirator with a combination multi- gas/HEPA cartridges must be worn unless supplied air is warranted based on leak response level.

4.3 PPE Decontamination

- a. Protective clothing that has come in contact with acid or caustic shall be thoroughly rinsed with water before removing.
- b. No protective clothing that has come in contact with acid or caustic can be reused. Return used protective clothing to the collection bin at Waste Management Yard labeled Used Acid Gear for disposal.

4.4 First Aid

Any part of the body that is contacted by acid or caustic liquids must be immediately and thoroughly flushed with water, preferably potable, for a minimum of 15 minutes. Remove contaminated clothing to ensure water flush is contacting the skin. Portable or fixed eye washes, showers, clean water buckets, spray hoses, etc., are recommended for this service. Any resulting burn or irritation must be reported to supervision and/or Medical to receive first aid immediately.

- **Before beginning a job that involves potential exposure to an acidic or caustic material, each individual must be aware of the location of and access to the nearest safety shower and eyewash.**

5.0 EQUIPMENT

Careful planning and adequate lighting are necessary before installing blinds, replacing valves or removing sections of lines.

5.1 Equipment Preparation

The following requirements apply for breaking containment on any vessel, line, replacing valves, or installing blinds on any system containing or possibly containing acid or caustic.

- a. Prior to breaking containment, all equipment must be cleared of any corrosive chemical and depressured.
- b. Caustic lines/equipment will be thoroughly flushed with water and drained. If a large section of the line must be removed, it must be neutralized and water washed. It will be the responsibility of the operating department to determine how long to flush the line and to arrange for suitable disposal of water. It may be appropriate to test the flush water for pH to ensure that the system has been properly flushed.
- c. Acid lines/equipment will be completely drained and then purged and/or flushed. The material used in the flushing or purging process will depend on the specifics for each case. Possible flushing/purging materials may be air, water, or nitrogen.
- d. The amount of purging necessary, such as, where to hook up, how long to purge, etc., will be decided upon by the operating department.

- e. When purging, it is important that a check valve and a vent valve be installed. Past experience has proven that the check valve could leak and allow acid to back into the purge media. A vent valve installed downstream of the check valve will allow the line to depressure under controlled conditions.
- f. If it can be determined that the line is empty by checking bleeders near the point of the job, the job may proceed without further purging.

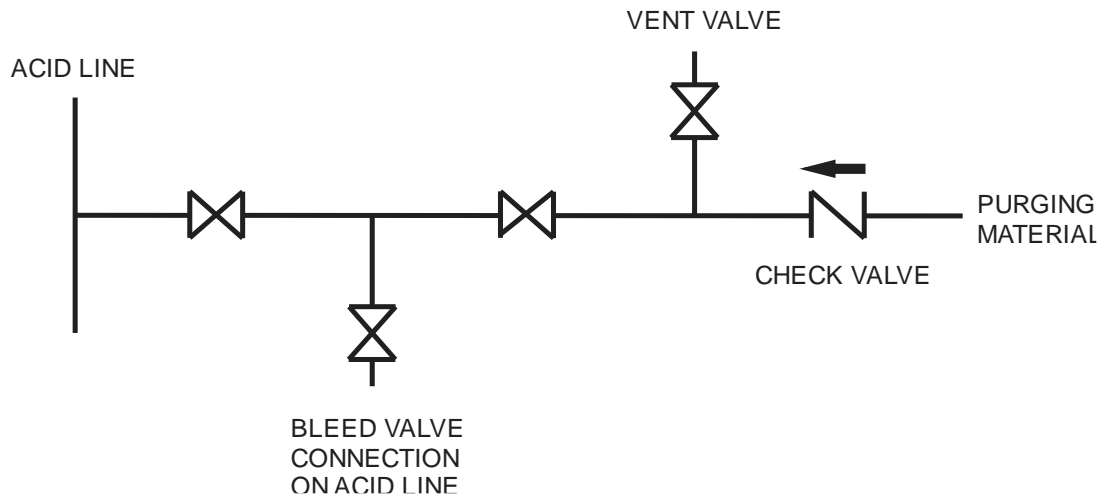


Figure 1 Purging Connection

- g. When breaking into flanges, the bolts on the far side of the flange must be first loosened so that any product will be directed away from worker, for more maintenance details refer to MNT-PIPE-004.

5.2 Work Completion

After work is completed, and as often as required during the course of the job, the following shall be completed:

- a. Work area must be cleared of any corrosive chemicals.
- b. All tools used shall be rinsed with water.
- c. All exposed equipment shall be rinsed with water.
- d. All valves, equipment, scrap and other materials such as packing which have been removed from the system shall be neutralized.
- e. Replace all protective flanges and valve covers in the system before returning to service.
- f. Any rags used to wipe tools or equipment shall be properly discarded so they cannot be used again.
- g. Items removed from acid or caustic service and sent out for further work or repair shall be tagged with the hazard warning of what the equipment contents were prior to removal from service.



- h. Return equipment to service, if applicable, after complete check of flanges, nipples, valves, gaskets, plugs, etc. See personal protection requirements for returning equipment to service, per *Table 2*.

Table 2 Acid & Caustic Tasks PPE Requirements

Below are the minimum PPE requirements for working with acids and caustics- For glove selection, use HSS 501 Appendix F		
Chemical	Activity	Minimum PPE (Must be Chemical Resistant)
<p>*Acid examples Sulfuric, Hydrochloric</p> <p>*Caustic examples, Lime, Potassium, Hydroxide, Sodium Hydroxide, Soda Ash, Bleach, Amines, Ammonia, Catecarb, Cleaners/Degreasers</p> <p>*Note: Please check SDS for pH of other chemicals not listed above for inclusion in table and associated ppe</p>	<p>Breaking containment on Equipment that has been water washed or decontaminated and verified by an operator through a pH check and documented on the permit unflanging lines, installing/removing blinds, breaking exchanger piping/heads, removing valve packing or bonnets, opening vessels or tank manways, disconnecting manifold piping</p>	<ul style="list-style-type: none"> • Goggles • Face shield • Gloves
	<p>Breaking containment on Equipment that has NOT been water washed, decontaminated or is the 1st opening unflanging lines, installing/removing blinds, breaking exchanger piping/heads, removing valve packing or bonnets, opening vessels or tank manways and, disconnecting manifold piping,</p>	<ul style="list-style-type: none"> • Goggles • Face shield • Gloves • Pants & Jacket or one piece suit • Boots • Tape Connections
	<p>Checking Levels during Railcar loading and Preparing Equipment for maintenance operator performed maintenance tasks such as tightening packings, flanges, etc.</p>	<ul style="list-style-type: none"> • Goggles • Face shield • Gloves
	<p>Sampling with Safeguards in place to protect personnel from splash Enclosed sample stations with closing door or Texas Sampler</p>	<ul style="list-style-type: none"> • Goggles • Gloves • Face shield • Jacket for High Pressure sample Points
	<p>Sampling without safeguards in place to protect personnel from splash Samples from Bleed Points or from locations with no engineered safeguards and off-loading/on-loading trucks</p>	<ul style="list-style-type: none"> • Goggles • Gloves • Face Shield • Pants & Jacket or one piece suit • Boots
	<p>Responding to leaks and releases (Without airborne mist/vapor)</p> <p>Leaks with airborne mist/vapor use respiratory protection under 4.2.g</p>	<ul style="list-style-type: none"> • Goggles • Faceshield • Gloves • Pants & Jacket or one piece suit • Boots



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		<ul style="list-style-type: none">• Tape Connections
	<p>When using cleaner/degreaser (soap)</p> <p>When applying soap on equipment and area that has a potential for splashing.</p>	<ul style="list-style-type: none">• Goggles• Gloves
	<p>Other work that is not likely to cause a release except where known and controlled</p> <p>Receiving and unloading to/from a closed system, Stop/start/switch pumps, Normal open and close of valves (not drains), Returning equipment to service, Lab work(dumping materials as waste, mixing chemicals outside a fume hood, cleaning material spills), Stripping paint</p>	<ul style="list-style-type: none">• Goggles• Gloves



Table 3 Types of Acid / Caustic Gear Available



	Pyrolon CR/FR	Dominator PVC on Nylon
Manufacturer/Distributor	Lakeland	MCR Safety
Acid Splash Protection (98%) Sulfuric Acid	If splashed, remove after rinsing within 20 minutes	If splashed, remove after rinsing within 60 minutes
Caustic Splash Protection (Sodium Hydroxide >70%)	If splashed, remove after rinsing within 8 hours	If splashed, remove after rinsing within 8 hours
Advantages (Comparison)	One piece, lighter weight, increased flexibility, elastic hood, wrists and feet, disposable	Two pieces, heavier weight, not susceptible to tearing, disposable
Limitations (Comparison)	Garment will tear if caught on bolts, flanges, blinds, harnesses and tools; overstretching	Garment weight limits mobility

6.0 CHANGE LOG

Date	Summary of Changes	By:
3/28/17	Integrated FS 480 – Acid and Caustic Equipment SI into HSS document for LAR use. Issued HSS-401 to LAR	Sharon Callahan
6/26/17	Added checking levels during railcar loading to Table 2	Sharon Callahan
4/24/20	No changes; update from Tesoro to Marathon	Sharon Callahan
3/11/21	Added Goggle Requirement when using Cleaner/Degreaser (Soap) to Table 2 Added amines and other chemicals to Table 2 Corrected Marathon References in Section 2	Sharon Callahan
1/20/23	Corrected bullet formatting in Table 2	Sharon Callahan