



## Los Angeles Refinery

# Safe Work Permit, Gas Tester & RAM Pocket Resource Guide

Safe Work Permit  
and Gas Tester Support:  
Contact your Safety Professional

Wilmington Radio Safety: C2  
Carson Radio Safety: C2

Sharepoint Site:

Sharepoint Site can be found on Marathon LAR homepage

3842625

9/27/2023

## Gas Testing Summary

	Task / Equipment	Gas Testing Requirements
<b>INSIDE PROCESS Unit / Tank Basin</b>	Vehicle Entry, Light Plants, Portable Compressors, Portable Engines	Initial Gas Test and Mid-Shift Gas Test
	Non-Attended Hot Work	Initial Gas Test and Mid-Shift Gas Test
	Opening an Energized Explosion-Proof Enclosure or Purged Enclosure in an Electrically Classified Area	Initial Gas Test and Mid-Shift Gas Test
	Attended Hot Work	Initial Gas Test, Mid-Shift Gas Test, <b>and</b> Continuous LEL Alarm
<b>OUTSIDE Process Unit / Tank Basin or inside pressurized building</b>	Non-Attended Hot Work	None
	Attended Hot Work	Initial Gas Test, Mid-Shift Gas Test, <b>and</b> Continuous LEL Alarm
<b>Confined Space Entry</b>	Confined Space Entry	Initial Gas Test, Mid-Shift Gas Test, <b>and</b> Continuous Multi-Gas Meter

## Guide for Authorized Gas Testers: MX-6 Response

Sensor	1/2 Face Multi-gas Combo	Full Face Multi-gas Combo	Supplied Air	PEL (8hrs)
				IDLH
<b>Oxygen</b>	None	None	No work if less 19.5%	19.5 - 23.5% < 19.5%
<b>% LEL</b>	None	None	1-10%; 10-19% - Co-Signers Required ≥20%, Variance Required	<10% >10% LEL
<b>Carbon Monoxide</b>	None	None	≥25 ppm	25 ppm 1200 ppm
<b>Hydrogen Sulfide</b>	None	10-49 ppm (if approved)	≥10 ppm	10 ppm 100 ppm
<b>Sulfur Dioxide</b>	None	0.5-100 ppm	≥100 ppm	2 ppm 100 ppm
<b>PID: including benzene streams</b>	20-199 ppm	200-999 ppm	≥1000 ppm	300 ppm 1000 ppm

Questions or Concerns? Contact Health and Safety on radio C-2. Rev 07/20

### Minimum Respiratory Protection Requirements for Welding/Hot Work

Rev. 9/2023

#### Open Space = Half Mask-HEPA (HH), Full Face-HEPA (FFH)1, or Supplied Air (SA)

	Carbon	Stainless or Alloys	Coated Metals, (e.g., galvanized structures) <0.06% lead	Coating of lead-containing material, including galvanized coating at or above 0.06% lead 2
Grinding	Not Required	HH	HH	HH w/ goggles or FFH2
Stick	Not Required	HH	See Note 3 below. Remove any coating to base metal and proceed with chart requirement or use SA.	See Note 2 below. Remove lead coating to base metal and proceed with chart requirement or use SA.
TIG or Heli-Arc	Not Required	HH		
MIG	Not Required	HH		
Oxy/Acetylene Torch Cutting	HH	HH		
Arc Gouging	HH	HH		

2. Lead-containing material must be handled by documented Lead-Awareness Trained Personnel per MRAL06.  
3. Coatings shall be stripped at least 4 inches from both sides of a weld per Cal-OSHA 1537, or SA is required.

#### Confined Space = Supplied Air (SA), Half Mask-HEPA (HH) or Full Face-HEPA (FFH)1

	Carbon	Stainless or Alloys	Coated Metals, (e.g., galvanized structures) <0.06% lead	Coating of lead-containing material, including galvanized coating at or above 0.06% lead 2
Grinding	HH	HH	HH	HH w/ goggles or FFH
Stick	HH	HH	See Note 3 below. Remove any coating to base metal and proceed with chart requirement or use SA.	See Note 2 below. Remove lead coating to base metal and proceed with chart requirement or use SA.
TIG or Heli-Arc	SA	SA		
MIG	SA	SA		
FCAW	SA	SA		
PAC/W	SA	SA		
Oxy/Acetylene Torch Cutting	SA	SA		
Arc Gouging	SA	SA		

1. When metal has been in sour service, a full face respirator with combination (multi-gas/HEPA) cartridges must be used due to the generation of sulfur dioxide unless supplied air respirators are required.  
2. Lead-containing material must be handled by documented Lead-Awareness Trained Personnel per MRAL06.  
3. Coatings shall be stripped at least 4 inches from both sides of a weld per Cal-OSHA 1537, or SA is required.  
4. Thermal Metal Application requires a Chromium (VI) decontamination plan; contact the Health group.  
5. **New construction welding in confined spaces must be evaluated by the Health group (Radio Cc-15; Wc-2).**

## Heat Illness Prevention

Flag Conditions	Air Temperature	Temperature with Chemical Protective Suits	Required Job Conditions for Workers
<b>White</b>	< 80°F	< 70°F	No restrictions
<b>Green</b>	80°F – 84°F	70°F – 74°	Water and shade must be as close as practicable.
<b>Yellow</b>	85°F – 94°F	75°F – 84°F	Water/shade must be as close as practicable. Implement work rest cycles based on permit conditions.
<b>Red</b>	95°F – 109°F	85°F – 99°F	<ul style="list-style-type: none"> <li>Water/shade must be as close as practicable.</li> <li>Contact the Health for temperature readings and work/rest cycles.</li> <li>Consider the following:               <ul style="list-style-type: none"> <li>include a buddy system/constant communication with workers, and</li> <li>"effective" observation and monitoring of symptoms occur based on Table 2;</li> <li>if symptoms occur, seek first aid or emergency response</li> </ul> </li> </ul>
<b>Black</b>	110°F - 119°F	100°F - 109°F	Contact Health for additional conditions
Mental State	Dehydration	Heat Exhaustion	Heat Stroke
	Conscious, may be <b>dizzy</b>	Conscious, may be <b>dizzy</b>	Sudden <b>collapse</b> , unusual behavior, altered mental state
Body Temperature	Normal	Normal	Hot, elevated
Other Symptoms	Headache, <b>Dry Mouth</b> , Loss of Skin Turgor (remains elevated when pinched)	Weakness, Headache, Dry Mouth, <b>Nausea</b> , Muscle Cramps, Muscle Spasms	Red Face/Skin, Strong Rapid Pulse, Wet or <b>Dry Skin</b> , Most likely sweating in younger individuals

## Acronym List

<b>SWP</b>	Safe Work Permit
<b>JSA</b>	Job Safety Analysis
<b>JPO</b>	Job Plan Overview
<b>JJSV</b>	Joint Job Site Visit
<b>RAM</b>	Risk Assessment Matrix
<b>PID</b>	Photoionization Detector
<b>PTL</b>	Permitted Task List
<b>SDS</b>	Safety Data Sheet
<b>OD</b>	Owning Department
<b>SG</b>	Servicing Group
<b>OMC</b>	Operations Maintenance Coordinator
<b>OSS</b>	Operations Shift Supervisor
<b>RSS/501</b>	Refinery Shift Superintendent
<b>ATL</b>	Area Team Lead

# INVASIVE WORK RISK ASSESSMENT MATRIX (RAM)

Invasive work is work that expects to require exposure to the internals of a vessel, pump, exchanger, or any other piece of refinery equipment (i.e. piping, sewers, tanks, hoses, etc)

Exposure Concern		Exposure Volume		Exposure Impact	
<b>Concern:</b>	<b>Score:</b>	<b>Volume:</b>	<b>Score:</b>	<b>Exposure:</b>	<b>Score:</b>
IDLH Atmosphere	1	“Live” Equipment	1	Large Impact	1
Material above Auto Ignition	1	Large Volume	1	Medium Impact	2
Corrosives – Acid/Caustic	2	Medium Volume	2	Small Impact	3
Over PEL, STEL or 1-10% of LEL	2	Small Volume	3	Low Impact	4
Hot Service – Above 140°F	3	Low Potential	4	No Impact	5
Other Material	10	No Volume	6		
<ul style="list-style-type: none"> <li><b>IDLH Atmosphere</b> – Equipment or piping systems that contain material immediately dangerous to life and health. Examples: toxic chemicals above their IDLH or inert atmospheres.</li> <li><b>Material Above Auto-Ignition Temperature</b> – Equipment or piping systems that contain material that will auto-ignite upon contact with the atmosphere.</li> <li><b>Corrosives – Acid/Caustic/KOH</b> - Equipment or piping systems that contain material with any caustic, acid or KOH mixture.</li> <li><b>Over PEL, STEL or 1-10% of LEL</b> - Equipment or piping systems that contain material that is above the Permissible Exposure limit, Short Term Exposure Limit or between 1% and 10% of the LEL.</li> <li><b>Hot Service – Above 140° F</b> - Equipment or piping systems that contain material that is above 140° F. This include hydrocarbons, catalyst, steam, condensate and Boiler Feed water.</li> <li><b>Other Material</b> – Utilities such as air and water that are low temperature and low pressure or any stream that does not meet any of the exposure concerns listed above.</li> </ul>		<ul style="list-style-type: none"> <li><b>“Live” Equipment</b> – Any equipment or piping circuit that is still in service or not completely isolated. <b>Examples</b> – Tightening leaking flanges or process connections, or any equipment or system that has been isolated but the isolation valves are known to be leaking.</li> <li><b>Large Volume</b> – Towers, vessels, receivers, and large bore piping circuits.</li> <li><b>Medium Volume</b> – Knock-Out drums, pumps, compressors and piping systems.</li> <li><b>Small Volume</b> – Transmitter impulse lines, sight glass assemblies, sample stations and small bore piping.</li> <li><b>Low Potential</b> – All volumes that have been quantifiably decontaminated or the volume contained between a standard isolated bleeder of less than 1” in size and its plug or cap.</li> <li><b>No Volume</b> – Verified by Operations to be free of any volume.</li> </ul>		<p><b>Exposure Impact</b></p> <ul style="list-style-type: none"> <li><b>Large Impact</b> – Could have off-site impact.</li> <li><b>Medium Impact</b> – Could have a refinery wide impact.</li> <li><b>Small Impact</b> – Could have an impact contained to the local unit.</li> <li><b>Low Impact</b> – Could have a localized impact at the invasive work site.</li> <li><b>No Impact</b> – No negative impact to the invasive work site expected due to successful energy isolation, material below 140°F and verified free of volume and H2S.</li> </ul>	

# BLANKET WORK PERMIT

You can **ALWAYS** blanket these items with another task on a permit:

- Inspection, except radiography, magnetic particle test, and penetrant testing.
- Crane supporting a task.

A blanket work permit may be issued to Servicing Group Representatives to perform work in multiple locations when the following conditions are met:

- The work remains under the responsibility of the operator that issued the original permit or a relieving operator.
- The work scope is the same at all locations and does not change once the work permit is approved and issued.
- The level of required personal protective equipment (PPE) and safeguards are the same for each work location.
- A Joint Job Site Visit (JJSV) is conducted at each work location.
- The Servicing Group Representative (individual receiving the permit) is performing or directing tasks at all job sites.

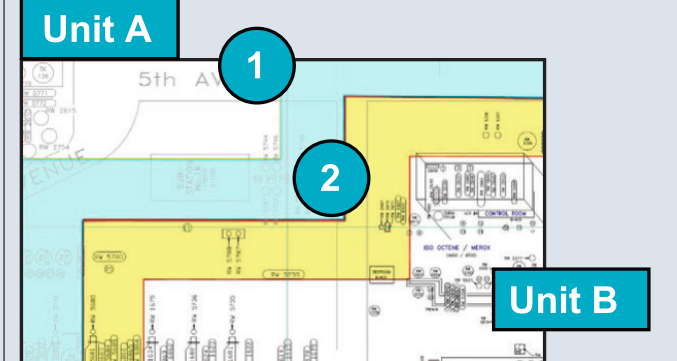
In order for work in multiple locations to be included on a blanket work permit, each location and piece of equipment must be documented on the permit. For example, to include the pulling of three separate control valves on one blanket permit, the conditions in the bullet points above must be met and the valve numbers must be documented on the permit.

**Note:** If an equipment list will be used because the space on the Detailed Work Description section of the Safe Work Permit does not suffice, the Owning Department Representative and Servicing Group Representative must identify each item on the equipment list by circling or highlighting the item and initialing next to each item. Two copies of the initialed equipment list with the identified equipment must be made. Both the Owning Department Representative and Servicing Group Representative must keep an initialed copy throughout the permit duration.

## Affected Areas & Buffer Zones

**Affected Area:** Any area affected by work in another area such as:

- work on common utility lines
- work on product/feed lines
- work in one area that affects a nearby area.



**Buffer Zone:** The last 50 Feet of an operating area including roadways between 2 units.

The purpose of buffer zones is to be sure the person responsible for the area near your task is aware of what is in progress and can ensure there are no SIMOPS conflicts (e.g. hot work, breaking containment).

If the task requires potentially hazardous work in a buffer zone, the Operator of the Affected Area must sign the permit.

## Vehicle Entry Guidelines

- Vehicles entering process units, including tank basins not designated as green, will require a Safe Work Permit for each shift.
- The Vehicle Entry can be included in a Blanket Permit for the task to be performed if the Blanket Work Permit criteria is met.
- A route verification, including an initial gas test, will be required.
- If the work lasts longer than 4 hours, a mid-shift gas test is required.
- Ops may pull the Safe Work Permit if conditions change.

- Authorized gas testers are those who have successfully completed Gas Tester training.
- Continuous gas monitoring **not required** for engines left running (i.e. vehicles, light plants, compressors).



## RAM Score: 1-12

### Level 1 Mitigations

#### Inhalation Hazard

- Breathing air
- Eductor or air mover to dilute and/or move toxic emissions from the work area.

#### Corrosive Material

- Chemical resistant suit
- Face shield & goggles
- Chemical gloves and boots

#### Material above Auto-Ignition Temperature

- Verify isolations and cool down below auto-ignition temperature before doing invasive work.

#### Fire or Hot Oil Hazard

- Heat resistant protective clothing

#### Miscellaneous Mitigations

- (Can be used with any of the above mitigations)
- Bleeder cleaner tool
  - Face shield, goggles and protective clothing

## RAM Score: 14-46

### Level 2 Mitigations

#### Inhalation Hazard

- Eductor or air mover to dilute and/or move toxic emissions from the work area.
- Air purifying respirator
- Route potential source to safe location using tubing or pipe.

#### Corrosive Material

- Chemical resistant suit, gloves, boots
- Face shield & goggles

#### Hot Service (Above 140o F)

- Heat resistant clothing
- Route potential source to safe location using tubing or pipe.

#### Fire Hazard/LEL Mitigation (non-confined space)

- Air Mover
- Continuous LEL Monitoring
- Non-Sparking tools

#### Miscellaneous Mitigations

- (Can be used with any of the above mitigations)
- Bleeder cleaner tool

## Score >46

### Level 3 Mitigations

- Normal Refinery PPE
- Standard Work Practices

Risk Assessment Scoring Equation: Exposure Concern  x Exposure Volume  x Exposure Impact  =RAM Score