HF Alky Unit PPE Guide

ALL PPE TO BE USED IN THE ALKY UNIT MUST BE THOROUGHLY INSPECTED, BY THE USER, PRIOR TO USE.

Operations Job Task Matrix				
Task	**Minimum Level of PPE Required**			
	A	**B**	**C**	**D**
Respond to HF acid release or emergency isolation.	X			
Isolate pumps, valves, and/or lines in the HF Acid section from equipment that has failed and is leaking to atmosphere.	X			
Connect and disconnect hoses to/from the HF Acid truck.		X		
Gauge the acid section vessels using tri-cocks.		X		
Open drain valves (venting) to atmosphere in the HF acid section.		X		
Blow down the acid service "Y" strainers to the atmosphere.		X		
Open a low point valve/flange in the HF Acid section even if other sections of the piping have been opened.		X		
Catch an un-neutralized ASO/polymer sample.		X		
Catch an HF Acid sample or a recycle isobutane sample if the recycle isobutane is not neutralized with a KOH scrubber.		X		
Remove bull plugs in lines in the HF Acid section. Note: It does not matter how many isolation valves are upstream of the bull plug.		X		
Remove pressure gauge on lines in the HF Acid section. Note: It does not matter how many isolation valves are upstream of the pressure gauge.		X		
Work on any depressured equipment in the acid section that is NOT blinded at the first flange.		X		
Catch a recycle isobutane sample it is neutralized with a KOH scrubber and the scrubber's KOH is replenished on a frequent basis per a PM schedule			X	
Blow down acid section pump "Y" strainers to the flare header.			X	
Catch a non-acid section sample when an HF Acid leak into the non-acid section is suspected. Non-acid Section Example: Cooling water, alkylate, condensate)			X	
Climbing stairs or ladders (including scaffolds) to perform Class C tasks			X	
Open and close valves in the acid section where product is not vented to atmosphere.			X	
Perform the following in the Alky Caustic section: • Catch caustic and spent caustic samples, and • Determine pH or gravity of caustic or spent caustic.			X	
Initial line-up of HF Acid pumps which includes the following: • Open the pump suction valve, • Open the pump discharge valve, and • Open the pump seal flush valves.			X	
Switch acid section pumps that are lined up for service.			X	
Line up a sight glass in acid service.			X	
Transfer acid to/from the Storage Tank. Note: This does NOT include tri-cock gauging of acid section valves.			X	
Obtain routine hydrocarbon samples that may contain trace amounts of HF.			X	
During a unit startup when HF Acid is being added to the unit.			X	
Drain/refill the acid section pumps' seal flush pots with the pot's isolation valves closed.			X	
Unload HF Acid trucks after the truck's hoses are connected and tightness tested. Note: This does NOT include connecting/ disconnecting the truck's hoses.			X	
Washing down the unit (inside acid curb area).			X	
NOTE: ***For any invasive work in the non-acid section of unit 27, the permit is required to identify the hazards and assess the risks by using the Risk Assessment Matrix (RSW-A-011-GV)***				
Perform the following preventive maintenance on all Alky Unit pumps: • Check and replenish pump bearing oil level, • visually inspect pump seal for leakage, • read pump suction and discharge pressure, • inspect pump casing for leakage, and • inspect pump seal pot pressure/level.				X
Visually inspect valves, piping, fittings, exchangers, and vessels for signs of corrosion or leaks.				X
Visually determine the spent caustic pit level.				X
Inspect firefighting and deluge equipment, safety showers and eye wash stations that are inside of battery limits.				X
Switch non-acid section pumps that are lined up for service.				X
Read meters and gauges.				X
Open and close valves in the non-acid section.				X
Obtain the samples which do NOT contain HF Acid or caustic.				X
Perform routine Alky Unit housekeeping duties which does NOT include washing down the unit or touching materials that may be contaminated with HF acid.				X
Drain/refill the non-acid section pumps' seal pots.				X
Drain water from KOH Treaters.				X
Open drain valves in non-acid section.				X
Initial line up of non-acid section or non-caustic pumps.				X
Catch a routine cooling water or condensate sample and determine its PH when an HF Acid leak is NOT suspected.				X
Climbing stairs or ladders (including scaffolds) to perform Class D tasks where no acid is expected.				X

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Maintenance Job Task Matrix				
Task	**Minimum Level of PPE Required**			
	A	**B**	**C**	**D**
Install or remove blinds in acid section.		X		
Initial opening of acid section equipment after blinding.		X		
Work on any depressured equipment in the acid section that is NOT blinded at the first flange.		X		
Remove valves in acid service if NOT blinded.		X		
Connect shutdown piping to low point in acid section.		X		
Disconnect shutdown piping from the process in acid section.		X		
Initial breaks of exchanger shell and tube sides.		X		
Initial break of pump seal gland for acid section pump after blinds are installed.		X		
Remove the plug from a transmitter tap in the acid section.		X		
Depressuring to atmosphere a transmitter in the acid section.		X		
Replace a transmitter in the acid section.		X		
Jetting/power-washing HF acid-containing equipment that has been neutralized and opened with no HF vapors present – A respirator is not required with the air fed hood because respiratory protection is not required; only splash protection is required.		X		
Replacing head bolts on a pump case one at a time in acid section.		X		
Climbing stairs or ladders (including scaffolds) to perform Class C tasks.			X	
Build/revise/remove scaffolding that has NOT been thoroughly washed with water or neutralized.			X	
Remove acid section shutdown piping after it has been disconnected from the process.			X	
Replace pump seal in acid section pump after blinded and initial break of seal gland.			X	
Open/close transmitter valves in acid section when NOT venting material to the atmosphere.			X	
Calibrate a transmitter in the acid section when NO venting or initial break occurs.			X	
Disassemble equipment that has been opened and neutralized (includes work at the shop).			X	
Perform external inspections in acid section where physical contact with acid section equipment is expected.			X	
Replace flange bolts in acid section one at a time when there is no visible sign of leakage.			X	
Working on acid section equipment after it has been blinded and after the initial opening has occurred.			X	
Hot bolt flange in acid section after the system is depressurized.			X	
Repair or replace valve operators in acid section.			X	
Replace valve packing in acid section after the valve has been opened and neutralized.			X	
Uncouple acid section pump that has been depressured.			X	
Add oil to acid section pump seal pot with the pot's isolation valves closed.			X	
Remove/install insulation in acid section.			X	
NOTE: ***For any invasive work in the non-acid section of unit 27, the permit is required to identify the hazards and assess the risks by using the Risk Assessment Matrix (RSW-A-011-GV)***				
Build/revise/remove scaffolding that has been thoroughly washed with water or neutralized.				X
Install shutdown piping without connecting piping to process.				X
Connect shutdown piping to low point in non-acid section.				X
Disconnect shutdown piping from the process in non- acid section.				X
Remove non-acid section shutdown piping after it has been disconnected from the process.				X
Climbing stairs or ladders (including scaffolds) to perform Class D tasks where no acid is expected.				X
Perform maintenance activities in non-acid section.				X
Take vibration readings in acid and non-acid sections when the pump is only touched with the probe.				X
Connect or disconnect air and electronics from control valve.				X
Connect or disconnect electronics from an instrument.				X
Painting.				X

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Turnaround Job Task Matrix

Task	Minimum Level of PPE Required			
	A	B	C	D
Open drain valves (venting) to atmosphere with no scrubbing of the vapors in the HF acid section to check lowpoints for liquid hydrocarbon during the unit shutdown.		X		
Remove bull plugs from bleeders (includes instrument bleeder plugs) in lines in the HF Acid section prior to the unit being chemically cleaned with the EnvTech cleaning process or prior to first breaks being completed following the acidizing process.		X		
Remove bull plugs from bleeders in lines and blowing down bleeders in the HF Acid section during the acidizing chemical cleaning process prior to the neutralization phase of the process.		X		
All first breaks for all acid piping, vessel, and exchanger circuits even if the unit has been chemically cleaned and neutralized.		X		
Connect shutdown piping to low point bleeders in acid section prior to the unit being chemically cleaned and neutralized.		X		
Disconnect shutdown piping from the process in the acid section if the piping and process has ***not*** been neutralized.		X		
Jetting/power-washing HF acid-containing equipment after the unit has been chemically cleaned, neutralized and opened with no HF vapors present - **A respirator is not required with the air fed hood because respiratory protection is not required; only splash protection is required.**		X		
After all first breaks have been completed for all acid piping, vessel, and exchanger circuits following chemical cleaning/neutralization.			X	
Open drain valves (venting) to atmosphere when the vapors are scrubbed to eliminate HF fumes (such as routing vapor into half barrel full of a neutralizing solution) in the HF acid section to check low points for liquid hydrocarbon during the unit shutdown.			X	
Remove bull plugs from bleeders (includes instrument bleeder plugs) in lines in the HF Acid section during ***EnvTech chemical cleaning*** process after the EnvTech solution has been circulated through the unit and verified to be neutral or basic. Prior to removing the bull plug the valve must be opened to allow the neutralizing solution to get between the valve and the bleeder. Then close the valve and then slowly remove the bull plug.			X	
Blow down instruments and bleeders during EnvTech chemical cleaning procedure after the EnvTech solution has been circulated through the unit and verified to be neutral or basic. Prior to removing the instrument's or bleeder's bull plug the valve must be opened to allow the neutralizing solution to get between the valve and the bleeder. Then close the valve and slowly remove the bull plug.			X	
Blowing down bleeders in the HF Acid section during the acidizing chemical cleaning process during the neutralization phase of the process after the system's pH is verified not to be acidic.			X	
During a unit startup when HF Acid is being added to the unit.			X	
Disconnect shutdown piping from the process in acid section after the unit has been chemically cleaned and depressured.			X	
Remove acid section shutdown piping after it has been disconnected from the process.			X	
Opening manways on columns after the unit has been chemically cleaned and neutralized and an initial break has been completed on the system.			X	
Hot bolt flange in acid section after the system is depressurized but has not been chemically cleaned and neutralized.			X	
NOTE: ***For any invasive work in the non-acid section of unit 27, the permit is required to identify the hazards and assess the risks by using the Risk Assessment Matrix (RSW-A-011-GV)***				
Following a unit shutdown in which the entire unit with the exception of the HF acid storage tank has been chemically cleaned and neutralized, the unit (does not include HF acid storage tank) can be treated as being non-HF acid for the unit startup/dryout process while the acid is stored in the storage tank and blinded off from the unit. This applies for activities such as switching pumps, opening bleeder valves to atmosphere, manipulating valves, calibrating transmitters, etc.				X
Repair or replace air-operated or motor-operated components of valves in acid section after the unit has been chemically cleaned and neutralized.				X
Add oil to acid section pump seal pot with the pot's isolation valves closed after the unit, pump, and seal pot and have been neutralized and initial break has occurred.				X
Hot bolt flange in acid section after the system has been chemically cleaned, neutralized, and depressured.				X
Build/revise/remove scaffolding that has been thoroughly washed with water and/or neutralized if necessary.				X
Install shutdown piping without connecting piping to process.				X
Connect shutdown piping to low point in non-acid section.				X
Disconnect shutdown piping from the process in non- acid section.				X
Remove non-acid section shutdown piping.				X
Climb scaffolding after the unit has been chemically cleaned and neutralized and the scaffolding has been washed thoroughly with water and neutralized if necessary.				X

PPE Exceptions by Employee Group

General Unit Access: If detailed tasks are performed in the unit that does not require touching equipment/piping or climbing such as writing, walking down blind or work list, or inputting data into data loggers, only nitrile or viton gloves are required for hand protection.

A minimum of Class D PPE is required to enter the unit.

NOTE: For any invasive work in the non-acid section of unit 27, the permit is required to identify the hazards and assess the risks by using the Risk Assessment Matrix (RSW-A-011-GV)

Welders	Welders are to wear the following PPE instead of a face shield, acid resistant jacket, and acid resistant gloves while welding: • Welding gloves, • Welding hood, and • Nitrile or viton gloves are to be worn under the welding gloves. **Important:** Welding gloves should be neutralized then disposed of at the end of each work day.
Insulators	Insulators are to wear cut resistant gloves instead of acid resistant gloves while installing insulation in the acid and non-acid sections or removing insulation in the non-acid section. Nitrile or viton gloves are to be worn under the cut resistant glove. **Important:** Class C PPE including acid resistant gloves are to be worn when removing insulation from the acid section.
Machinists	Machinists can wear nitrile glove liners instead of acid resistant gloves while performing detailed work on pumps after the pump has been blinded, opened, and neutralized.
Instrument Technicians and Electricians	Instrument Technicians and Electricians can wear only nitrile or viton gloves instead of the acid resistant gloves when performing very detailed work.
Crane/Heavy Equipment Operator	Crane/Heavy Equipment Operators (does not include carry decks) are not required to wear Alky PPE when in the cabin; however, if the Operator exits the cab and enters the Alky Unit then the appropriate Alky PPE per job task is required.
Personnel Working Inside Neutralized HF Alky Vessels/Towers	After HF Alkylation Unit vessels are neutralized, water rinsed and neutral pH results are verified for vessel internals by Operations (while wearing standard Level C PPE), Lakeland Pyrolon® CBFR coveralls may be worn by personnel conducting work activities inside these vessels/towers. Pyrolon® CBFR coveralls are one-piece chemical resistant suits and may be worn in place of the Level C bib and jacket. HF Alky foot and hand protection shall be worn in addition to the CBFR coveralls. The use of Pyrolon® CBFR increases worker mobility for activities such as climbing between trays and moving inside vessels/towers while affording an equivalent level of protection to standard Level C PPE. Each Pyrolon® CBFR coverall shall be single use only. New coveralls shall be obtained at the beginning of each work shift, replaced if damaged and disposed of at the end of each shift or upon completion of the work activity. All used coveralls shall be disposed of according to the Site HF Alky Unit PPE disposal procedure.

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Alky Level D:

Minimum level of PPE required to enter process, chemical treatment or storage areas of the HF Alky Unit for any reason. Process, chemical treatment or storage areas are defined as: anywhere on the slab and areas on gravel within 20 feet of equipment.

1) Hard hat and hearing protection (>25 NRR plugs or muffs).

2) Personal H_2S Monitor.

3) Full-body fire retardant clothing.

4) Face-shield and safety glasses with side shields.

5) PVC or neoprene gloves must be in your possession at all times. These gloves must be worn to touch any equipment, ladders, etc. in the unit.

Nitrile glove liners can be worn to walk through the unit if nothing will be touched.

Exception: Instrument and electrical technicians may wear nitrile glove liners to work on non acid equipment when enhanced dexterity is required.

Alky Level C:

Minimum Level of PPE required to work on equipment in the acid or caustic (KOH) areas of the HF Alky Unit

1) Hard hat and hearing protection (>25 NRR plugs or Muffs)

2) Person H2S monitor

3) Full-body fire retardant clothing

4) Face-shield and indirect vented or unvented chemical splash goggles.

5) Nitrile glove liners must be worn at all times.

6) PVC or neoprene gloves must be worn at all times. Use of support rings is recommended.

7) HiGlo PVC acid pants and coat.

8) Foot Protection options below:
- PVC overboots (12 inch or greater) worn over steel toed boots.
- Steel toed PVE or neoprene boots (12 inch or greater).

9) Personal cooling Devices – For duration of greater than 15 minutes when temperature exceeds 80*F.
- Personal air conditioner/vest – Personal AC is plant air powered and the vest provides cold air distribution to chest and back.
- Isotherm cool vest – (For work requiring movement around equipment).

Alky Level B:

Minimum level of PPE required to open any bleeder, instrument, pipe or vessel in the HF Alky Unit that may contain HF acid.

1) Hard hat and hearing protection (>25 NRR Plugs or Muffs).

2) HiGlo PVC acid pants.

3) Nitrile glove liners must be worn at all times.

4) PVC or neoprene gloves with support rings must be worn at all times. Gloves with support rings must be pulled tight into hooded coat sleeve cuffs to form a liquid/vapor seal.

5) Full face supplied air respirator with 5 minute escape pack.

6) HiGlo PVC plant air feed hood.

7) Foot protection options are limited to steel toed PVC or neoprene boots (12 inch or greater).

8) Personal air conditioner - For work duration of greater than 15 minutes when temperature exceeds 80° F.

Alky Level A:

Fully encapsulating suit and SCBA (not shown) to be used by trained Marathon personnel for emergency response.