



SARNIA REFINERY

**PERSONAL PROTECTIVE EQUIPMENT:
HYDROFLUORIC ACID AND ACID SOLUBLE OIL**

Issue Date: February 4, 2020 Revision #: 8 Next Review Date: November 4, 2024

STANDARD

Document Number:
4000-ZSD-S-MSAFeca-00214

Document Owner: Manager, EH&S

Document Contact: Occupational Hygienist

SCOPE AND PURPOSE

This standard sets out the operational controls and expectations & accountabilities for personal protective equipment requirements to reduce the risk of exposure to Hydrofluoric Acid (HF Acid) or Acid Soluble Oil (ASO).

ROLES AND RESPONSIBILITIES

All workers are accountable to comply with this standard.

Operations Employees are accountable to this Standard and to follow operating procedures and routines.

All Leaders are accountable to ensure their workers are trained and comply with the standard. Leaders will conduct periodic documented inspections to ensure compliance with the PPE requirements specified in this standard.

Operations Leaders are accountable to this Standard and to develop and maintain operating procedures and routines to achieve this Standard.

Plant 1 Operation Manager is accountable to review and approve the type of PPE used in HF Acid areas and ensure the inventory of Alky PPE is sufficient.

Occupational Hygienist will:

- provide technical support to the Plant 1 Operations Manager for PPE selection
- audit inspection results periodically to ensure deficiencies are corrected
- conduct a comprehensive audit to review PPE practices in HF Acid areas at least annually.

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Change House Attendant is accountable to inspect Alky PPE during the cleaning process and before making each item available for use and to report any defective equipment to the Facilities Planner.

Facilities Planner will order the necessary Alky PPE and ensure it is delivered to the appropriate change room.

Permit Receivers are accountable to ensure all workers working under their permit are Alky Unit Certified

The **Joint Health and Safety Committee** will be invited to participate in and or review audit findings.

EXCEPTIONS

There will be no exception to this Standard without the permission of the Operations Director. Approval will be considered only after completion of a formal risk assessment. Our Management of Change process will be employed to document mitigating actions, assign accountabilities and track the abnormal condition. The Management of Change document must be reviewed and approved by the Director of Operations before permission is granted.

RISK CONTROLS

Identification of HF Acid Areas

Areas containing HF Acid are restricted entry areas and identified by orange chains and/or signs. These areas include:

- Alkylation Unit (including the NASO Skid area)
- Acid De-Inventory Tank (19V020)
- 11H113 firebox and convection sections

Any area within the Alky Unit where equipment containing HF Acid has the possibility of being emitted to the atmosphere, by means of venting, blanking or equipment removal, will be identified by orange "HF Acid" danger tape.

During maintenance work on the East Side of the Alky Unit, moveable barrier chains will extend around the work area away from the dyke wall.

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Controlled Access to HF Acid Areas

WB/WD Operators are granted permission to enter HF Acid areas by virtue of their qualification.

Under normal operating conditions (outside of a turnaround) access into these areas will be controlled as follows:

- Anyone entering HF Acid areas, excluding WB/WD Operators, must have completed the Alkylation Unit Certification Training Program within the past two years, or be accompanied by Operations or someone who is currently Alky Unit Certified.
- Anyone performing “hands on work” must be Alky Unit Certified.
- Individuals requiring a safe work permit as defined in the Safe Work Permit standard will obtain it from CB#1 for HF Acid areas; Personal protective equipment requirements will be specified on the permit (as per this standard).
- Individuals who do not require a safe work permit must sign in and out (times and reason for entry) on an entry log in CB#1 for HF Acid areas, before entering the unit. Personal protective equipment requirements will be reviewed and specified at that time (as per this standard).

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Alky PPE Classifications (Table 1)

Protection Class	When to Use	Requirements	Heat Stress Controls <i>(The Heat Stress Standard shall be referenced when considering controls)</i>
Class A	When exposure to HF vapor and liquid is expected	<ul style="list-style-type: none"> Totally enclosed acid resistant and flame retardant pressurized, suit with a Scott 4.5 Self-Contained Breathing Apparatus (SCBA) or airline fed respirator with escape pack An operator with radio monitoring the activity Work must be conducted in pairs with two additional workers dressed and ready to assist 	A Class suit is considered emergency work. This work is outside the constraints of the Heat Stress Screening Table. Work may be performed provided the on scene Command Officer or delegate closely monitors the work to evaluate controls as appropriate.
Class B	When HF exposure is anticipated	<ul style="list-style-type: none"> Air supplied HF hood and, One piece acid resistant suit (no ventilation holes) Acid resistant gauntlet gloves* attached at the sleeves Acid resistant boots An operator with radio monitoring the activity Work must be conducted in pairs 	B Class suit is considered work outside the constraints of the Heat Stress Screening Table. Work may be performed provided a safe work plan is developed. The Occupational Hygienist (or designate) may be contacted to assist in the development of a site/job-specific heat stress control plan for work that cannot be conducted within the constraints of the Heat Stress Screening Table.
Class C	When performing routine work on acid-containing equipment when no acid exposure is expected	<ul style="list-style-type: none"> Hard hat equipped with a face shield Optional goggles Acid resistant gauntlet gloves* Acid resistant jacket and pants or acid resistant coveralls Acid resistant boots 	The following clothing adjustment factors must be added to the WBGT when comparing to the Heat Stress Screening Table: <ul style="list-style-type: none"> 9 - Woven coveralls + Alky Class C jacket and pants 10 - Woven coverall + Alky Class C jacket, pants and hood.
Class D	When no physical contact with acid-containing equipment is to be made	<ul style="list-style-type: none"> Hard hat equipped with a face shield Acid resistant gauntlet gloves* Optional acid resistant boots Recommended acid resistant jacket 	The following clothing adjustment factor must be added to the WBGT when comparing to the Heat Stress Screening Table: <ul style="list-style-type: none"> 6 - Woven coveralls + Alky Class D jacket

*Refers to the heavy dark green PVC gloves available in Alky changerooms – see Figure 1.

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WARNING

Evaporation of sweat from the skin is the body's predominant heat removal mechanism. Impermeable clothing and encapsulating suits severely restrict heat removal. With heat removal hampered by clothing, metabolic heat may produce excessive heat strain even when the ambient conditions are considered cool. Consideration of appropriate heat stress controls (as per Table 1) must be made when wearing Alky PPE.

NOTE

The face shield is to be in the down position while performing work, assisting with work or observing work.

Exceptions for C&D Classes

- While in the process of welding, welders may wear standard welding PPE (e.g. welding hood and leather welding gloves) if they are within a neutralized work area and there is no potential for HF acid exposure.

NOTE

Personnel must wear Alky PPE to and from the job.

- Insulators wearing protective clothing for an asbestos work activity may decontaminate outside the Alky Unit change rooms if there has been no HF acid contact.
- Face shields are not required if full face respirators are worn.
- While performing fine dexterity work, personnel may wear green Sol-vex gloves – see Figure 1.
- Swinging of pumps 19P003/4/5/6 requires C Class.



Acid Resistant Gauntlet Gloves



Green Sol-Vex Gloves

Figure 1 – Alky Gloves

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Alky PPE for Rope Access Work

The following requirements and allowances apply only to non-invasive D Class rope access work:

- A helmet appropriate for rope access with a compatible faceshield may be worn. The faceshield must be made of an HF-compatible material, such as acetate, and must provide a comparable level of coverage to the standard faceshield.
- No load-bearing components may be made of or contain nylon. (This includes, but is not limited to, harness, ropes, etc...)
- The combination of green Sol-Vex gloves under rope access gloves may be worn during rope access activity. Acid-resistant gauntlet gloves must be worn to and from the rope access work area and while climbing ladders.

Obtaining and Handling of Alky PPE

Protective equipment is to be available from:

- Maintenance (Contractor) Change Room - North of Alky Unit
- Operations (Suncor) Change Room - West of Alky Unit
- H113 Change Room – West of 11H113

Prior to donning Alky PPE it is essential that the user inspects it to ensure that the equipment has not been compromised - as per Personal Protective Equipment [4000-ZSD-S-MSAFeca-00178]

Used Alky PPE is to be deposited into the dirty PPE containers upon exiting HF Acid areas.

If exposed to HF liquid, clothing must be decontaminated as soon as possible.

Alky PPE is for HF Acid areas only and must not be removed from the change rooms for use in any other area of the Refinery unless approved by Plant 1 Operations.

When performing work in the maintenance shop, contaminated clothing shall be placed in appropriate containers and taken to the Maintenance Change Room for cleaning

Each class of Alky PPE shall be stored and labelled separately in the change rooms.

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Minimum Alky PPE Inventory Requirements

- A minimum of 4 Class A suits shall be stored in CB#1.
- A minimum of 4 Class A suits shall be stored in the Fire Hall.
- A minimum of 10 Class B suits with air fed helmets and shrouds shall be stored in the Operations and Maintenance Change Rooms.
- An adequate supply of C and D protective equipment shall be stored in the Operations and Maintenance Change Rooms.

TRAINING

WB/WD Operators will be trained as part of the WB/WD Operators qualification and rectification process. All other workers requiring access to HF Acid areas are required to complete the Alkylation Unit Certification Training Program. Alky certification is valid for two years.

REFERENCES TO RELATED DOCUMENTS

- American Petroleum Institute 751 – Recommended Practice for Operation of Hydrofluoric Acid Alkylation Unit
- Sarnia Refinery Hydrofluoric Acid – Safety and First Aid Booklet
- Heat Stress Control [4000-ZSD-SM00HHCA-000857]
- Personal Protective Equipment [4000-ZSD-S-MSAFeca-00178]

DEFINITIONS

Leader An employee with management or supervision duties. The following roles are “Leaders” within this standard:

- Operations and Maintenance Directors
- Operations and Maintenance Managers


Alky PPE Refers to the collection of personal protective equipment items provided for the protection of a worker from exposure to HF Acid and/or Acid Soluble Oil (ASO)

Alky Unit Certified Has successfully completed the Alkylation Unit Certification Training Program within the last two years

END OF STANDARD

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		<u>REVISION LOG</u>	
Date MM/DD/YYYY	Revision	Section	Comment
11/01/06	Original	All	Original issue of Sarnia Refinery Hydrofluoric Acid Alkylation Unit, Personal Protective Equipment Standard. Replaces previous document Operating Instruction 5.014 (Alkylation Unit Protective Clothing).
06/26/2012	1	All	Updated format and placed into new template, but content was NOT altered.
07/15/2013	2	Roles & Responsibilities	Zone 1 Planner changed to Facilities Planner. The Facilities Planner will order the necessary PPE.
		Training	Removed the exception from Alky certification training for the WD Operator post
		References	Reference to Sarnia Alky PPE Standard Training Document removed and replaced with Sarnia Refinery Hydrofluoric Acid – Safety and First Aid Booklet. Document Contact & Owner updated.
04/07/14	3	Roles & Responsibilities	Change House Attendant will report any defective equipment to the Facilities Planner.
		PPE Classifications	C Class Requirements: <ul style="list-style-type: none"> • Added Acid Resistant Coveralls • Removed “optional” from acid resistant boot requirement • Removed monitoring requirement D Class Requirements: <ul style="list-style-type: none"> • Changed “optional” to “recommended” for acid resistant jacket requirement
07/18/14	4	All	<ul style="list-style-type: none"> • Removed reference to ASO and 11H113 • Roles & Responsibilities • Identification of HF Acid Areas • Controlled Access to HF Acid Areas • Obtaining and Handling of PPE • Minimum PPE Inventory Requirements. • Training

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06/09/2015	5	PPE Classifications		Class A WBGT controls.
		Obtaining and Handling of PPE		Added reference to PPE standard.
		References To Related Documents		Added reference to Heat Stress Control standard.
12/19/2017 (M. Courteaux)	6	General		<p>Combined “Alkylation Unit Protective Clothing” Standard resulting in the following changes:</p> <ul style="list-style-type: none"> • Revised “Scope and Purpose” • Added “Roles and Responsibilities” for Operations Employees/Leaders/Director • Added “Exceptions” section • Revised “Controlled Access to HF Acid Areas” section <p>References to “PPE” and/or “HF Acid PPE” changed to “Alky PPE”, where appropriate to improve consistency</p> <p>Minor changes to headings and formatting to clean up appearance and consistency of document</p>
		ROLES AND RESPONSIBILITIES		Added Permit Receivers.
		RISK CONTROLS	<i>Identification of HF Acid Areas</i>	Added 19V020 and 19H113.
			<i>Alky PPE Classifications</i>	<p>Added a statement to the end of the table to clarify what acid resistant gauntlet gloves are to be used</p> <p>Changed reference of “blue SOLVEX gloves” to “green Sol-vex gloves” to more accurately reflect the gloves used.</p>
			<i>Figure 1</i>	Added pictures of Alky gloves.
			<i>Obtaining and Handling of Alky PPE</i>	Added H113 Change Room.
		DEFINITIONS		<p>Added definitions for:</p> <ul style="list-style-type: none"> • Alky PPE; and • Alky Unit Certified.
11/29/2018 (M. Chipman)	7	RISK CONTROLS	<i>Alky PPE Classifications</i>	<p>Added warning statement below table to stress and explain the importance of considering heat stress controls when wearing Alky PPE. eSign page lost due to minor edit to table name page 4. Approved by T. Murray.</p>

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02/04/2020 (M. Chipman)	8	RISK CONTROLS	<i>Alky PPE for Rope Access Work</i>	Added section.
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The following individuals have approved and signed this document.

UserName: Todd Murray (toddmurray)

Title: Manager EH&S Sarnia Refinery

Date: Thursday, 20 February 2020, 11:19 AM Mountain Time

Meaning:

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