



Internal Operating Procedure

ISO 9001:2015 SOC NEVADA LLC

DOCUMENT No.
FES.IOP.FFO.0017

TITLE:

REV. 4

**110 Hg STORAGE WAREHOUSE WITH CO₂ FIRE SUPPRESSION
RESPONSE & MANUAL ACTIVATION OF SYSTEM**

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APPROVAL SIGNATURES		
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APPROVED BY 	BURTON PACKARD, DIRECTOR BASE OPERATIONS	DATE 3/14/18
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REVISION HISTORY			
REV	CHANGE DESCRIPTION	AUTHOR	DATE
4	ANNUAL REVIEW: UPDATED SIGNATORY AUTHORITY TO REFLECT CURRENT REQUIRED SIGNATURES. CHANGED DOCUMENT TO ISO9001:2015 FORMAT.	CHRISTINA HOLLOWAY	03/2018
3	ANNUAL REVIEW, UPDATED SIGNATORY AUTHORITY TO REFLECT CURRENT REQUIRED SIGNATURES.	CHRISTINA HOLLOWAY	05/2017
2	Changed signatory authority to reflect current required signatures.	Karli Wilbur	05/2016

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REFERENCE DOCUMENTS

DOCUMENT NUMBER	DOCUMENT TITLE
SOC.HWAD.FES.0005	Emergency Response Plan Annex C Section 2 Fire Response
S/N 30000038	Chemtron Fire Systems Operations & Maintenance Manual Issued 7/15/1998 Rev. C-1 07/24/2007 p. 31-34.
QP.QMS.0001	Control of Documents
QP.QMS.0002	Control of Quality Records

DOCUMENTS REFERENCED IN THIS PROCEDURE ARE APPLICABLE TO THE EXTENT SPECIFIED HEREIN.

1. PURPOSE

- 1.1 It is important to follow this procedure when responding to an alarm at a mercury storage warehouse (in the 110 Group Warehouses) that have CO₂ fire suppression systems installed. Correct actions put forth in this IOP will help improve the safety of the occupants and firefighters and minimize the property damage.

2. SCOPE

- 2.1 This IOP covers the mercury storage warehouses at HWAD that have CO₂ fire suppression system installed at each of these warehouses. This procedure addresses safety concerns for workers and responders and provides the appropriate steps to manually activate and emergency shutdown a CO₂ fire suppression system.

3. DEFINITIONS AND ACRONYMS

- 3.1 CO₂: Carbon Dioxide
- 3.2 ESD: Emergency Shut Down
- 3.3 Hg: Mercury
- 3.4 HWAD: Hawthorne Army Depot
- 3.5 IOP: Internal Operating Procedure
- 3.6 NFIRS: National Fire Incident Reporting System
- 3.7 LDH: Large Diameter Hose
- 3.8 PPE: Personal Protective Equipment

4. FLOWCHART

- 4.1 No flowchart needed

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5. RESPONSIBILITIES

5.1 It is the responsibility of the senior fire officer to size up the incident and determine if the CO₂ fire suppression system should be manually activated. Before manually activating the fire suppression system, the senior fire officer will ensure that all occupants have been evacuated from the warehouse and are accounted for and in a safe location. All firefighters shall be in proper PPE before manually activating the CO₂ fire suppression system.

6. PROCEDURE

6.1 HWAD Areas with CO₂ suppression system:

A. 110 Hg Storage Facilities

110-52, 110 -66, 110-77, 110-78,110-87, 110-88, 110-89, 110-92, 110-93, 110-94, 110-95, 110-96, 110-97, and 110-98.

6.2 Safety:

- A. Emergency Shut Down (ESD) The on-scene Incident Commander has the authority to shut down the CO₂ system manually if the situation involves life threatening conditions. To accomplish this task, the main discharge valve labeled (Tag # 5), needs to be unlocked and close the valve manually. This will stop discharge of CO₂ into the building.
- B. Pre-Fire Planning A response to a mercury storage warehouse (110 group) with a CO₂ fire suppression system will require the Incident Commander to decide if the warehouse is occupied or not. This should be accomplished by information inquired from the building supervisor or leader on site and in conjunction with the pre-fire/pre-incident plans.
- C. Hg Warehouse Storage warehouses that contain mercury require careful strategic and tactical considerations before manually activating the CO₂ fire suppression system or attacking the fire.
- D. Fire Response to a warehouse with mercury requires the first arriving fire engine to lay 5" LDH supply line from the nearest uncommitted fire hydrant to the engine.
- E. Incident Commanders need to acquire accurate information about the warehouse:
 - Evacuation and accountability of all personnel
 - Key switch enabled
 - Doors closed

Note: If the above is 100% accurate, the Incident Commander can choose to manually activate the CO₂ fire suppression system or implement other firefighting strategies and tactics to mitigate the incident.



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6. PROCEDURE (CONTINUED)

Valve Matrix:

Tags are applied to each valve and numbered for easy identification

- 1 – Janesbury Ball Valve
- 2 – Pilot Valve
- 3 – Cardox Plunger
- 4 – Pilot Line Valve
- 5 – Main Discharge Valve
- 6 – Vent Return Valve
- 7 – Fill Line Valve
- 8 – Safety Relief Vents

F. Manual Activation

- Open Micro EV-1 Panel
- Close Janesbury Ball (Valve # 1)
- Open Pilot valve (Valve # 2)
- 100% of CO₂ will be discharged
- Initiate ventilation of warehouse (**see note below**)
- Conduct an Incident Investigation
- Initiate a trouble call to refill the CO₂ tank
- Supply refilling valves and unlock fill valves for filling of tank.

Note: If CO₂ system is activated automatically or manually ensure warehouse is ventilated by a mechanical or natural means to remove CO₂ from the warehouse.
Conduct air monitoring using the monitor and mercury vapor analyzer, full PPE and respiratory protection to determine level of oxygen and mercury vapor in the air.

Note: Lumex Mercury monitoring and calibration: Only personnel that have been trained to use the Lumex mercury vapor instrument shall operate the instrument. Operator will refer to laminated instruction sheet to operate the Lumex (provided in the pelican case). The Operator must perform an internal calibration test of the Lumex on the "Test" mode/command of the unit prior to its use in the field.

Note: MX6 oxygen monitoring and calibration: Only personnel that have been trained to use the MX6 gas monitor shall operate the instrument. The Operator will refer to the manufacturer's operating and maintenance manual provided with the instrument. The Operator must perform a functional test prior to each days use for the purpose of verifying sensor and alarm operation.
An oxygen concentration of at least 19.5% is required for a safe re-entry into warehouse without supplied oxygen. Mercury vapor monitoring shall indicate that mercury vapors are below 25,000 ng/m³ for re-entry into the warehouse unless appropriate respiratory protection is used.



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7. METRICS

7.1 Following this procedure and reviewing the run reports and after incident critique will determine if the IOP is accurate and determine if improvements are needed to the IOP to perform safely.

8. QUALITY RECORDS

8.1 The following Quality Records shall be generated and managed in accordance with SOC.QP.QMS.0002

QUALITY RECORDS			
RECORD REQUIRED	CUSTODIAN	RETENTION	DISPOSITION
NFIRS Report	Firehouse Software	5 years	Database
Incident Critique	Fire Chief	5 years	Chief's Office
Training Report	Firehouse Software	Length of Employment	Database

9. FORMS

9.1 The following forms are applicable to this document.

APPLICABLE FORMS	
FORM NUMBER	TITLE
Firehouse Database	National Fire Incident Reporting Form
DZHC 590-E	Incident Critique
Firehouse Database	Training Report



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DLA Pre and Post Hg Overpack
Shipment Procedures
January 2009

ADDENDUM 1
SHIPPING CONTAINER AND
MERCURY FLASK OVERPACK DRUM
VERIFICATION PROCEDURES

PART II. HWAD RECEIPT LOCATION

Responsibility	Procedure
Quality Assurance (QA)	A. General Inspection Before unloading the palletized drum overpacks from a shipping container, (HWAD) ¹ will verify the shipping container and its inventory using the shipment documentation.
Fire & Emergency Services (FES)	B. Monitoring, Cleaning/Decontamination, and Verification of Shipping Containers 1. <u>General</u> : Prior to off-loading the pallets of overpack drums from each shipping container, HWAD will monitor shipping containers arriving at HWAD for presence of mercury metal leakage or its vapor release. HWAD will use a properly calibrated Lumex RA-915+ mercury monitor for mercury monitoring of the shipping containers. 2. <u>Monitoring of Shipping Containers</u> ²
FES	a. Open the arriving shipping container and let it air out thoroughly ³ .
FES	b. Monitor the shipping container for mercury vapor by sweeping it with the Lumex mercury monitor from front to rear at a height of 4' from the floor of the shipping container.
FES	c. Record the highest mercury concentration reading and its location.
FES	d. Inspect the shipping container interior for any sign of mercury leakage or spill during transit.
FES	e. Be on the lookout for any visible mercury on drum overpacks, in drip pans, or on pallets.
Receipt, Storage &	f. Off-load the palletized drum overpacks to the assigned staging area.

¹ Hawthorne Army Depot (HWAD) personnel will be directing the off-loading operations as HWAD will assume the charge for safeguarding the mercury storage and storage related operations. DNSC will provide all assistance HWAD requires in meeting its charge. It is important to remember that HWAD will be in command and charge of the mercury metal at the receipt location.

² HWAD Fire Department is in charge of the initial inspection of the trailer interior for mercury metal or vapor losses. The Fire Department has a standard operating procedure for the initial inspection of the arriving trailers. The instructions here are general in nature and are not intended to circumvent HWAD Fire Department's procedure. HWAD Fire Department uses proper personal protective equipment during the initial inspection in line with its practice of responding to emergencies with presence of unknown chemicals, fumes, or vapors.

³ Previous reviews by CAPP auditors have not allowed this step to be performed.



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Issue (RS&I)	
FES	g. Re-inspect the empty shipping container. If free mercury was evident, proceed to cleaning and decontamination of the shipping container regardless of the mercury vapor concentration reading.
QA	h. If free mercury was not evident, sweep the empty shipping container for mercury vapor concentration with Lumex mercury monitor from front to rear at a height of 4' from the floor of the shipping container.
QA/FES	i. If the shipping container exhibits mercury vapor concentration reading at or in excess of 25 ug/m ³ , proceed to cleaning/decontamination of the shipping container.
FES	<p>3. <u>Cleaning/Decontamination of Shipping Container</u></p> <p>a. If free mercury was not evident, thoroughly air out the shipping container using a high velocity air fan. Generally, airing out will remedy the situation. In a persisting situation, proceed to step "c" below⁴.</p> <p>b. If free mercury was evident, promptly recover or contain mercury in the shipping container using suitable recovery methods or by using absorbent material as necessary.</p> <p>c. Use the shipping container cleaning/decontamination procedure outlined in <u>Attachment 1</u>.</p>
FES	<p>4. <u>Verification</u></p> <p>a. Before releasing the decontaminated shipping container, sweep it with the mercury monitor from front to rear.</p> <p>b. Record the data.</p> <p>c. Release shipping container.</p>

⁴ Previous reviews by CAPP auditors have not allowed this step to be performed.



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	<p>C. Monitoring and Verification of Drum Overpacks after Off-Loading</p>
RS&I	<p>1. <u>General</u>: HWAD personnel will off-load the pallets with drum overpacks and move them to the warehouse if spillage or leaks of mercury was not observed in the shipping containers and the mercury vapor readings in the shipping container with the pallets were compatible with the shipping point mercury vapor data before the container was closed and sealed.</p>
FES	<p>If spillage or leakage of mercury metal was present/suspected or there was mercury vapor reading in excess of 25 ug/m³ in the shipping container, HWAD personnel will move the pallets with drum overpacks to the assigned staging area for additional monitoring and remedying the situation.</p>
	<p>2. <u>Pre-Monitoring Activities for the Drum Overpack Assemblies (overpacks, drip pans, and pallets as assembled) are as follows:</u></p>
QA/RS&I	<p>a. Establish a staging area such that a pallet of off-loaded drum overpacks can be sampled away from the surrounding mercury storage.</p>
RS&I	<p>b. Bring palletized drum overpacks from the shipping container to the staging area for monitoring and verification.</p>
QA	<p>c. Visually inspect the palletized drum overpacks for mercury metal leaks.</p>
QA/FES	<p>d. If free mercury was observed, proceed to cleaning/decontamination of palletized drum overpacks without waiting for vapor monitoring.</p>
QA	<p>e. If free mercury was not observed, proceed to monitoring and verification of overpack assembly(ies).</p>
	<p>3. <u>Monitoring and Verification of the Drum Overpacks assemblies (overpacks, drip pans, and pallets as assembled)</u></p>
QA	<p>a. Monitor the drum overpacks on each pallet for mercury with the Lumex mercury monitor as follows:</p>
QA	<p>i. Go completely around the entire pallet of drums with mercury sampler inlet 6 inches from the side surfaces of the drums and approximately 6 inches above the <i>bottom edge</i> of the drums on the pallet.</p>
QA	<p>ii. Go completely around the drum lids and at the bung by holding the mercury sampler inlet 6 inches above the drum lid.</p>
QA	<p>b. Record the highest mercury concentration readings and locations obtained in items 3(a)(i) and (ii), above.</p>



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<p>QA/FES</p> <p>QA/RS&I</p>	<p>4. <u>Mercury Drum Overpack Decision</u></p> <p>Mercury drum overpack decision will be made as follows:</p> <p>a. If mercury measurements on drum overpacks on a pallet obtained through monitoring procedures in 3(a)(i) and (ii) are at or in excess of 25 ug/m³, flag, reject, and move the particular pallet of drum overpacks to a secondary holding area for further evaluation as described in Section D.</p> <p>b. If mercury measurements on drum overpacks on a pallet obtained through monitoring procedures in 3(a)(i) and (ii) are less than 25 ug/m³, move the pallet of drum overpacks to the destination warehouse.</p>
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	<p>D. Rehabilitation of Drum Overpack Assemblies <u>if Flagged/Rejected</u> and Verification of Rehabilitation</p>
FES	<p>1. <u>General</u>. Disassemble and remove the overpack drums from the drip pan and the pallet if flagged and rejected per procedure in Section C. This will allow mercury monitoring to be conducted on individual drum, drip pan, and the pallet and allow the source of contamination to be determined.</p>
FES	<p>2. <u>Monitoring of Drum Overpacks (as individually separated)</u></p> <p>a. Move the individual drum overpack to be monitored away from the rest of the disassembled components.</p> <p>b. Monitor the drum that was in the <u>flagged/rejected</u> pallet of drum overpacks for mercury with mercury monitor as follows:</p> <p>i. Go completely around the separated drum holding the mercury sampler inlet 6 inches from the side surfaces while sweeping the side surfaces.</p> <p>ii. Go completely around the drum lid bung seal and drum lid seal holding the sampler inlet 2 inches from the seals.</p> <p>iii. Record the highest mercury concentration readings and their locations in items (i) and (ii) above.</p> <p>iv. If mercury readings obtained through monitoring in 2(b)(i) and (ii) are at or in excess of 25 ug/m³ on the separated drum overpack, re-seal the drum lid or the bung, as the case may be, and/or proceed to rehabilitation of drum overpack(s) through cleaning/decontamination of the drum before considering its replacement⁵.</p> <p>v. If mercury readings obtained through monitoring in 2(b)(i) and (ii) are below 25 ug/m³, mark and release these drum overpacks for reassembly for transfer to the warehouse pending verification of the drip pan and the pallet.</p> <p>vii. Proceed to rehabilitation of drum overpack(s) measuring in excess of 25 ug/m³.</p>
FES	<p>3. <u>Rehabilitation of Drum Overpack</u></p> <p>a. For cleaning/decontaminating a drum overpack, use the procedure outlined in <u>Attachment 2</u> if required.</p>

⁵ HWAD has been instructed by ORNL to not replace 30 gallon drums, which would entail handling individual flasks. Should a drum continue to have readings greater than 25,000 ng/m³ they will be overpacked in a 55 gallon drum and shipped to a Mercury Recycling Facility.



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b. For re-setting the lid or bung seals, follow the drum manufacturer's seal setting procedure outlined in Attachment 3 if required.

FES	4. <u>Verification of Drum Overpack</u> a. Re-monitor the drum overpack once rehabilitated and record the data. b. Proceed to monitor the drip pan.
FES	5. <u>Monitoring of Drip Pans</u> a. Monitor each drum drip pan associated with a flagged/rejected pallet of drum overpacks in Section C for mercury with mercury monitor as follows: i. Make one complete pass over the entire <i>top</i> surface of drip pan and the <i>inside</i> of folded edge with mercury sampler inlet 6 inches from the top surface. ii. Make one complete pass over the entire <i>bottom</i> surface of drip pan and the <i>outside</i> of folded edge with mercury sampler inlet 6 inches from the bottom surface. b. Record the highest mercury concentration readings and locations in items (i) and (ii) above. c. If mercury readings obtained through monitoring in 5(a)(i) and (ii) are at or in excess of 25 ug/m ³ , proceed to rehabilitation (cleaning/decontamination) of the drip pan. d. If mercury readings obtained through monitoring in 5(a)(i) and (ii) are below 25 ug/m ³ , mark and release the drip pan for use with the associated drum overpacks pending verification of the pallet.
FES	6. <u>Rehabilitation of Drip Pans</u> For cleaning/decontaminating a drip pan, use the procedure outlined in <u>Attachment 2</u> if required.
FES	7. <u>Verification of Drip Pans</u> a. Re-monitor the drip pan once rehabilitated and record the data. b. Proceed to monitor the pallet.
FES	8. <u>Monitoring of Pallets</u> a. Monitor each pallet associated with a <u>flagged/rejected</u> pallet of drum overpacks in Section C for mercury with mercury monitor as follows:



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	<p>i. Make one complete pass over the entire <i>top</i> surface and the <i>side</i> surface of the pallet with mercury sampler inlet 6 inches from the top surface.</p>
	<p>ii. Make one complete pass over the entire <i>bottom</i> surface of pallet with mercury sampler inlet 6 inches from the bottom surface.</p> <p>b. Record the highest mercury concentration readings and their locations 8(a)(i) and (ii) above.</p> <p>c. If mercury readings obtained through monitoring in 8(a)(i) and (ii) are at or in excess of 25 ug/m³, proceed to cleaning/decontamination of the pallet.</p> <p>d. If mercury readings obtained through monitoring in 8(a)(i) and (ii) are below 25 ug/m³, mark and release the pallet for use with the associated drum overpacks.</p>
FES	9. <u>Rehabilitation of Pallets</u> . For cleaning/decontaminating a pallet, use the procedure outlined in <u>Attachment 2</u> if required.
FES	10. <u>Verification of Pallets</u> Re-monitor the pallet and record the data.
FES	11. <u>Re-assembly</u> : Re-assemble the drum overpacks, drip pan, and the pallet for transfer to the destination warehouse.



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FES	<p><u>Attachment 1</u></p> <p>Shipping Container Decontamination Procedure</p> <p>Parties recognize these may be shipping containers that would have transported in commerce mercury metal, mercury-bearing articles, or mercury-bearing wastes destined for recycling or disposal. As DLA has no control over the choice of arriving commercial shipping containers by the commercial contractor, empty contaminated commercial shipping containers arriving at DNSC Depots will be REJECTED.</p> <p>Cleaning and decontamination procedures described in this Attachment will be used for cleaning and decontamination of shipping containers with mercury shipments at the destination location at Hawthorne Army Depot (HWAD) in Hawthorne, NV.</p>
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FES	<p>Mercury Cleaning and Decontamination of Shipping Containers</p> <p>A. <u>General</u>: For decontamination of shipping containers, wear all proper protective clothing and a mercury vapor respirator. It is absolutely essential to properly evaluate the extent of the mercury contamination problem and to assess the quality of the clean-up process. Monitoring should be carried out with a calibrated mercury monitor as needed.</p> <p>Open the shipping container and let it air out naturally⁶.</p> <p>B. <u>Cleaning/Decontamination</u></p> <ol style="list-style-type: none"> 1. Remove unauthorized persons in the vicinity of the shipping container to be decontaminated. 2. Mark off the area by placing signs or border tape to warn other personnel of potential mercury hazard. 3. Wear appropriate personal protective equipment. 4. Monitoring mercury vapor levels and visual observation should determine if there is any spilled mercury, which can be reclaimed without immediately applying a mercury vapor chemical absorbent/depressant. 5. Remove any visible mercury with a mercury vacuum or an aspirator bulb. 6. If it appears that mercury vapors are continuing to be generated from the spill, and further reclamation is not feasible, apply an absorbent/depressant HgX or any other approved chemical absorbent/depressant according to the manufacturer's recommendations. 7. After the majority of the spilled mercury has been cleaned up, re-treat the surface area of the spill thoroughly using approved chemical absorbent/depressant. 8. Upon completion of the initial cleanup and decontamination, apply a mercury-indicating powder to the area or location to determine if additional decontamination is required. 9. Residual mercury is generally the result of "micro-droplets" in the cracks and crevices of the floors, walls, storage containers and storage aids (i.e. pallets, trays, etc.). The use of a mercury-indicating chemical will help detect if there is any hidden mercury left behind. This will provide a good indication if further decontamination is necessary because the indicating chemical will change from a bone-white color to a pink or black color on contact with actual mercury or mercury vapors.
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⁶ Previous reviews by CAPP auditors have not allowed this step to be performed.
9



TITLE:

**110 Hg STORAGE WAREHOUSE WITH CO₂ FIRE SUPPRESSION
RESPONSE & MANUAL ACTIVATION OF SYSTEM**

SAI GLOBAL
ISO 9001
Quality

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DLA Pre and Post Hg Overpack
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	10. Apply the indicating chemical by sprinkling a thin layer of powder over the decontaminated area or the area in question.
FES	<p>11. Treat vertical surfaces by preparing a thin paste with water and painting it over the area in question.</p> <p>12. After it has been applied, leave the indicating chemical layer undisturbed for 24 hours. The presence of mercury or mercury vapor will be indicated by individual or numerous pink or black spots. Each spot pinpoints a source of mercury or mercury vapor.</p> <p>13. Using a mercury vacuum, sweep up the complexing agent residues.</p> <p>C. Keep in mind that mercury vapor build-up will vary with temperature, atmospheric pressure (altitude), air circulation, type of surface involved, and the effects of other contaminants. Heavily contaminated surfaces may require more decontaminant.</p> <p>D. Re-Monitoring/Verification: Re-monitor the shipping container to ensure that all sources of mercury contamination have been identified, cleaned, or removed.</p> <p>E. Keep accurate records as to time, place and levels of all mercury monitoring results using the Mercury Monitoring Sheet in the DLA Form 32.</p>



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RESPONSE & MANUAL ACTIVATION OF SYSTEM

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FES	<p><u>Attachment 2</u></p> <p>Cleaning and Decontamination Procedure</p> <p>For</p> <p>Overpack Assemblies, Handling Equipment, and Vehicles</p>
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**110 Hg STORAGE WAREHOUSE WITH CO₂ FIRE SUPPRESSION
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DLA Pre and Post Hg Overpack
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FES	Mercury Cleaning and Decontamination
	<p>A. <u>General</u>: For decontamination of affected overpack assemblies, handling equipment and vehicles, wear all proper protective clothing and a mercury vapor respirator. It is absolutely essential to properly evaluate the extent of the mercury contamination problem and to assess the quality of the clean-up process. Monitoring will be carried out with a properly calibrated Lumex mercury monitor.</p> <p>Move the overpack assemblies, handling equipment and vehicles to the staging area as appropriate away from the mercury storage areas. This action will eliminate or greatly reduce the potential interference by any mercury present in the storage areas</p> <p>B. <u>Cleaning/Decontamination</u></p> <p>Follow directions in B.1. through B.12. in Attachment 1.</p> <p>C. Keep in mind that mercury vapor build-up will vary with temperature, atmospheric pressure (altitude), air circulation, type of surface involved, and the effects of other contaminants. Heavily contaminated surfaces may require more decontaminant.</p> <p>D. <u>Re-Monitoring/Verification</u>: Re-monitor the shipping container to ensure that all sources of mercury contamination have been identified, cleaned, or removed.</p> <p>E. Keep accurate records as to time, place and levels of all mercury monitoring results using the Mercury Monitoring Sheet in the DLA Form 32.</p>



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DLA Pre and Post Hg Overpack
Shipment Procedures
January 2009

Attachment 3

Drum Manufacturer's
Seal Setting and Tightening
Procedure

TITLE:

110 Hg STORAGE WAREHOUSE WITH CO₂ FIRE SUPPRESSION RESPONSE & MANUAL ACTIVATION OF SYSTEM

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January 2009

SKOLNIK

STEEL CONTAINERS + PACKAGING

GAP / PQ 080

CLOSURE INSTRUCTIONS In compliance with DOT 49 CFR §178.2 (c), persons shipping Skolnik drums must comply with the following closure instructions.

BOLT RING CLOSURE FOR OPEN HEAD DRUMS

- CHECK GASKET** – to ensure cover gasket is properly fitted into cover groove (see Fig. 1 or 2).
- PLACE COVER ON DRUM** – being careful to properly seat gasket all around curl (see Fig. 3).
- POSITION & SEAT RING** – with lugs downward. Ensure the inner channel of the closure ring engages entire drum curl and cover (see Fig. 4). Apply downward pressure on cover. Use a non-sparking dead-blow mallet to further seat cover and drum curl into the inner channel of the ring.
- INSERT BOLT** – through the unthreaded lug of the ring. Assemble the locking hex nut onto the threaded end of the bolt and tighten into the threaded lug (see Fig. 5). Close the ring to an initial gap of about 1/2".
- TIGHTEN THE BOLT** – with a calibrated torque wrench while using downward pressure on the cover and hammering the outside of the ring with a non-sparking dead-blow mallet to further seat the ring. Continue tightening and hammering the ring until the torque stabilizes at 55 - 60 ft. lbs. and does not decrease when further hammering on the ring circumference is performed. Ring ends must not touch. (Effective 25 September, 2006 and in accordance with CFR 178.2(c), we have revised this procedure to use torque as the most effective closure requirement.)
- LOCK RING** – by tightening the nut against the unthreaded lug (see Fig. 6).

OPEN HEAD DRUM - LEVERLOCK CLOSURE

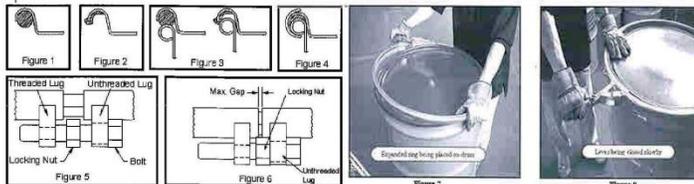
- CHECK GASKET** – to ensure cover gasket is properly fitted into cover groove (see Fig. 1 or 2).
- PLACE COVER ON DRUM** – being careful to properly seat gasket around curl (see Fig. 3).
- OPEN LEVERLOCK** – and place expanded ring on to the drum cover with the vertical-skirt hugging the drum body (see Fig. 7).
- CLOSE LEVERLOCK** – by slowly and cautiously pulling the LEVERLOCK so that the outer ring engages the cover / body juncture. Downward pressure along with tapping the outside of the ring may assist in an even closure (see Fig. 8).
- ENGAGE LOCK** – to complete closure.

DRUMS WITH FITTINGS

- CHECK GASKETS** – and ensure gasket is properly seated on plug.
- TIGHTEN** – to specifications listed below, and do not cross thread.

PLUG TYPE	Tri-Sure		Riecke (plastic)		Riecke (steel)		Nuc-Fil fillers
	Buna	Poly or Teflon	PE/PP (composite drums)	—	poly	all other	
3/4" plug	12 ft-lbs	20 ft-lbs	—	9 ft-lbs	20 ft-lbs	15 ft-lbs	8 - 12 ft-lbs
2" plug	20 ft-lbs	30 ft-lbs	10 ft-lbs	20 ft-lbs	40 ft-lbs	30 ft-lbs	—

IMPORTANT
A drum is properly closed only when all steps are completed in the manner and sequence indicated.
If difficulties are encountered, do not stop the drum and call Skolnik for further instruction.



IMPORTANT:

- Under the applicable DOT regulations, any changes made to the method of closure or a closure component constitutes a change in the design type of this packaging, and invalidates the certification.
- After filling and prior to transport, the shipper should verify the torque of all closures to determine if the effects of heating and cooling or gasket relaxation have resulted in the need to re-tighten the closure.
- Drums (other than this composite) are tested at room temperature.
- Calibrated plug torque wrenches can be purchased from Skolnik.

Skolnik Industries, Inc. 4900 S Kilbourn Avenue, Chicago, IL 60632-4593 – U.S.A.
Telephone: (773) 735-0700 - Fax: (773) 735-7257 - Email: sales@skolnik.com - Web: www.skolnik.com

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Rev. B

Retired Closure Instructions