




Main Building Ventilation Filter Change Out

USE EVERY TIME

Implementation Date: 8/7/14

APPROVAL:

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FOR Q. CARTER

7/28/2014
Date



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Revision Summary

Revision	Change Summary
0	Initial issue – Supersedes UT-P-OP-516
1	Updated torque wrench value on Attachment B
2	Added new attachment for HEPA filter in-place test efficiency
3	Added Quality Assurance oversight
4	Made provisions for not starting blower after filter change, moved Attachment E to CM-UET-MT-506

Current Revision Specific Changes

Location	Description	Reason
5.3.5, 5.3.6	Changed to ensure statements	Clarification
5.5.42, 5.5.43	Deleted steps	Performed in Subsection 5.7 and UT-UET-OP-506
5.7	Deleted Steps 5.7.2 and 5.7.3, added new step for restarting	
Att. E	Moved to CM-UET-MT-506	Document Owner requested

1.0 INTRODUCTION

1.1 Purpose

This procedure provides direction for the Main Building Ventilation System exhaust filter change out.

1.2 Scope

This procedure is applicable to the change out of the TRU Waste Processing Center (TWPC) Main Building Exhaust Ventilation filters in housings F-011, F-012 and F-013. Details are provided for change-out of all 4 stages including the stage 1, moisture separators; the stage 2, 95% American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE); and the stage 3 and 4 High Efficiency Particulate Air (HEPA) filters.

1.3 Document Use

This document has been evaluated by the Document Use Review Team and has been determined to be a **USE EVERY TIME** procedure.

USE EVERY TIME procedures require direct use and verbatim compliance. These documents are open and being referenced during the performance, e.g., in-hand or present for the user to actively reference during actual performance of action steps. A Reader Doer approach may also be implemented where it is impractical for the performer to hold or access the procedure. If work cannot be accomplished as described in the implementing procedure or accomplishment of such work would result in an undesirable situation, a condition adverse to quality, or an unacceptable safety risk, then the work is suspended until the appropriate procedure change provisions are implemented. If work is suspended due to inadequacy of procedure, then a page change notice or revision of the procedure is initiated. On-shift management (i.e., Shift Superintendent, Process Superintendent, Senior Supervisory Watch, OM, etc.) should be made aware of any work suspension due to a problem procedure.

2.0 PRECAUTIONS AND LIMITATIONS

2.1 Safety

- The Main Building Ventilation System is classified as a Safety Significant System and constitutes a Limiting Condition for Operation of processing activities per CM-X-AD-022, Technical Safety Requirements.
 - The Main Building Ventilation System prevents the release of radioactive materials to the environment.
 - The safe control of the tasks performed in this procedure fall under the guidance of TWPC radiological controls procedures and specific guidance of the applicable radiological work permits.
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- Inventory and store replacement HEPA filter elements, bags, and straps in a controlled environment. Care must be taken to protect these items from damage.
- Remove or secure jewelry, loose articles of clothing, and other loose items prior to working within the Main Building Ventilation System ducting or filter housings.

2.2 Technical Safety Requirements

- None

2.3 Nuclear Criticality Safety Evaluation

- None

3.0 RESPONSIBILITIES

3.1 Personnel Assignments

The following personnel are responsible for performing the activities described in this document and for training to this document prior to accomplishing the activities described herein. These TWPC personnel may delegate alternate personnel to assist in carrying out their responsibilities.

3.1.1 Facility Manager (FM)

- approves this procedure

3.1.2 Shift Superintendent (SS)

- verifies required plant conditions are established

3.1.3 Operations Personnel

- perform the tasks outlined within this procedure

3.1.4 Radiological Control Manager (RCM)

- approves opening ventilation dampers within the HEPA Enclosure

3.1.5 Main Building Ventilation Cognizant System Engineer (CSE)

- ensures that initial testing and in-service testing are performed in accordance with ASME N510, Testing of Nuclear Air Treatment Systems, Section 10
- participates in the evaluation and deposition resolution of filters received having questionable quality prior to installation
- ensures system meets design performance criteria prior to returning to service

3.1.6 Waste Certification Official (WCO)

- provides guidance for disposition, characterization, and packaging of used filters for disposal
-

3.1.7 Quality Assurance (QA) Inspector

- verifies Quality Control Receipt Inspection is performed and approved
- participates in the evaluation and disposition resolution of filters received having questionable quality prior to installation
- approves completed Attachment B, Equipment List
- provides oversight during the performance of action steps

3.2 Document Maintenance

The FM is designated the document owner and is responsible for updating this document. Approval authority rests with the FM. Submit suggestions for revisions or improvement to the FM utilizing Attachment E, New Document and Revision Request Form, of CM-P-AD-061, Document Preparation, Review and Approval.

4.0 PREREQUISITES

- If changing out HEPA filters, ensure the CSE has arranged for subsequent aerosol penetration testing to be performed.
- Obtain guidance from WCO for disposition, characterization, and packaging of used filters for disposal.
- Quality Assurance oversight shall be implemented before performing action steps in this procedure.

NOTE 1: Operations personnel perform the following steps, unless otherwise noted.

NOTE 2: Section 5.0 is divided into multiple subsections. Steps within those subsections are followed in the sequence written unless stated otherwise. Operations personnel may enter specific subsections as needed to start a new work activity or resume work activities (e.g., directed by other procedures, after shift turnover, returning from the weekend, holiday, etc.), only after applicable safety precautions and prerequisites are verified to be satisfied or implemented.

5.0 PROCEDURE

NOTE 1: This subsection may be performed at any time prior to starting filter replacement activities.

NOTE 2: Steps in this subsection may be performed in any order.

5.1 Initial Preparation for Filter Change Out

5.1.1 Obtain required equipment to perform filter change using Attachment B, Equipment List for guidance.

- 5.1.1.1 Initial and Date the Attachment B, Equipment List to indicate required equipment has been staged, or verified available.
-

NOTE: QA personnel may perform the following step.

- 5.1.2 Ensure new filter elements have had a Quality Control Receipt Inspection performed and are approved for use.
 - 5.1.2.1 Obtain QA Inspector signature on Attachment B, Equipment List.
- 5.1.3 Ensure appropriate scaffolding is erected for upper filter bank change outs.
- 5.1.4 Obtain appropriate containers or packaging materials for disposal of used filters as directed by the WCO.
- 5.1.5 Forward completed Attachment B, Equipment List, to the SS for review.

NOTE 1: This subsection may be performed at any time prior to or during filter replacement activities.

NOTE 2: This subsection applies to the HEPA filter elements and the 95% ASHRAE Filters. T-CM-FW-S-ME-223, Acceptable Filter Summary Sheet, identifies acceptable filters.

5.2 Preparing New Filters for Installation

- 5.2.1 Inspect the filter gasket for visible damage (cracks, gouges, missing gasket).
- 5.2.2 IF the filter gasket is damaged, THEN go to Attachment C, Installing Gaskets on High Efficiency Particulate Air Filters.

NOTE 1: Each new filter gasket is coated with silicone grease to help prevent the filter gasket from sticking to the housing sealing surface after being compressed for an extended period.

NOTE 2: Steps 5.2.3 and 5.2.4 should be performed for every filter to be installed simultaneously and prior to placing them in bags.

CAUTION: Room Temperature Vulcanizing silicone (RTV) is not used on filter gaskets. RTV would stick filter to the housing, thereby compounding potential problems of filter removal.

- 5.2.3 Apply a 1/8 inch to 3/16 inch diameter bead of silicone grease to the entire 3/4-inch wide gasket.
- 5.2.4 Spread the grease evenly across the gasket surface.

NOTE 1: Attachment D, Filter Change-out Record, is filled out for replacement of the HEPA filter elements only.

NOTE 2: QA personnel may perform Steps 5.2.5 and 5.2.6.

- 5.2.5 Record filter change-out date, filter housing number, and names of filter change-out personnel on an Attachment D, Filter Change-out Record.
-

- 5.2.6 Record the filter serial number, manufacture date, and Filter Test Facility (FTF) test date of the filter element staged for installation in the applicable block of Attachment D, Filter Change-out Record to represent the as-installed filter location (e.g., the first filter in and furthest inserted into the housing is listed first on Attachment D, Filter Change-out Record).

NOTE: HEPA filters are bi-directional. Arrows showing vendor test flow direction may be different than installed flow direction based on gasket orientation. The filter gasket is oriented to face upstream.

- 5.2.7 Inspect a new bag for tears or other signs of visible damage.

NOTE: Correct filter orientation is verified as it is pre-loaded into a bag for installation into the filter housing. This orientation will change depending on which side of the filter housing is being changed.

- 5.2.8 Place the new filter inside the new bag, positioning the filter deep enough into the bag so that the filter is past the Bag Stub Removal Glove Sleeve.
- 5.2.9 Ensure that the bag is not torn or damaged after positioning the filter into the bag.
- 5.2.10 Repeat Steps 5.2.5 through 5.2.9 for all new filters to be installed.

5.3 Preparing Filter Housing for Filter Change Out

NOTE: Steps 5.3.1 through 5.3.3 may be performed simultaneously or in any order.

- 5.3.1 Obtain SS permission to proceed with filter change out.
- 5.3.2 Ensure Competent Person inspections of scaffolding are completed in accordance with CM-P-IS-023, Scaffolding.
- 5.3.3 Obtain CSE, FM, and RCM permission to reposition ventilation dampers associated with the HEPA Enclosure.
- 5.3.4 IF not there already,
THEN increase stack flow approximately 2,000 to 4,000 additional scfm above 55,000 scfm to compensate for HEPA enclosure exhaust needs.
- 5.3.5 Ensure the associated blower for the affected filter housing is secured in accordance with UT-UET-OP-506, Main Building Ventilation and HEPA System.
- 5.3.6 Ensure the applicable inlet and outlet dampers (ID3-22 through ID3 27) are shut for the affected filter housing to minimize air movement.
- 5.3.7 Crack open the applicable filter housing inlet damper (0 to 1 turn) to allow a slight negative pressure within the filter housing to prevent the possible migration of contamination outside the filter housing during the filter change out.
-

NOTE: Only two of the HEPA enclosure exhaust dampers (BD3-35, BD3-36, BD3-37, and BD3-38) are allowed to be opened simultaneously.

- 5.3.8 Open the following applicable HEPA enclosure exhaust dampers nearest the intended work area:
- BD3-35
 - BD3-36
 - BD3-37
 - BD3-38
- 5.3.9 Open HEPA enclosure supply damper BD3-34.
- 5.3.10 Ensure contamination containment and controls are established as required, with guidance in accordance with CM-REF-RP-322, Contamination Control, and applicable Radiological Work Permits.

5.4 Removing Dirty Filters

NOTE: Filters are removed from the work area as soon as possible after they are removed from the filter housing and stored in a designated Radioactive Material storage area while awaiting packaging for disposal.

CAUTION: Avoid contacting door gasket with door bolts as door is removed to prevent damage to gasket material. Also, the door must be stored in a way to prevent the gasket from being damaged.

- 5.4.1 Remove the housing access door by loosening the four aluminum retaining knobs, swiveling the door latches away from the door, and pulling the door straight forward.

NOTE: Door gasket may be replaced at any time during filter replacement and prior to reinstalling.

- 5.4.2 IF the door gasket is damaged, THEN replace the door gasket.

NOTE 1: Radiological Controls personnel may perform a contamination survey.

NOTE 2: The filter removal shelf is optional tooling and may be used at Operators discretion.

- 5.4.3 If necessary, install and secure the filter removal shelf.
-

5.4.4 Carefully check the bag's flexibility to ensure that the bag has not become brittle or unworkable.

- IF the bag is not brittle or unworkable,
THEN remove the cinching strap and unfold and inspect the bag for any tears or other visible damage.
- IF the bag is not torn or visibly damaged,
THEN proceed to Step 5.4.6.
- IF the bag is not useable,
THEN install a new bag over the old one per Steps 5.4.4.1 through 5.4.4.10 below, then proceed to Step 5.4.5.

5.4.4.1 Remove the security strap.

5.4.4.2 Carefully maneuver the shock cord of the old bag so it is between the two ribs of the bag-in/bag-out ring.

5.4.4.3 Place a new plastic bag over the bag-in/bag-out ring.

5.4.4.4 Locate the shock cord of the plastic bag between the second rib of the ring and the housing frame. See Figure 1 below.

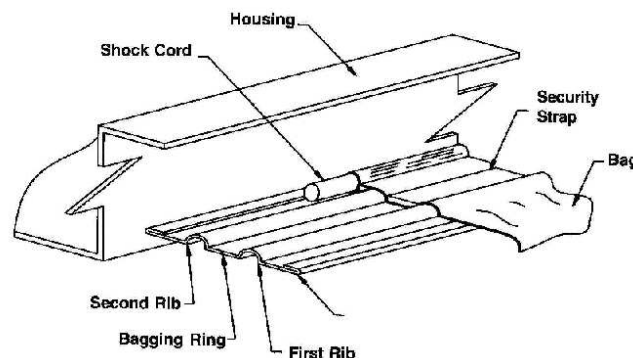


Figure 1.

5.4.4.5 Place hand and arm in the Bag Stub Removal Glove Sleeve.

NOTE: The old bag will be discarded with the dirty filter.

5.4.4.6 Carefully remove the old bag from the bagging ring without pulling the new bag off of the bagging ring.

5.4.4.7 Place the security strap between the first and second ribs of the bag-in/bag-out ring. See Figure 1.

5.4.4.8 Loop the end of the security strap through the Tension Lock Buckle on the security strap.

5.4.4.9 Locate the Tension Lock Buckle at top of the bag-in/bag-out ring.

5.4.4.10 Pull the strap to tighten the security strap around the bag-in/bag-out ring.

5.4.5 Remove the cinching strap while leaving the security strap in place on the bag-in/bag-out ring.

NOTE: The following step is not applicable to the moisture separators.

- 5.4.6 Unlock the filters by turning locking mechanisms counterclockwise with a ratchet until you feel them bottom out.
- 5.4.7 Place hands and arms into the Filter Removal Glove Sleeves.

NOTE: Filter removal rods built into the housing may be used to bring the filter to within the operator's reach.

- 5.4.8 Slowly and carefully remove filter from housing, holding filter at top and bottom of frame.
- 5.4.9 Pull filter as far as possible out into extended bag as seen in Figure 2 below.

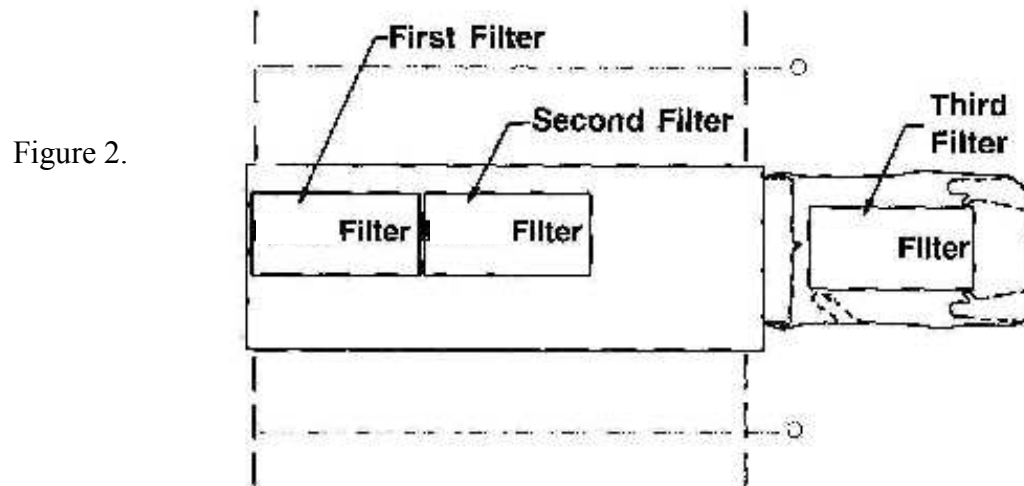


Figure 2.

- 5.4.10 Inspect the filter sealing surface of the housing to ensure that no foreign material will interfere with the new filter to be installed.
- 5.4.11 Seal the dirty filter into the bag by twisting an 8 to 10 inch section and installing plastic tie wraps with the zip gun approximately 6 to 8 inches apart between the filter and the housing.
- 5.4.12 Tightly wrap the twisted section of bag with vinyl tape and overlap at least ½ inch beyond the plastic tie wraps.
- 5.4.13 Separate the dirty filter by cutting the plastic between the two tie wraps and taping over the exposed ends.
- 5.4.14 Remove the security strap from the bag-in/bag-out ring.
- 5.4.15 Carefully maneuver the shock cord of the bag stub (remainder of the first bag) so it is between the two ribs of the bag-in/bag-out ring.

NOTE: It is easier to work from bottom to top of bag-in/bag-out ring, locating the seam of the bag at top of ring so that the gloves in bag are in the correct position.

- 5.4.16 Place a new plastic bag over the horse tailed remainder of the previous bag (bag stub) and the bag-in/bag-out ring.
- 5.4.17 Locate the shock cord of the plastic bag between the second rib of the ring and the housing frame. See Figure 1.
- 5.4.18 Place hand and arm in the Bag Stub Removal Glove Sleeve.
- 5.4.19 Carefully remove the bag stub from the bagging ring without pulling the new bag off of the bagging ring. The bag stub is discarded with the dirty filter.
- 5.4.20 Place the security strap between the first and second ribs of the bag-in/bag-out ring. See Figure 1.
- 5.4.21 Loop the end of the security strap through the Tension Lock Buckle on the security strap.
- 5.4.22 Locate the Tension Lock Buckle at top of the bag-in/bag-out ring.
- 5.4.23 Pull the end of the security strap to tighten the security strap around the new bag and the bag-in/bag-out ring.
- 5.4.24 IF removing the second filter,
THEN repeat Steps 5.4.7 through 5.4.23.
- 5.4.25 IF removing the first filter,
THEN repeat Steps 5.4.7 through 5.4.13.

NOTE: This subsection applies to the HEPA filter elements and the 95% ASHRAE Filters. For replacement of the moisture separators proceed to Subsection 5.6.

5.5 Installing Replacement Filter

- 5.5.1 Remove the security strap from the bag-in/bag-out ring.
- 5.5.2 Carefully maneuver the shock cord of the bag stub (remainder of the last bag) so it is between the two ribs of the bag-in/bag-out ring.
- 5.5.3 Lift filter and bag to housing access door area.
- 5.5.4 Place the new plastic bag over the bag-in/bag-out ring. The shock cord of the plastic bag is to be located between the second rib of the ring and the housing frame. See Figure 1.

NOTE: It is easier to work from bottom to top of bag-in/bag-out ring, locating the seam of the bag at top of ring.

- 5.5.5 Place hand and arm in the Bag Stub Removal Glove Sleeve.
 - 5.5.6 Carefully remove the bag stub from the bagging ring without pulling the new bag off of the bagging ring.
-

- 5.5.7 Place the security strap between the first and second ribs of the bag-in/bag-out ring. See Figure 1.
- 5.5.8 Loop the end of the security strap through the Tension Lock Buckle on the security strap.
- 5.5.9 Locate the Tension Lock Buckle at top of the bag-in/bag-out ring.
- 5.5.10 Pull the strap to tighten the security strap around the bag-in/bag-out ring.
- 5.5.11 Roll the bag stub into a small ball.
- 5.5.12 While gripping the bag, slowly pull arm out of the Bag Stub Removal Glove Sleeve, turning the glove sleeve inside out with the bag stub inside.
- 5.5.13 Place hands and arms into Filter Removal Glove Sleeves.
- 5.5.14 Carefully install the new filter into housing.
- 5.5.15 Load the filter element into the housing, ensuring the filter is installed in the correct position, as indicated by the filter manufacturer's orientation markings or engineer's directions.
- 5.5.15.1 Ensure the filter sealing gasket (HEPA filters and 95% ASHRAE filters only) is toward the filter housing's sealing surface.
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- NOTE 1:** When sliding the filter into the housing, it is helpful to use the pressure bars on the locking mechanism as guides by butting the non-gasket side of the filter to the bars.
- NOTE 2:** It may be necessary to use the second filter to push the first filter into place in a three-wide housing.
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- 5.5.15.2 Gently, but firmly, push the filter until it touches the back of the housing or as far as can be reached.
- 5.5.16 IF another filter is to be installed,
THEN twist, tape, and cut the bag at a point between the Bag Stub Removal Glove Sleeve and bagging ring so that the previous bag stub will be removed along with the excess of the new bag.
- 5.5.17 Repeat Steps 5.5.1 through 5.5.16 to install the second filter.
- 5.5.18 Repeat Steps 5.5.1 through 5.5.15.2 to install the third filter.
- 5.5.19 Secure excess security strap so it won't interfere with the door seal when it is replaced.
- 5.5.20 Lock the filters in place to the housing sealing surface by tightening the filter locking mechanisms, alternating from top locking mechanism to bottom locking mechanism.
- 5.5.21 Turn the top locking mechanism clockwise with the ratchet until the filter is snug, but not completely tightened.
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NOTE: The filter locking mechanisms incorporate factory-installed stops to determine when the filter is sealed.

- 5.5.22 Turn the bottom locking mechanism with the ratchet until the filter is completely tightened.
- 5.5.23 Completely tighten the top locking mechanism.
- 5.5.24 Torque the locking mechanisms per the following guidelines:
- Stage 3 or 4 HEPA**
- Recommended Torque: 32-38 ft-lbs
 - Maximum torque limit: 43 ft-lbs
- Stage 2 95% ASHRAE Filters**
- Torque the locking mechanisms to a nominal 30-32 ft-lbs
- 5.5.25 Ensure that the bag stub is packed tightly inside the Bag Stub Removal Glove Sleeve.
- 5.5.26 Remove arms from the Filter Handling Glove Sleeves, leaving the glove sleeves inside the bag.
- 5.5.27 Separate, cut, the contaminated bag stub from the new bag using the banding method or twist and tape method.
- 5.5.28 Gather the bag at a point near the lip of the bag-in/bag-out ring, drawing the bag taut and allowing the slack to fall off to one side.
- 5.5.29 Place a cinch strap around the bag, but do not tighten or pull taut.
- 5.5.30 With a cinch strap in place, extend the bag out completely.
- 5.5.31 Fold the end of the bag so corners are together, then towards the housing using a folding or rolling motion, squeezing the air out of each folded portion.
- 5.5.32 WHEN the air in the bag is expelled through the cinch strap, THEN pull the cinch strap taut.
- 5.5.33 Continue folding bag until slack in bag is neatly within the bag-in/bag-out ring and the bag window (clear portion) is taut and evenly distributed around the bag-in/bag-out ring.
- 5.5.34 With the bag folded and tucked neatly inside the bag-in/bag-out ring, remove the filter removal shelf, if used.
- 5.5.35 Ensure the door latch threads are coated with anti-seize.
- 5.5.36 Reinstall the access door, being careful not to disturb the gasket.
- 5.5.37 Swivel the door latches into the closed position.
- 5.5.38 Hand-tighten the retaining knobs in an alternating diagonal pattern.
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NOTE: Adequate compression may be achieved when the gasket slightly flattens at the interface. Smoke testing or ultrasonic leak detector monitoring may also be performed upon HEPA bank re-start.

- 5.5.39 Visually check the door seal by observing the interface between the gasket and the gasket-seating surface.
- 5.5.39.1 IF the step above does not create a seal,
THEN increase the torque incrementally and sequentially on each retaining knob until a seal is attained, but not to exceed 20 ft-lbs of torque applied.
- 5.5.39.2 IF an acceptable seal is still not achieved, OR if the door gasket is damaged,
THEN repair or replace the door gasket as needed.
- 5.5.40 Repeat Subsection 5.4 and Steps 5.5.1 through 5.5.39.2 for each row of three filters to be replaced.
- 5.5.41 Dispose of contaminated filters and bag stub in accordance with SS instructions.

5.6 Installing Moisture Separator Elements

NOTE: Steps 5.6.1 through 5.6.3 may be performed at any time prior to moisture separator element replacement activities.

- 5.6.1 Inspect a new bag for tears or other signs of visible damage.
- 5.6.2 Place a new moisture separator element inside the new bag, positioning the element(s) deep enough into the bag so that the element(s) is past the Bag Stub Removal Glove Sleeve.
- 5.6.3 Ensure that the bag is not torn or damaged after positioning the moisture separator element(s) into the bag.
- 5.6.4 Remove the security strap from the bag-in/bag-out ring.
- 5.6.5 Carefully maneuver the shock cord of the bag stub (remainder of the last bag) so it is between the two ribs of the bag-in/bag-out ring.
- 5.6.6 Lift moisture separator element(s) and bag to housing access door area.
- 5.6.7 Place the new plastic bag over the bag-in/bag-out ring. The shock cord of the plastic bag is to be located between the second rib of the ring and the housing frame.
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- NOTE:** It is easier to work from bottom to top of bag-in/bag-out ring, locating the seam of the bag at top of ring.
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- 5.6.8 Place hand and arm in the Bag Stub Removal Glove Sleeve.
- 5.6.9 Carefully remove the bag stub from the bagging ring without pulling the new bag off of the bagging ring.
- 5.6.10 Place the security strap between the first and second ribs of the bag-in/bag-out ring.
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- 5.6.11 Loop the end of the security strap through the Tension Lock Buckle on the security strap.
 - 5.6.12 Locate the Tension Lock Buckle at top of the bag-in/bag-out ring.
 - 5.6.13 Pull the strap to tighten the security strap around the bag-in/bag-out ring.
 - 5.6.14 Roll the bag stub into a small ball.
 - 5.6.15 While gripping the bag, slowly pull arm out of the Bag Stub Removal Glove Sleeve, turning the glove sleeve inside out with the bag stub inside.
 - 5.6.16 Place hands and arms into Filter Removal Glove Sleeves.
 - 5.6.17 Carefully install moisture separator element into housing positioned so the pleats are vertical and the reinforcement bar is located downstream.
 - 5.6.17.1 Gently, but firmly, push the moisture separator element until it touches the back of the housing or as far as can be reached. It may be necessary to use the second moisture separator element to push the first moisture separator element into place in a three-wide housing.
 - 5.6.18 Twist, tape, and cut the bag at a point between the Bag Stub Removal Glove Sleeve and bagging ring so that the previous bag stub will be removed along with the excess of the new bag.
 - 5.6.18.1 Repeat Steps 5.6.1 through 5.6.18 to install the next moisture separator element until all three elements are installed.
 - 5.6.19 Secure excess security strap so it won't interfere with the door seal when it is replaced.
 - 5.6.20 Ensure that the bag stub is packed tightly inside the Bag Stub Removal Glove Sleeve.
 - 5.6.21 Remove arms from the Filter Handling Glove Sleeves, leaving the glove sleeves inside the bag.
 - 5.6.22 Separate, cut, the contaminated bag stub from the new bag using the banding method or twist and tape method.
 - 5.6.23 Gather the bag at a point near the lip of the bag-in/bag-out ring, drawing the bag taut and allowing the slack to fall off to one side.
 - 5.6.24 Place a cinch strap around the bag, but do not tighten or pull taut.
 - 5.6.25 With a cinch strap in place, extend the bag out completely.
 - 5.6.26 Fold the end of the bag so corners are together, then towards the housing using a folding or rolling motion, squeezing the air out of each folded portion.
 - 5.6.27 WHEN the air in the bag is expelled through the cinch strap, THEN pull the cinch strap taut.
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- 5.6.28 Continue folding bag until slack in bag is neatly within the bag-in/bag-out ring and the bag window (clear portion) is taut and evenly distributed around the bag-in/bag-out ring.
- 5.6.29 With the bag folded and tucked neatly inside the bag-in/bag-out ring, remove the filter removal shelf, if used.
- 5.6.30 Ensure the door latch threads are coated with anti-seize.
- 5.6.31 Reinstall the access door, being careful not to disturb the gasket.
- 5.6.32 Swivel the door latches into the closed position.
- 5.6.33 Hand-tighten the retaining knobs in an alternating diagonal pattern.

NOTE: Adequate compression may be achieved when the gasket slightly flattens at the interface. Smoke testing or ultrasonic leak detector monitoring may also be performed upon HEPA bank re-start.

- 5.6.34 Visually check the door seal by observing the interface between the gasket and the gasket-seating surface.
- 5.6.34.1 IF the step above does not create an acceptable seal,
THEN increase the torque incrementally and sequentially on each retaining knob until an acceptable seal is attained, but not to exceed 20 ft-lbs of torque applied.
- 5.6.34.2 IF an acceptable seal is still not achieved,
OR if the door gasket is damaged,
THEN repair or replace the door gasket as needed.
- 5.6.35 Repeat Subsection 5.4 and Steps 5.6.1 through 5.6.34 for each row of three moisture separator elements to be replaced.

5.7 Restoration of Filter Housing

- 5.7.1 Open the applicable filter housing inlet isolation damper.
- ID3-22 (F-011)
 - ID3-24 (F-012)
 - ID3-26 (F-013)
- 5.7.2 Close supply damper BD3-34.
- 5.7.3 Close or check closed applicable exhaust dampers:
- BD3-35
 - BD3-36
 - BD3-37
 - BD3-38
- 5.7.4 IF restarting,
THEN restart in accordance with UT-UET-OP-506, Main Building Ventilation and HEPA System.
-

NOTE: The CSE ensures that testing is performed in accordance with ASME N510, Testing of Nuclear Air Treatment Systems, Section 10.

- 5.7.5 IF HEPA filters were replaced, THEN perform a leak check/aerosol penetration test in accordance with CM-UET-MT-506, Main Building Ventilation System Maintenance, prior to returning the filter housing to service.
- 5.7.6 Forward the Attachment D, Filter Change-out Record, to the FM and CSE for review.

6.0 RECORDS

Records are identified, classified, and maintained in accordance with CM-P-AD-049, Records Management, and CM-X-AD-026, Records Inventory and Disposition Schedule.

6.1 Record Numbering

Record	Record Naming Convention
Att. B	MBVEL-YYMMDD where MBVEL=Record Code; YY=Year; MM=Month; DD=Day (e.g., MBVEL-120401)
Att. D	MBVFCR-YYMMDD where MBVFCR=Record Code; YY=Year; MM=Month; DD=Day (e.g., MBVFCR-120401)

6.2 Records Inventory and Disposition Schedule

Records generated from this procedure are:

Record	Retention Period	Class	Record Type	Disposition Location	File Index Loc.	Media Type	OUO	Vital		Other File Loc.
								L & F	E O	
Attachment B, Equipment List	LOP+30	Record	COMFOR	7880V	17.2	EP	N/A	N/A	X	CM-P-MT-013
Attachment D, Filter Change-out Record	LOP+30	Record	COMFOR	7880V	17.2	EP	N/A	N/A	X	CM-P-MT-013

COMFOR – Completed Form **EO** – Emergency Operating **EP** – Electronic and Paper **L&F** – Legal & Financial
LOP+30 – Life of Project + 30 years **OUO** – Official Use Only

7.0 ATTACHMENTS

Attachment A: Acronyms/Abbreviations, Definitions, References, and Reviewer Selection for Major Revisions

Attachment B: Equipment List

Attachment C: Installing Gaskets on High Efficiency Particulate Air Filters

Attachment D: Filter Change-out Record

Attachment E: Intentionally Left Blank

Attachment A: Acronyms/Abbreviations, Definitions, References, and Reviewer Selection for Major Revisions

Acronyms/Abbreviations

ASHRAE – American Society of Heating, Refrigeration, and Air Conditioning Engineers

CSE – Cognizant System Engineer

FM – Facility Manager

FTF – Filter Test Facility

HEPA – High Efficiency Particulate Air

QA – Quality Assurance

RCM – Radiological Control Manager

RTV – Room Temperature Vulcanizing silicone

SS – Shift Superintendent

TRU – Transuranic

TWPC – TRU Waste Processing Center

WCO – Waste Certification Official

Definitions

High Efficiency Particulate Air Filter or HEPA Filter: A throw-away extended-pleated-medium dry-type filter with: (1) a rigid casing enclosing the full depth of the pleats, (2) a minimum particle removal efficiency of 99.97% for particles with a diameter of 0.3 micrometers, and (3) a maximum pressure drop of 1.0 in. w.c. or 1.3 in. w.c. when clean and operated at its rated airflow capacity (DOE-STD-3020-2005).

Note HEPA filters are factory tested to meet a minimum performance criteria of 99.97% or 99.99% efficient (as specified) on a mono-dispersed particle size of 0.3 microns. Additionally, DOE's designated Filter Test Facility tests TWPC safety significant HEPA filters to ensure 99.97% minimum efficiency prior to installation.

Safety Significant HEPA filters are field tested in-place in accordance with ASME N510 to meet a minimum performance criteria of 99% efficient on a polydispersed particle size ranging from 0.4 microns to 3.0 microns.

Developmental References

2003-W100, Filtration Group Inc., Revision 12-10-03, Gasketing High Efficiency Filters

ASME N510, Testing of Nuclear Air Treatment Systems, Section 10

T-CM-FW-D-PR-036, Sheet 1, Piping & Instrument Diagram AHU-005 Process Bldg.

T-CM-FW-D-PR-037, Piping & Instrument Diagram Stack, Blowers, & HEPA Units

T-CM-43-M-ME-001, Filter Housing Operation & Maintenance Manual

CM-X-AD-022, Technical Safety Requirements

OAHA-10-004, Main Building Ventilation Filter Change Out



Attachment A: Acronyms/Abbreviations, Definitions, References, and Reviewer Selection for Major Revisions

Cross References

T-CM-FW-S-ME-223, Acceptable Filter Summary Sheet
 CM-P-IS-023, Scaffolding
 CM-UET-MT-506, Main Building Ventilation System Maintenance
 CM-REF-RP-322, Contamination Control
 UT-UET-OP-506, Main Building Ventilation and HEPA System

Reviewer Selection for Major Revisions

Required	Optional
Peer Review Specialist	Director of Regulatory Interface and Integration
Radiological Control Manager	Quality Assurance Manager
Main Building Ventilation Cognizant System Engineer	Safety Authorization Basis Manager
Facility Manager	Health and Safety Manager
CH/RH Process Superintendent	Waste Certification Official
	Operations Manager
	Shift Superintendent



Attachment B: Equipment List

Record Number: MBVEL-
(YYMMDD)

	Initial	Date
New filter elements (3 per row on each side, 24 per stage) w/ completed QA Inspection		
New plastic change-out bags (one per filter except moisture separators) Stage One • 70C x 72 long, Flanders Part 11-103, or equal Stage Two • 84C x 96 long, Flanders Part 11-112, or equal Stage Three/Four • 84C x 96 long, Flanders Part 11-112, or equal		
Security straps (one per access door)		
Cinching straps (one per access door)		
3/4" 6 or 12 point socket, short extension, and standard ratchet (N/A for Moisture Separators)		
Torque Wrench (10-100 ft-lbs) with adapters (N/A for Moisture Separators)		
Anti-seize (Chesterton 772 Premium Nickel Anti-Seize or equivalent)		
Plastic tie wraps w/ zip gun		
Tape (for horsetails, 12 rolls)		
Gaskets and Adhesive (N/A for Moisture Separators, see table below)		
Isopropyl Alcohol (N/A for Moisture Separators)		
Filter Release Agent (silicone grease, Novaguard G661 or equivalent) (N/A for Moisture Separators)		
Warm air blower/hair dryer (N/A for Moisture Separators)		
Putty knife (N/A for Moisture Separators)		

Type	FGI PN OR EQUAL	Size	Material OR EQUAL
Gasket	60-88021	5/8"	Poron
Gasket	60-85042	3/4"	Poron
Adhesive	30-88015	--	3M - # 1357

Filter QA Inspection complete: _____

QA Inspector Signature / Date

Forward Original to DCRM.

Attachment C: Installing Gaskets on High Efficiency Particulate Air Filters

NOTE: This section applies to all 95% ASHRAE filters and HEPA filters with gaskets.

1. Notify QA and the CSE of the filter deficiency and collectively determine if the filter should be used as is, regasketed, or scrapped.
2. If necessary to remove old gasket, then proceed using the following guidance. If not, proceed to Step 3.
 - 1.1 Use a warm blower (possibly hair dryer) to warm the gasket before and during gasket removal.
 - 1.2 Use a putty knife to scrape away the gasket material using a low angle to get under the PSA (pressure sensitive adhesive) layer while removing the gasket material.
 - 1.3 Remove as much remaining adhesive as possible.
3. Wipe all gasket mounting surfaces with Isopropyl Alcohol to remove dirt, adhesive, or other foreign contaminants.
4. Verify/Select approved materials:

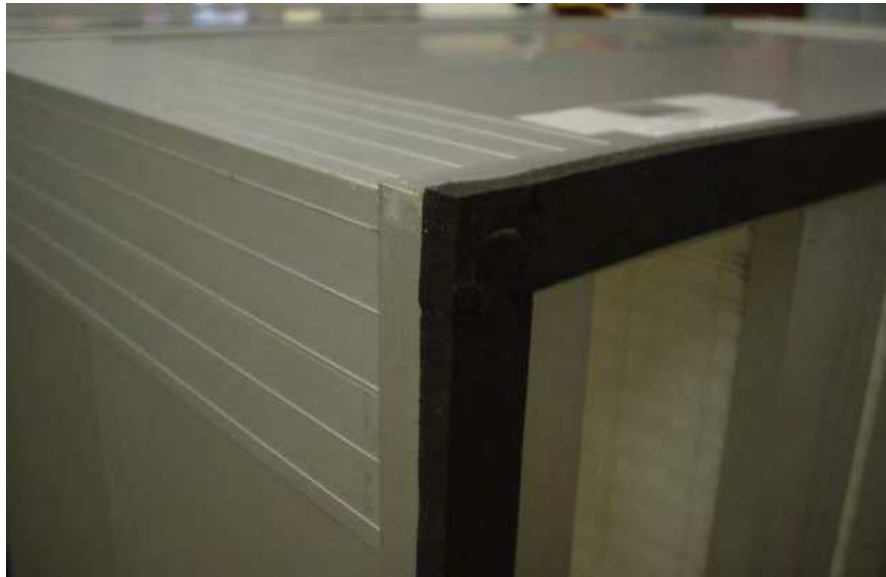
Type	FGI PN OR EQUAL	Size	Material OR EQUAL
Gasket	60-88021	5/8"	Poron
Gasket	60-85042	3/4"	Poron
Adhesive	30-88015	--	3M - # 1357

5. Cut gaskets to fit filter frame. Notch and key all corners.

6. Apply a thin (1/16" - 1/8") bead of gasket adhesive to center line gasket location.

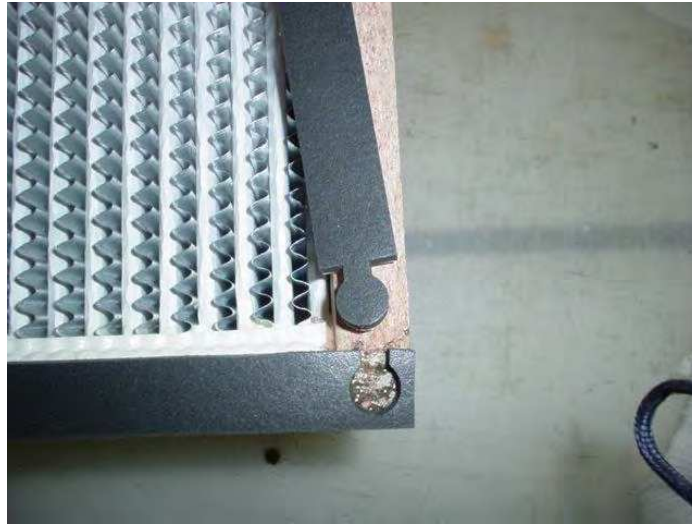


7. Remove paper backing from gasket.
8. Press gasket onto filter frame, aligning gasket with outside edge of filter frame.



NOTE: Remaining gaskets are applied with all corners interlocked.

9. Apply thin glue bead on gasket edge in interlocked corners.



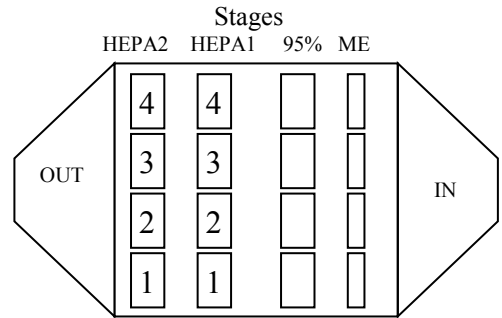
10. Allow gasket adhesives to cure one (1) hour before installation then proceed to Step 5.2.3.



Attachment D: Filter Change Out Record

Record Number: MBVFCR-
(YYMMDD)

Date: _____
Filter Housing: _____
Filter Change Out Personnel: _____



Record filter serial numbers, mfr. Date, and FTF Test Date as installed:

North Side

Filter Location Diagram (Elevation View)

Location	Serial #	Mfr. Date	FTF Test	Location	Serial #	Mfr. Date	FTF Test
HEPA1 C*				HEPA2 C			
Level 1 B				Level 1 B			
A				A			
HEPA1 C				HEPA2 C			
Level 2 B				Level 2 B			
A				A			
HEPA1 C				HEPA2 C			
Level 3 B				Level 3 B			
A				A			
HEPA1 C				HEPA2 C			
Level 4 B				Level 4 B			
A				A			

South Side

Location	Serial #	Mfr. Date	FTF Test	Location	Serial #	Mfr. Date	FTF Test
HEPA1 C*				HEPA2 C			
Level 1 B				Level 1 B			
A				A			
HEPA1 C				HEPA2 C			
Level 2 B				Level 2 B			
A				A			
HEPA1 C				HEPA2 C			
Level 3 B				Level 3 B			
A				A			
HEPA1 C				HEPA2 C			
Level 4 B				Level 4 B			
A				A			

*C is the innermost filter

Reviewed FM Signature: _____ Date: _____

Reviewed CSE Signature: _____ Date: _____

Forward Original to DCRM.



Attachment E: Intentionally Left Blank

(Previously HEPA Filter In-Place Test Efficiency – Do not re-assign)
