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DESIGN NOTES:

- 1. REFER TO THE EQUIPMENT LIST IN THE MECHANICAL STANDARDS MANUAL FOR DESCRIPTION OF MECHANICAL EQUIPMENT. RENUMBER ITEMS AS REQUIRED TO SUIT PROJECT.
- 2. THE STANDARD DETAILS ILLUSTRATE ONLY A FEW OF THE POSSIBLE FILTER TRAIN COMBINATIONS THAT MAY BE REQUIRED FOR A SPECIFIC PROJECT. THE DESIGNER SHOULD REVIEW THE REQUIREMENTS AND MAKE THE DETAIL "PROJECT SPECIFIC."
- 3. FIRE SCREENS ARE REQUIRED UPSTREAM OF THE PREFILTER.
- 4. PREFILTERS ARE REQUIRED UPSTREAM OF THE FIRST HEPA FILTER BANK. WHEN MOISTURE SEPARATORS ARE INSTALLED, A FILTER SCREEN IS NOT REQUIRED.
- 5. MOISTURE SEPARATORS (DEMISTORS)
  - A. MOISTURE SEPARATORS ARE REQUIRED WHEN ENTRAINED WATER DROPLET CONCENTRATION MAY BE GREATER THAN 1LB. OF WATER PER 1000CFM OF AIRFLOW OR WHEN THE DUCTWORK IS SPRINKLED UPSTREAM OF THE FILTER TRAIN.
  - B. INSTALL UPSTREAM OF PREFILTER.
  - C. PROVIDE TRAINS IN THE MOISTURE SEPARATOR HOUSING. CONSULT WITH ESH-18 FOR DESIGN OF DRAINAGE PIPING AND THE METHOD OF DISPOSING OF LIQUID.
  - D. CONSULT WITH THE USER, INDUSTRIAL HYGIENE, AND AIR QUALITY.
- 6. HEPA FILTERS
  - A. 24" x 24" x 11-1/2" NOMINAL SIZE HEPA FILTERS, WOOD, OR STEEL FRAMES, FURNISHED AND INSTALLED BY THE LABORATORY.
  - B. BASE DESIGN ON AN AIRFLOW RATE OF 1000 CFM/FILTER OR 1250 CFM/FILTER; MINIMUM FLOW RATE 200 CFM/FILTER.
  - C. CONSULT WITH ESH PERSONNEL FOR THE NUMBER OF HEPA FILTRATION STAGES REQUIRED.
- 7. CHEMICAL ADSORBERS
  - A. CHEMICAL ADSORBERS REMOVE GASEOUS EMISSIONS FROM RADIOACTIVE, BIOLOGICAL, AND/OR CHEMICAL PROCESS EXHAUST AIR.
  - B. SPECIFY NUCLEAR GRADE CHEMICAL ADSORBERS USING VIRGIN COCONUT SHELL CARBON.
  - C. CONSULT WITH ESH PERSONNEL AND THE CHEMICAL ADSORBER MANUFACTURER'S TECHNICAL REPRESENTATIVE TO ASSURE PROPER SELECTION, RESIDENCE TIME CALCULATION, AND SYSTEM CONFIGURATION.
  - D. INSTALL HEPA FILTERS UPSTREAM OF THE FIRST ADSORBER CELL AND DOWNSTREAM OF THE LAST ADSORBER CELL.

- 8. BASE FAN SELECTION ON THE FOLLOWING FILTER AIR FLOW RESISTANCE (INCHES W.G.), RATED AT 1000 CFM/FILTER.

	CLEAN	DIRTY
FIRE SCREEN	0.10	0.60
MOISTURE SEPERATOR	0.10	0.60
PREFILTER	0.20	1.20
HEPA FILTER (FIRST STAGE)	1.00	3.50
HEPA FILTER (SUBSEQUENT STAGES)	1.00	1.50
CHEMICAL ADSORBER	1.25	1.25

- 9. FILTER TEST SECTIONS
  - A. INSTALL TEST SECTIONS UPSTREAM AND DOWNSTREAM OF EACH HEPA FILTER AND CHEMICAL ADSORBER EXCEPT AS NOTED.
- 10. FILTER TRAIN
  - A. LOCATE THE FILTER TRAIN INDOORS, IF FEASIBLE. CONSULT WITH FOD, INDUSTRIAL HYGIENE, AND THE USER FOR LOCATION APPROVAL.
  - B. LOCATE THE FILTER TRAIN AS CLOSE AS POSSIBLE TO THE SOURCE OF CONTAMINATION. PROVIDE A MINIMUM OF 10'-0" OF DUCTWORK BETWEEN THE SOURCE AND THE FILTER TRAIN TRANSITION FLANGE.
  - C. A CLEARANCE OF 5'-0" IS REQUIRED FOR FILTER CHANGE OUT FROM FACE OF ACCESS DOOR.
  - D. IN PLACE ACCEPTANCE TEST (DOS, FREON, ETC.) OF THE INSTALLED HEPA FILTERS AND THE CHEMICAL ADSORBERS ARE DONE BY THE LABORATORY.
  - E. SPECIFY FILTER ACCESS DOORS ON BOTH SIDES OF THE HOUSING WHEN THERE ARE MORE THAN 3 FILTERS WIDE IN A BANK.
  - F. DO NOT SPECIFY HOUSINGS EXCEEDING 6 FILTERS WIDE OR 3 FILTERS HIGH.
- 11. MAGNEHELIC GAUGES
  - A. PROVIDE GUAGES TO MEASURE THE PRESSURE DIFFERENTIAL ACROSS EACH FILTER BANK (I.E., FIRE SCREEN, PREFILTERS, 1ST AND 2ND HEPA BANK, CHEMICAL ADSORBERS, ETC.)
  - B. LOCATE THE GAUGES INDOORS WHEN THE FILTER TRAIN IS INSTALLED OUTDOORS.
- 12. CONSIDER SECONDARY AND TERTIARY CONFINEMENT SYSTEMS TO MINIMIZE THE SPREAD OF RADIOACTIVE AND OTHER HAZARDOUS MATERIALS. CONSULT WITH INDUSTRIAL HYGIENE, RAD ENGINEERING, FOD, AND THE USER FOR THE REQUIREMENTS AND CONDITIONS FOR MINIMIZING THE DISPERSION OF THE HAZARDOUS MATERIALS.
- 13. CONSULT WITH FACILITIES ENGINEERING DESIGN, INDUSTRIAL HYGIENE, AND RAD ENGINEERING FOR THE SPECIFIC PROJECT REQUIREMENTS THAT WILL GOVERN THE SEISMIC CRITERIA TO BE USED.
- 14. CONSULT WITH FIRE PROTECTION GROUP FOR FIRE PROTECTION REQUIREMENTS OF FILTERS.

DRAWING DEVELOPED FOR ML-3/ML-4 PROJECTS. FOR ML-1/ML-2, ADDITIONAL REQUIREMENTS AND QA REVIEWS ARE REQUIRED. (REMOVE THIS NOTE WHEN INSERTED INTO A DRAWING PACKAGE).

1	05-11-2017	UNCLASS	ML	ADMIN. CHANGES TO CAD STD. REV#5 FORMAT	JB	ML	AJ	ML	TO
NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP

  

<b>ENGINEERING STANDARDS</b>				
<b>MECHANICAL</b>			DRAWN	
<b>FILTER TRAIN DESIGN NOTES</b>			DESIGN	
			CHECKED	
			DATE	6-28-99
TA- XX		BLDG XX		
SUBMITTED		APPROVED FOR RELEASE DISCIPLINE POC: DANNY NGUYEN		
		SHEET <b>M4</b>		
		<b>4</b> OF <b>4</b>		
D.C.: U		REVIEWER: DANNY NGUYEN		DATE:
PROJECT ID		DRAWING NO		REV
<b>XXXXXX</b>		<b>ST6700.4</b>		<b>1</b>

00% REVIEW NOT FOR CONSTRUCTION

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