Terminal HEPA Filters and Housings and USP 797 Guidelines

January 20, 2020

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ABOUT ME

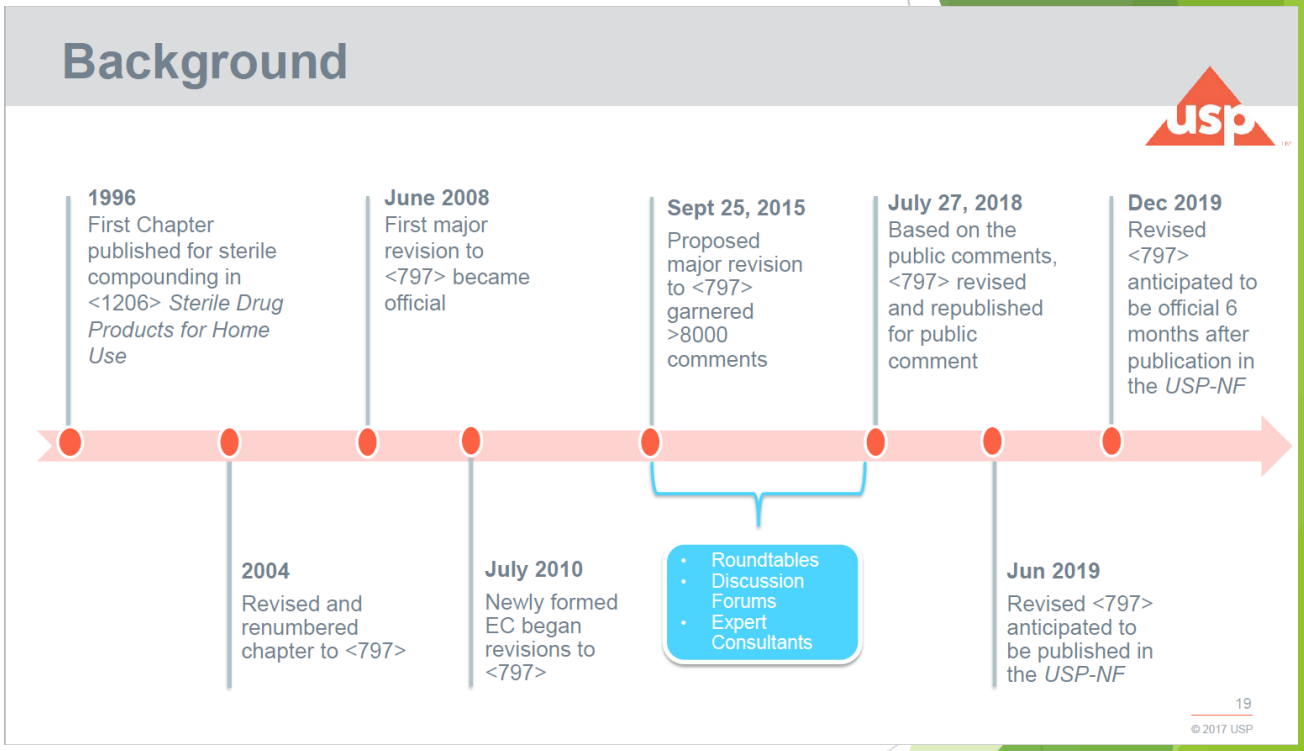
- Graduated The Ohio State University in 2000 with a BS in Biology with a specialization in Immunology
- 15+ years of experience in Biosafety and Containment Systems
- Worked at Camfil since 2011
- Currently Life Science Segment Manager
- Live in Central Ohio

Agenda: Life Science HEPA Filters and Housings

- Background on USP 797
  - Requirements in Current 2008 Version
  - Proposed Changes for 2019 Version
  - Current status of USP 797 2019
  - USP 800 2019 Hilights
- Terminal HEPA Options
  - Disposable HEPA Terminal Diffusers
  - Basic Terminal HEPA Housing features
  - Fully Configurable Terminal HEPA housing features
  - Fan powered HEPA housing options

USP 797 BACKGROUND

- USP 797 was first Published in 2004
- Current version was last revised in USP31-NF26 Second supplement on June 1, 2008
- Current Version is “Official” and enforceable
- Current Revision was released on June 1, 2019
- Current revision was to become “Official” December 1, 2019 in USP NF 37
- USP 797 2019 is currently postponed indefinitely



CURRENT USP 797 – 2008 GOALS AND REQUIREMENTS

- Objective of USP 797 that pertain to Environmental controls
  - "The objective of this chapter is to describe conditions and practices to prevent harm, including death, to patients that could result from Microbial Contamination"
  - Provides minimum quality standards for drugs and nutrients based on current scientific information and best practices
  - Must prove any deviations are equal or superior with proof

CURRENT USP 797 – 2008 HEPA FILTERS

- HEPA-filtered supply air shall be introduced at the ceiling,
- Returns should be mounted low on the wall,
- ISO 7 areas must have 30 ACH unless they are recirculating (greater than 15)
- Laminar flow should be maintained with velocity at 40 fpm
- HEPA filters should be MPPS tested
  - **Requires IEST Class J or K**
  - **No 99.99% on 0.3 micron**
  - **Testing to occur at factory AND again in-situ (after installation)**
- Ceilings should be cleaned monthly including HEPA filters

CURRENT USP 797 – 2008 DEFINITIONS

- Ante-area is an Iso Class 8 or better area where the following occur
  - Hygiene and garbing
  - Staging of components
  - Labeling
- Goal is to perform high-particulate generating activities away from critical areas
- Provides a pressure buffer from clean to dirty areas 0.02” w.g. positive relative to surrounding Pharmacy area
- No food or drinks in these areas

CURRENT USP 797 – 2008 DEFINITIONS

- Biological Safety Cabinet
  - Downward Laminar Flow
  - HEPA Filtered air
  - HEPA filtered Exhaust optimally vented outside
  - Typical product preparation area
  - Cannot be the “Sole-Source” of HEPA filtered air
  - Negative Pressure relative to room so air flows inward (optimally 0.01” w.g.)
- Goal is to provide a critical area to preform the compounding
- Often considered the Critical Area, Primary Engineering Control or Direct Compounding Area

CURRENT USP 797 – 2008 DEFINITIONS

- Buffer area or Cleanroom
  - Dedicated area Iso 7 or better
  - Area where primary engineering controls is physically located
  - Preparation and staging of components for compounding
  - Positively pressurized 0.02”-0.05” w.g. to Ante area
  - Windows must be sealed
  - Sinks may not be located in this area
  - Microorganisms are monitored
- Terminal HEPA units are required here
- Goal is to provide a Clean area to surround the Critical area

CURRENT USP 797 – 2008 CERTIFICATION

- Initial Startup and every 6 months or sooner (in case of identified problems) for the following preparations:
  - Hazardous Drug Preparations
  - Environmental sampling for viable and non-viables
  - Pressure differential monitoring
  - Certification of equipment and facility

CURRENT USP 797 – JHACO POSITION

- Effective January 1, 2017, The Joint Commission launched its new Medication Compounding Certification program for all compounding pharmacies.
- Evaluate a pharmacies compliance with standards that were based off the sterile and non-sterile compounding requirements issued by the USP in its chapters <797> and <795>
- Onsite review conducted at least once every two years
- The program has been developed to recognize organizations that demonstrate excellence in medication compounding through a combination of standards compliance for both Joint Commission standards for medication compounding and the USP standards.
- This program is open to all organizations performing medication compounding.
- Program is Voluntary

PROPOSED CHANGES - CONSTRUCTION

- Removal of instruction on Administration of Pharmaceuticals
- Movement or radiopharmaceuticals to a separate chapter 825
- Will require ISO 7 Positively pressurized buffer room instead of currently unclassified space
- Will require an ISO class 8 Anteroom with clear separation

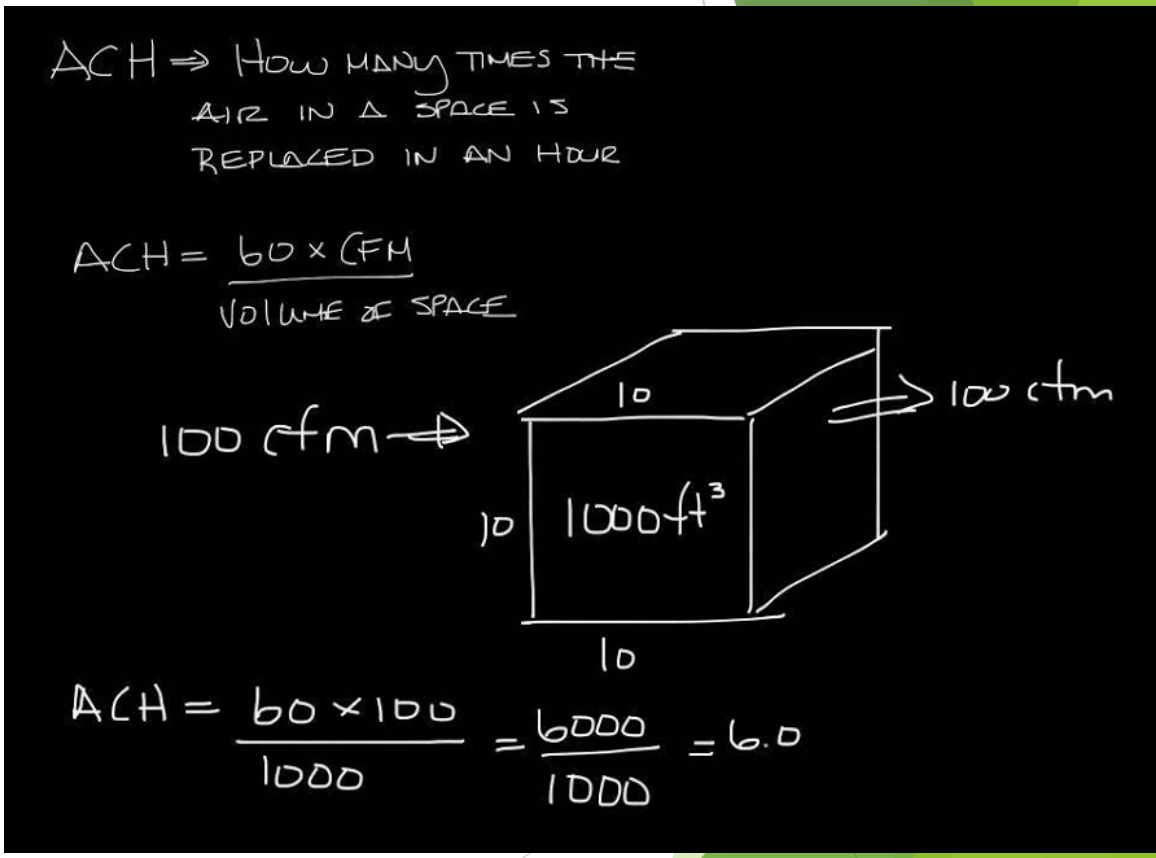
Table 1 — Selected airborne particulate cleanliness classes for cleanrooms and clean zones

ISO classification number (*N*)	Maximum concentration limits (particles/m³ of air) for particles equal to and larger than the considered sizes shown below (concentration limits are calculated in accordance with equation (1) in 3.2)					
	0,1 µm	0,2 µm	0,3 µm	0,5 µm	1 µm	5 µm
ISO Class 1	10	2				
ISO Class 2	100	24	10	4		
ISO Class 3	1 000	237	102	35	8	
ISO Class 4	10 000	2 370	1 020	352	83	
ISO Class 5	100 000	23 700	10 200	3 520	832	29
ISO Class 6	1 000 000	237 000	102 000	35 200	8 320	293
ISO Class 7				352 000	83 200	2 930
ISO Class 8				3 520 000	832 000	29 300
ISO Class 9				35 200 000	8 320 000	293 000

NOTE Uncertainties related to the measurement process require that concentration data with no more than three significant figures be used in determining the classification level

PROPOSED CHANGES – AIR REQUIREMENTS

- Will require clearly defined Air Change rates
  - Greater than 30 ACH for Buffer Room
  - Great than 20 ACH for Anteroom
  - Buffer rooms cannot contain Water sources



PROPOSED CHANGES - CERTIFICATIONS

- Room will need to be certified bi-annually
  - Certification includes Airflow testing
  - HEPA integrity test (Scan test)
  - Total particle count testing (room ISO level)
  - Smoke Visualization studies (Laminarity)
  - Viable Air Sampling Maintained

- A webinar on the changes is available on line at http://www.usp.org/compounding/general-chapter-797

CURRENT STATUS OF USP 797

USP-NF

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USP General Chapters <795>, <797>, <800>, and <825>

Language | Share | Print

Type of Posting: Notice of Intent to Revise
Posting Date: 23–Sep–2019
Official Date December 1, 2019; TBD
Expert Committee: Compounding, Chemical Medicines Monographs 4

On June 1, 2019, USP published revisions to <795> *Pharmaceutical Compounding – Nonsterile Preparations* and <797> *Pharmaceutical Compounding – Sterile Preparations*, as well as a new chapter <825> *Radiopharmaceuticals – Preparation, Compounding, Dispensing, and Repackaging*. After publication of the revised and new compounding standards, USP received appeals on certain provisions in <795>, <797>, and <825>.

In accordance with USP's Bylaws, the responsible Expert Committees worked with a sense of urgency to consider the information raised in the appeals and issued decisions on the appeals (see Decisions on Appeals to USP <795> and <797> and <825>). In accordance with USP's formal appeals process, stakeholders who submitted appeals on the compounding chapters have requested further review by an appointed Panel.

USP's Bylaws provide that the official date of a standard under appeal must be postponed while an appeal is pending. Therefore, **USP is postponing the official dates of the revised <795> and <797>, and the new general chapter <825> until further notice**. In the interim, the currently official chapters of <795> (last revised in 2014) and <797> (last revised in 2008) including the section *Radiopharmaceuticals as CSPs* will remain official. The decisions on the appeals to <795>, <797>, and <825> do not foreclose the possibility of future revisions to these chapters.

General Chapter <800> is not subject to any pending appeals and will become official on December 1, 2019. During the postponement and pending resolution of the appeals of <795> and <797>, <800> is informational and not compendially applicable. USP encourages utilization of <800> in the interest of advancing public health.

USP plays no role in enforcement. State and other regulators may make their own determinations regarding the enforceability of <800>. USP remains committed to advancing public health and to promoting the quality of compounded preparations and the safe handling of hazardous drugs. USP will continue to communicate updates on the compounding chapters and the appeals process. For any questions, please contact the Healthcare Quality & Safety Team at CompoundingSL@usp.org.

CN-20-007-00

Related Resources

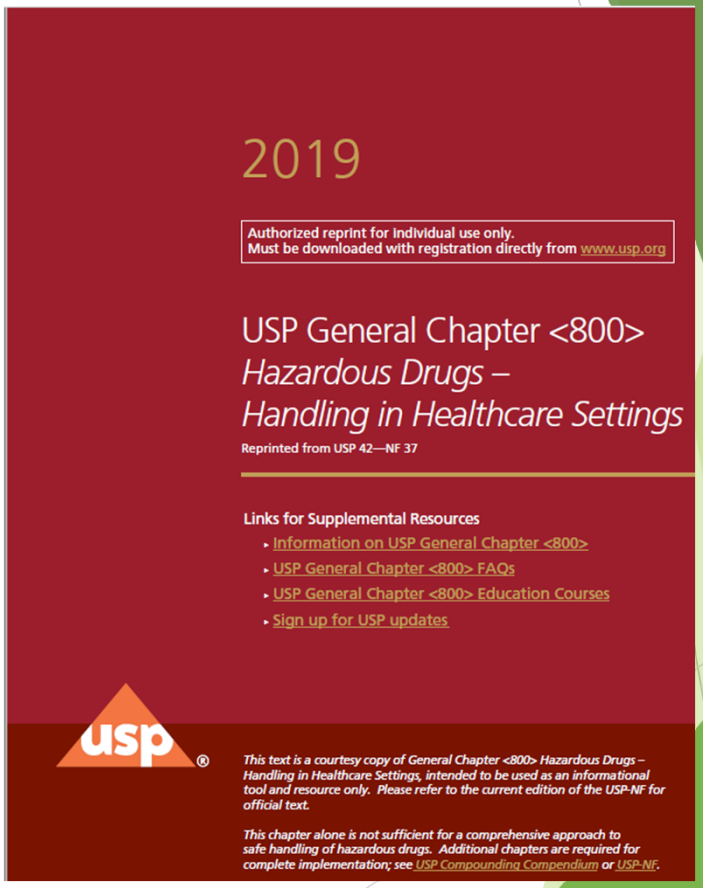
- Publication & Comment Schedule
- Compendial Tools
- Download Reference Standards Catalog
- Purchase USP Reference Standards
- Chromatographic Columns
- Expert Committee Workplan
- Sign Up for Newsletters & Monthly Updates

September 23, 2019 USP Issued the following notice:

- **"USP is postponing the official dates of the revised <795> and <797>, and the new general chapter <825> until further notice."**
- USP 797 2019
  - Currently postponed
  - What was appealed:
    - Beyond-Use Date (BUD) provisions in <795> and <797>
    - Removal of Alternative Technology provision from <797>
    - Applicability of <795> and <797> to veterinary practitioners
- USP 800 2019
  - Was not appealed
  - Has references to USP 797 2019 that make it "Informational" at this time and non-mandatory
  - USP urges that designers and Hospitals follow the standard in the interest of "advancing public health"
- A detail of the release is available on line at https://www.uspnf.com/notices/compounding-chapters-postponement

CURRENT USP 800 HILIGHTS

- Applies to Hazardous Drugs as defined by NIOSH
  - Storage areas must:
    - Be Negatively Pressurized
    - Directly Exhaust Air outside
    - Maintain 12 ACH for Non-sterile Compounding
    - Follows guidelines of USP 797 for Sterile Compounding
  - C-Pec is equipment in which a drug is made (Containment Primary Eng. Ctrl.)
    - Should be externally vented
    - May be counted in ACH totals if it runs at all times
  - C-Sec is the surrounding Cleanroom (Containment Secondary Eng. Ctrl.)
    - Physically separated from surrounding areas
    - Negative pressure of 0.01”-0.03” w.g. relative to surrounding areas
    - Have at least 12 ACH



TERMINAL HEPA OPTIONS

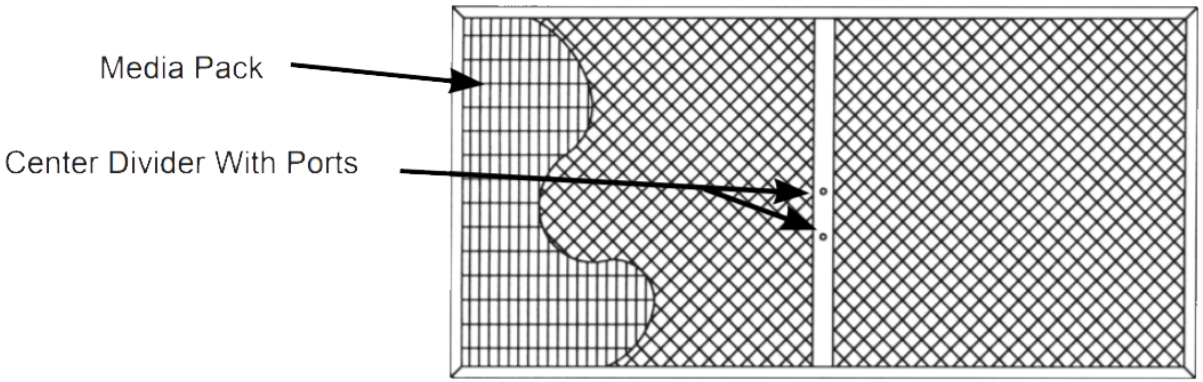
- Discussion on the types of products available to meet USP 797 with respect to Terminal HEPA filters
- Review or requirements
  - HEPA-filtered supply air shall be introduced at the ceiling,
  - Laminar flow should be maintained with velocity at 40 fpm
  - HEPA filters should be MPPS tested
    - Requires IEST Class J or K
    - No 99.99% on 0.3 micron
    - Testing to occur at factory AND again in-situ (after installation)
  - Ceilings should be cleaned monthly including HEPA filters

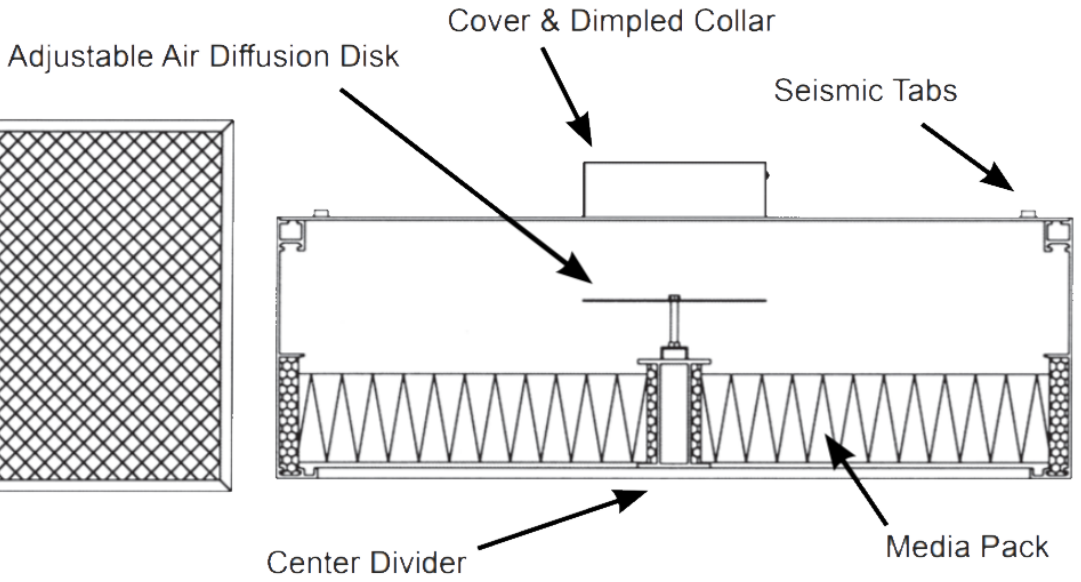
What type of HEPA housings should be used

Cheapest option

- Disposable HEPA Diffusers
  - Replace entire unit each time
  - Typically lowered into T-Bar ceilings

- Lowest Initial Cost option but high maintenance cost
- Difficult to test units individually
- Caulked back plate with collar





What type of HEPA housings should be used

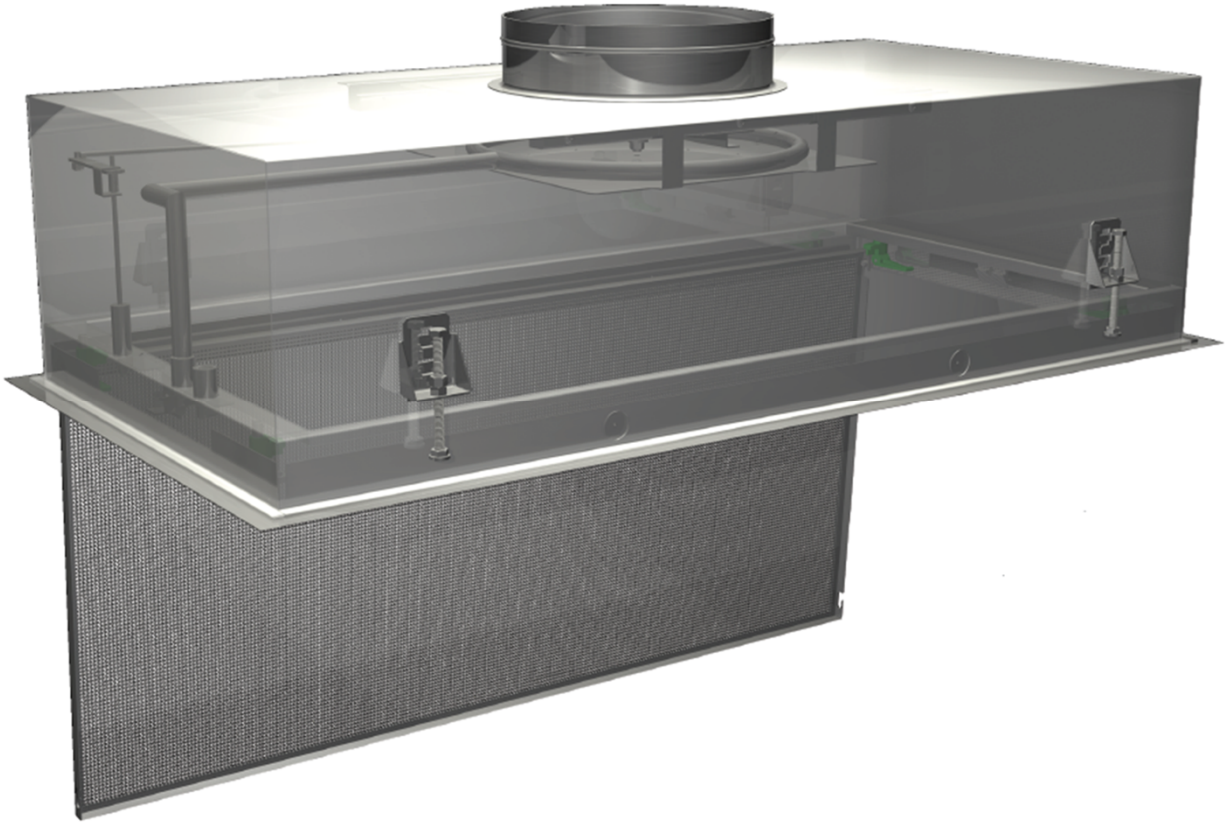
Next step up

- Value focused terminal HEPA filter with housings without integrated testability
- Housing is permanently installed and filter is replaced from room-side
- Center port for Damper adjustment
- Lower filter cost but higher initial cost
- Caulked Extruded Aluminum housing

What type of HEPA housings should be used

Preferred option

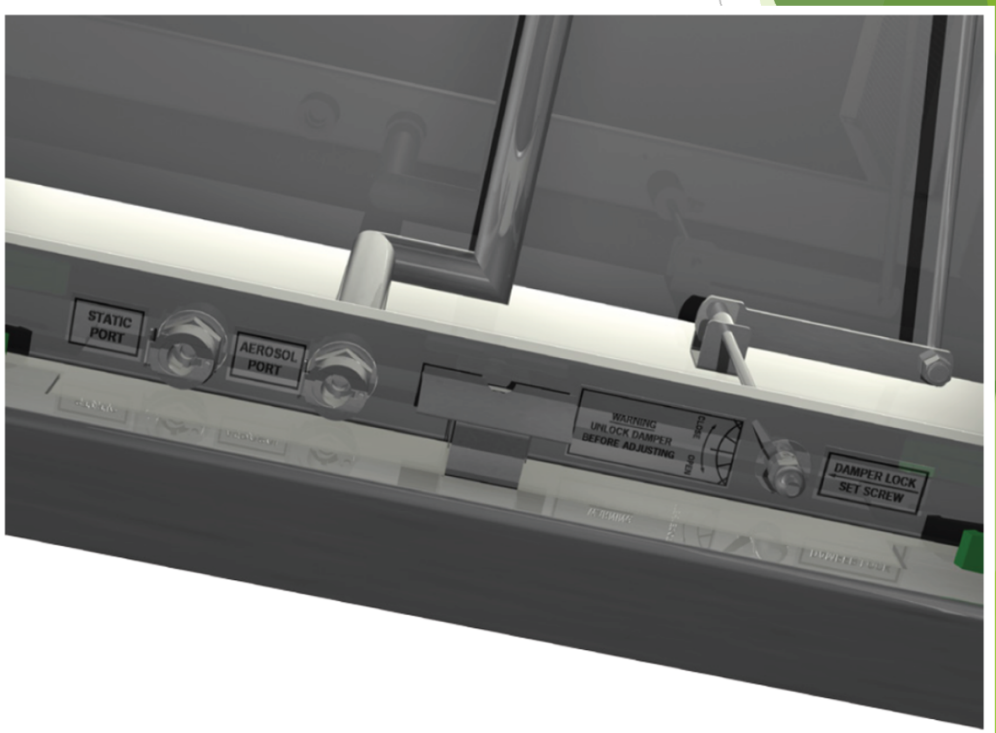
- Fully welded terminal HEPA filter housing without integrated testability
- Housing is permanently installed and filter is replaced from room-side
- Grille Protects filter from damage
- Lower filter cost, upkeep cost, and testing cost, but higher initial cost



What type of HEPA housings should be used

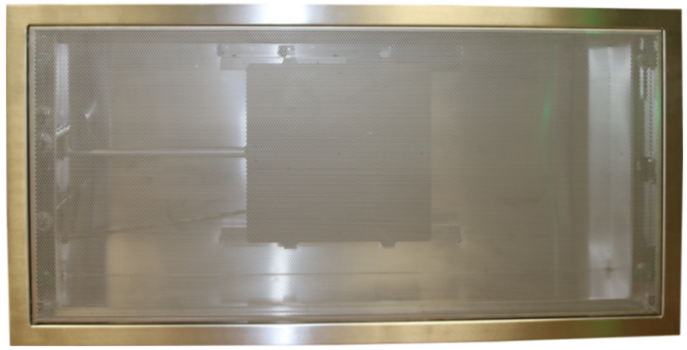
Preferred option Continued

- Quick Connections for fast movement from unit to unit for testing
- Qualified test ports for IEST standards
- Maximizes online time for Pharmacy rooms



Removable Grille

- Flush, concealed, & hinged grille
  - Quick and easy to open
  - Smooth room-side surface
  - Easy to clean
  - No components to lose
  - Rapidly removed if needed

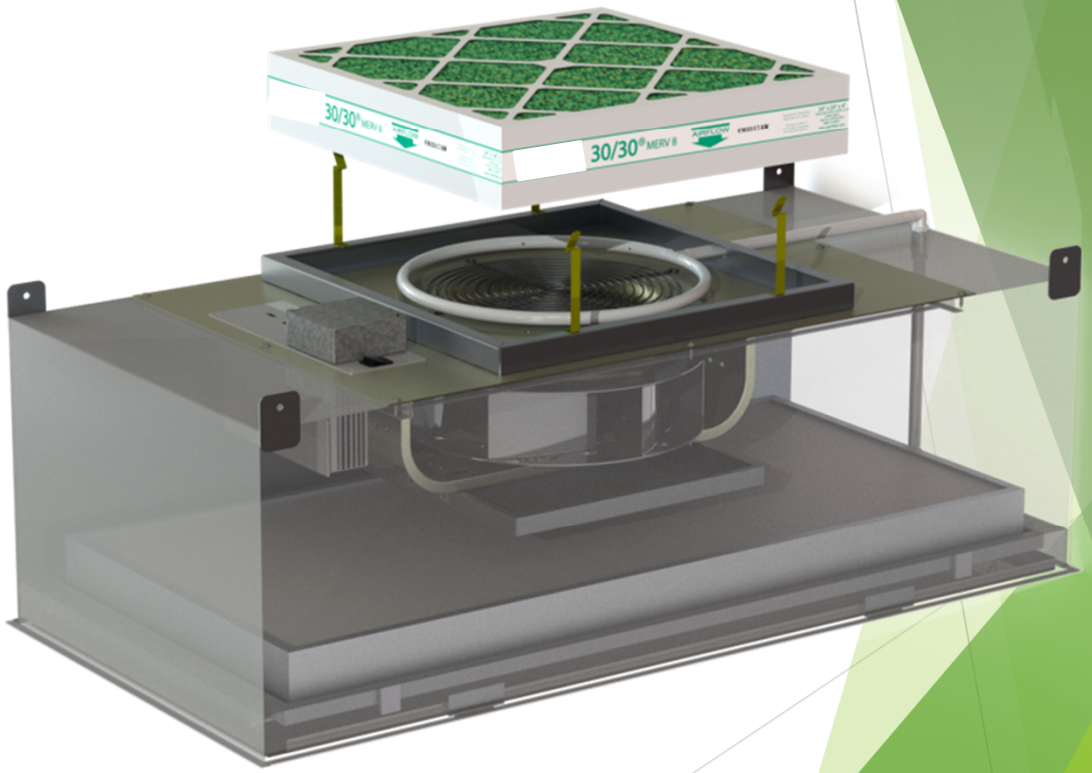


Advantages: The Pharmaseal comes with a flush mounted, hinged safety grille constructed of stainless steel. The concealed grille ensures protection of the filter and internal components and has a 40% open area face screen with a 2B finish. The grille has solid border with no sharp edges.

What type of HEPA housings should be used

Fan powered option

- Fully welded terminal HEPA filter housing with integrated testability
- Housing is permanently installed and HEPA filter is replaced from room-side
- Grille Protects filter from damage
- EC and Rheostat Controlled Motors are most common
- Work well when there is no available supply air from AHU



Questions?