ASME N511, In-Service Testing of Nuclear Air Treatment, Heating, Ventilating, and Air-Conditioning Systems

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ASME N511, In-Service Testing of Nuclear Air Treatment, Heating, Ventilating, and Air Conditioning Systems, shall be used for:

- In-service testing to verify equipment availability and to obtain data for operational considerations for perform their intended functions.
- Provides procedures for surveillance (interval) testing to satisfy technical specifications and specific site surveillance requirements.

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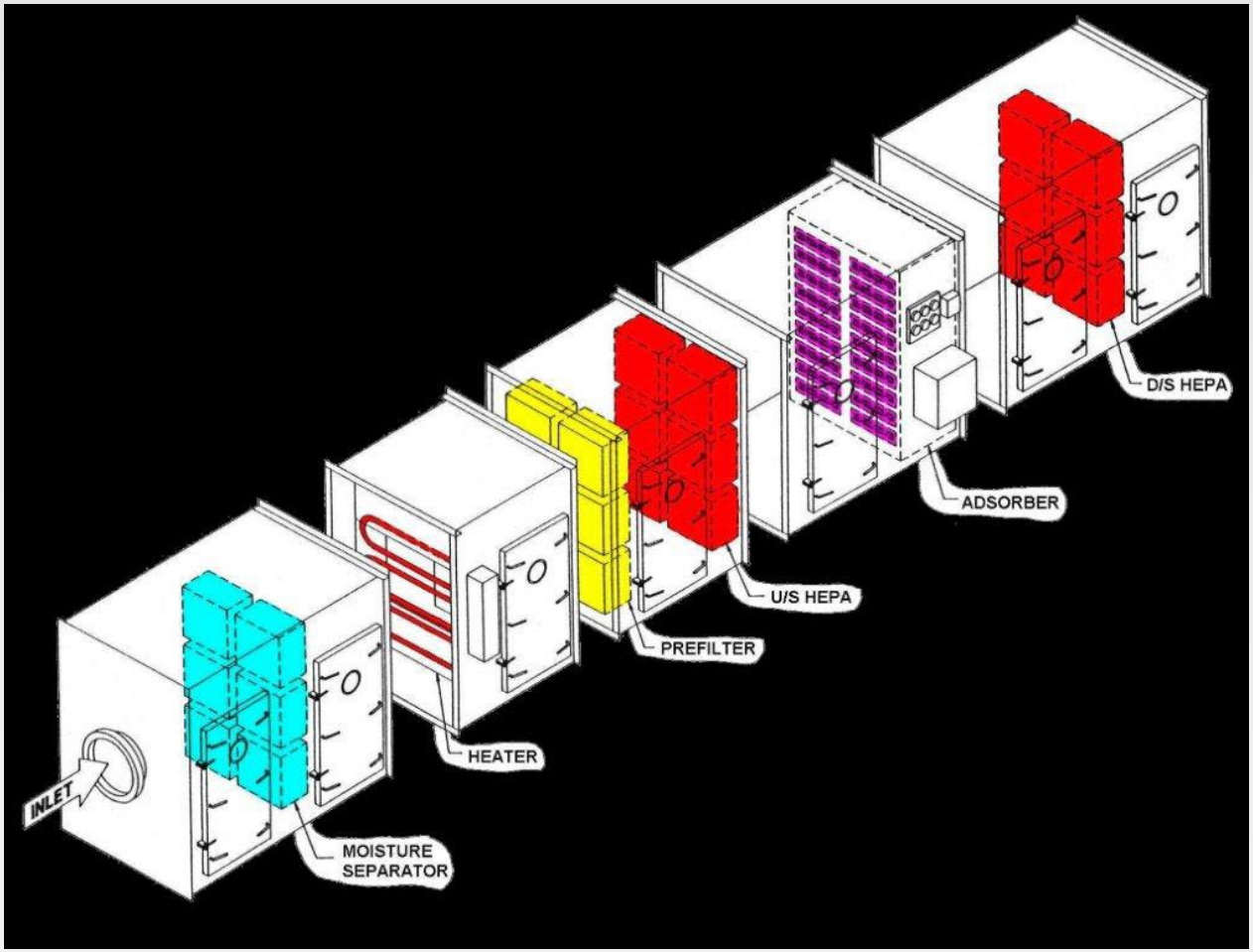

ASME AG-1 Nuclear Air-Treatment System

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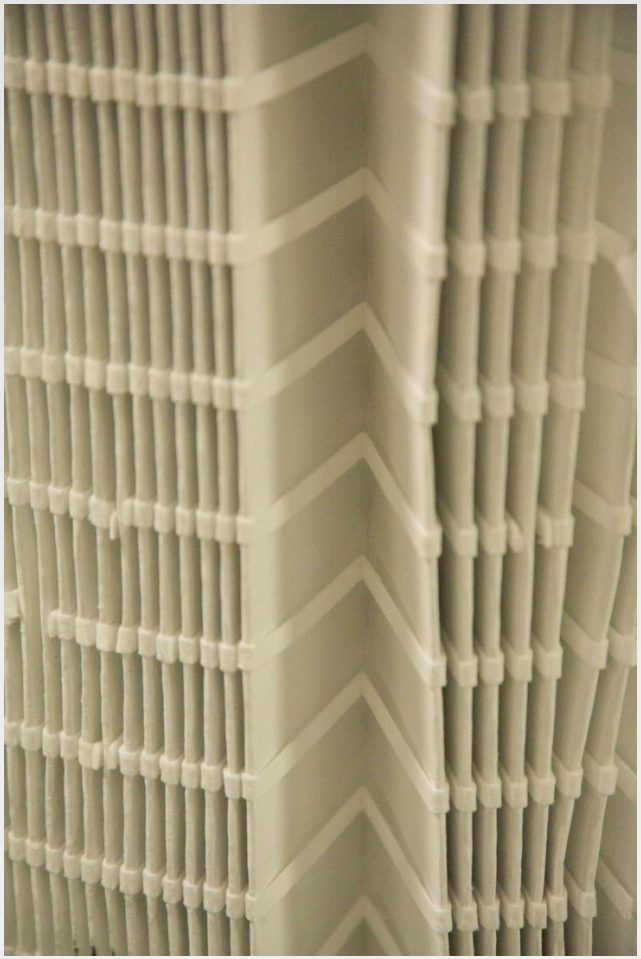

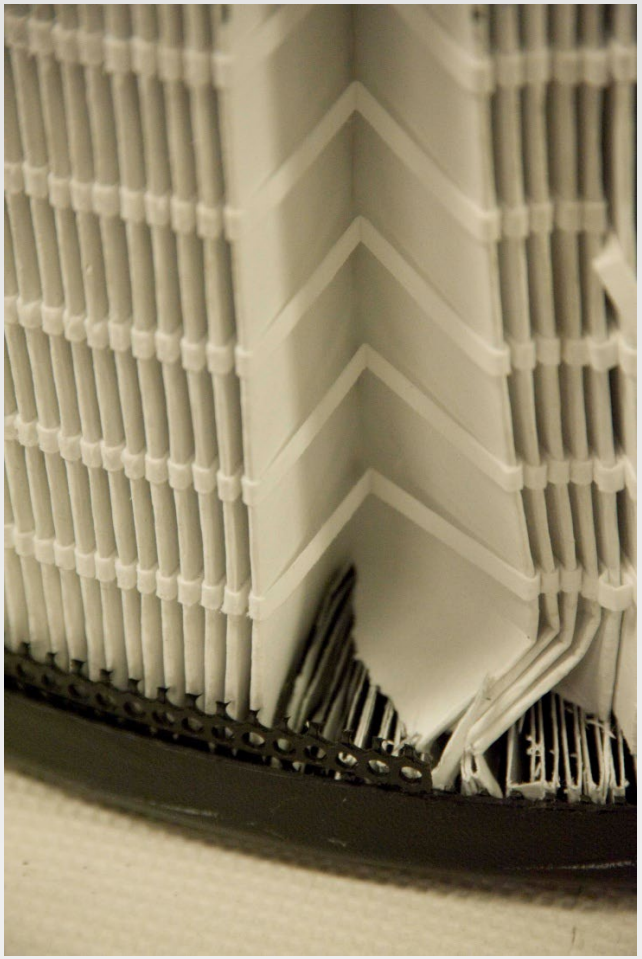

Ribbon Separated Pleat Design Failure

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Background

- In 1971, the Committee on Nuclear Air and Gas Treatment was organized as ANSI N45.8 to develop standards for high-reliability, air-cleaning equipment for nuclear facilities and corresponding tests to confirm performance of the equipment.
- ASME N509 and ASME N510, were published in 1975, and 1976, and updated in 2002 and 2007.

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Background

- ASME N511 first edition was issued on October 30, 2007, that included Engineered Safety Features (ESF) air cleaning systems designed, fabricated, and tested in accordance with ASME AG-1 for nuclear power plants.
- ASME N511 was revised in 2017, replaced N510, and ASME N510 was withdrawn
- ASME N511 latest revision will be release in 2022.

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Nuclear Reactor Power Plants

- Applying this standard will need to develop their testing frequencies based on their licensing commitment.
- The frequency of maintenance and test activities may either be time based or, condition based depending on the safety-significance categorization of the equipment as defined in NRC Regulatory Guide 1.201 and INPO document AP-913.

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Nonreactor Facilities

- Applying this standard will need to develop other testing frequencies appropriate for their operational requirements.
- Example:
  - Hanford emission units' In-service HEPA filter penetration tests from annual to biennial basis due to years of successful In-service testing results, differential pressure, and trending.

Regulatory Requirements

- ASME Code
- Regulations
- Regulatory
- Technical Specifications
- Hanford Site
  - Washington State has stringent regulatory requirements and driven by permits (WAC).
  - Federal Facility Agreement and Consent Order (HFFACO aka Tri-Party Agreement) between the Department of Energy and environmental regulatory agencies.

Regulatory Requirements

- The air quality standards are set by the Washington State Department of Ecology and the enforcement of the requirements has been relegated to the WDOH.
- The primary regulations covering radioactive air emissions at Federal Facilities are Washington Administrative Code (WAC) 246-247, Radiation Protection Air Emissions, WAC 173-480 Ambient Air Quality Standards and Emission Limits for Radionuclides.

Washington Department Health (WDOH)

Technology and Practices

- WAC 246-247 regulations require the use of best available radionuclide control technology (BARCT).
- WDOH requires emission units at Hanford site to comply and implement ASME/ANSI AG-1, ERDA 76-21, Nuclear Air Cleaning Handbook, and ACGIH, Industrial Ventilation, A Manual of Recommended Practice.

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Recommended In-service Test Frequency Requirements:

- Based on the facility operating cycle
- In-service test, after each HEPA filter replacement and at least once each operating cycle.
- Reactor refueling 18-24 months cycle

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Conclusions

- In-service testing periodicity is used as SSC baseline guide,
- The standard may be used for guidance for test frequencies of nonreactor facilities.
- In-service testing periodicity is based on licensing commitment and or the reactor refueling 18-24 months cycle,
- DOE facility SSCs In-service testing periodicity are based the facility historical experience, operational requirements different than ASME N511.

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References

- ASME N510-2007 [Withdrawn], Testing of Nuclear Air-Treatment Systems.
- ASME AG-1, Code on Nuclear Air and Gas Treatment.
- ASME N511-2022, In-Service Testing of Nuclear Air Treatment, Heating, Ventilating, and Air-Conditioning Systems.
- DOE-HDBK-1169-2022, Nuclear Air Cleaning Handbook.
- DOE-STD-1269-2022, Air Cleaning Systems in DOE Nuclear Facilities
- ERDA 76-21ERDA 76-21, Nuclear Air Cleaning Handbook.
- NRC Regulatory Guide 1.52, Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems In Light-Water-Cooled Nuclear Power Plants.
- RPP-RPT-61591, ASME N510 and ASME N511 In-Service Testing Intervals Code Interpretations of Ventilation Structures, Systems, and Components (SSCs)

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Questions?