



House Report 117-118

Air Purification Assessment

Pursuant to House Report 117-118, Page 314, accompanying
H.R 4350, the National Defense Authorization Act 2022

November 2023

The estimated cost of this report or study for the
Department of Defense is approximately
\$11,500 for the Fiscal Years 2022 - 2023. This includes
\$500 in expenses and \$11,000 in DoD labor.

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Congressional Requirement

House Report 117-118, page 314

Therefore, the committee directs the Secretary of Defense to:
“provide a briefing to the House Committee on Armed Services by February 1, 2022, on an assessment of the Unified Facilities Criteria with respect to air purification standards and whether more widespread deployment of portable air purification technology should be considered to improve the air quality of base housing and other on-base facilities.”



Executive Summary

- Portable air purifiers only support one facet of indoor air quality
 - They do not affect any relative humidity issues (i.e., mold)
- Building mechanical air filtration / purification is another facet of indoor air quality
 - Building envelop continuity should be evaluated/enhanced
 - Increased outdoor air ventilation rates should also be addressed in conjunction with outdoor air filtration
 - Indoor air recirculation filtration should be addressed
- Portable or whole building air purification systems only work if manufacturers' recommended operation and maintenance is conducted.

The better solution to air quality issues is to address contaminants at their source. Portable purification equipment will only address individual room contaminants.



Indoor Air Quality Protection

Requires an integrated approach:

- Mold and Moisture Control:
 - Adequate roof, wall, and foundation drainage
 - Moisture resistant building materials where appropriate (e.g., showers)
- Efficient Heating, Ventilating, and Air Conditioning Systems (HVAC):
 - Adequate mechanical filtration and fresh air ventilation
 - Dehumidification capacity to maintain humidity between 30%-50%
 - Clean air handling systems and ductwork
 - Eliminate dirt accumulation in ventilation systems
- Pollution Source Control / Reduced Emissions:
 - Building materials with no or low volatile organic compounds
 - Proper sealing of the building envelope
 - Radon-resistant construction techniques
 - Combustion venting to prevent back drafting of pollutants into the home
 - Homeowner education on operating and maintaining systems

Mechanical air filtration / purification is just one facet of indoor air quality.



DoD Approach to Indoor Air Quality

DoD Actions/Plans/Status:

- Policies on managing environmental health and safety (EHS) hazards in housing
 - Issued in Jan 2022, initial OUSD(P&R) policy identifies EHS standards and management requirement for mold, lead-based paint, radon and asbestos, and clarifies the roll of installation EHS subject matter experts
 - Accompanying OUSD(A&S) policy to identify EHS standards and management requirement for mold, lead-based paint, radon and asbestos, and clarifies the role of the installation Military Housing Office (MHO) to be issued
- Family Housing units must pass a detailed inspection to be approved for occupancy, using the standardized inspection checklist from the enterprise Military Housing (eMH), the DoD official housing system
 - Conducted by the installation's military housing office at each change of occupancy
 - Measures temperature, relative humidity, and dew point
 - Identifies visible mold, water damages/stains, and persistent/dampness/moisture
 - Assesses HVAC operation/filter condition, condition of asbestos/lead-based paint materials, etc.
- Unaccompanied Housing units are inspected by the Installation MHO using a standardized inspection checklist from eMH to inspect the rooms
- Third-party Privatized and Government-owned and controlled housing inspections required by section 3051 of FY 2020 NDAA, as amended by section 2818 of the FY 2021 NDAA
 - Initiated FY21; most completed; 100% completion in FY 2024
 - All privatized family housing and Gov-owned/controlled family and Unaccompanied housing (~250,000 housing units)



DoD Approach to Indoor Air Quality (cont'd)

DoD Actions/Plans/Status (cont'd):

- Existing indoor environment quality (IEQ) includes:
 - IEQ drivers & requirements are addressed in Unified Facilities Criteria (UFC) 1-200-02 HIGH PERFORMANCE AND SUSTAINABLE BUILDING REQUIREMENTS
 - Supported by Unified Facilities Guide Specifications (UFGS) 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING
 - Indoor Air Quality (IAQ) requirements dovetail into many UFGSs, particularly as low-to-no off-gassing material properties and air filtration requirements
 - Over 60 UFGSs specifically include “indoor air quality” requirements
 - UFGS 02 85 00 MOLD REMEDIATION
 - UFGS 31 21 13 RADON MITIGATION
 - UFC 4-711-01 FAMILY HOUSING, Chapter 7 Environmental Requirements, contains minimum IAQ requirements
- Established IEQ standards for DoD facilities
 - Issue IEQ technical specifications in DoD Unified Facilities Criteria (UFCs) in FY 2024
 - Measurable IEQ standards based on publicly available data/studies
 - Family Housing and Unaccompanied Housing IEQ standard should be more stringent than most other DoD facilities
 - Does not apply to privatized housing facilities
 - Family Housing and Unaccompanied Housing IEQ standards reflected in President’s Budget Request for FY 2026

Addressing air quality issues should be data driven and address the sources of contaminants. Portable air purification addresses symptoms, but lack thereof is not the root cause of IEQ issues.



Widespread Deployment of Portable Air Purifiers

Pros

- Self-contained, modular
- Residential or office deployable
- Removes dust, volatile organic compound, fungus, & pathogens
- Minimal labor required for maintenance
 - Annual UV bulb replacement
 - Biennial HEPA/Carbon filter replacement
- Can be relatively quiet at low speed depending on manufacturer
 - Equivalent to Library background noise

Cons

- Use of air cleaners alone cannot ensure adequate indoor air quality particularly where significant pollutant sources are present
 - Building envelope continuity and outdoor intake & indoor air mixing are key sources
- Possible ozone production from UV lamps
- Ownership & Maintenance responsibility & perpetual costs
- UV Maintenance risk (exposure to eyes)
 - Cornea damage, cataracts, macular degeneration
- Carbon filter risk
 - Filter releases contaminants when “FULL”
- Audible Noise is Distracting

Portable units address airborne contaminants, but building systems should be designed to do this. Identifying where and why designed air systems are not providing needed comfort should be a primary solution.