

Filter Selection

Overview

Filters are an important component of ducted heating and cooling systems. When installed on the return side of the HVAC air handler, filters protect the HVAC motor and may improve indoor air quality. Filters or screens should also be installed in fresh air intakes to clean outside air that is brought into the home.

Filters with higher Minimum Efficiency Reporting Value (MERV) ratings of MERV 6 or above can trap pollutants like pollen, dust mites, and mold spores. However, [a dirty or clogged filter can dramatically reduce air flow, which increases furnace run time, wear on the motor, and energy consumption of the air handler fan \(up to a 50% increase.\)](#) For best operation of both the filter and the HVAC equipment, the filters should be replaced or cleaned frequently. Therefore, it is important that filters are in a location that is easily accessible for the homeowner.

MERV vs Static Pressure

- 1" filter, lowest MERV (6 to 8) due to increased static pressure with higher MERV 1" filters
- 2-5" pleated filter (MERV 10-16) creates less static pressure due to increased surface area through the deeper pleats
- Disposable fiberglass, plastic, or washable filters can suffice for fan protection, but adds little Indoor Air Quality benefit. These filters typically create the least static pressure increase in the ductwork
- Electronic filters are the one system where filtration lessens over time as it the filter gets dirty. While these filters create very low static pressure increases, they also [should be evaluated for their potential to create ionized air or release ozone, which is considered a lung irritant](#) and may have negative indoor air quality impacts



1" pleated filter



5" pleated filter



Fiberglass filter

Images by: [Grainger Industrial Supply](#)

Filter Locations

Accessible Locations

If the furnace/heat pump air handler is in an accessible location, such as a utility room or basement, the filter can be installed in the air handler at the return plenum. If the furnace/heat pump is in the attic, the attic should be equipped with a staircase or pulldown stairs and a permanently installed walkway.

The air handler box should be equipped with a filter media box that has a removable access panel cover with a gasket to ensure an air-tight seal when closed. The filter box may be prefabricated by the manufacturer or made on site. The filter media frame should be appropriate for the size and type of filter desired. The filter dimensions and filter depth both influence filter capacity and air flow velocity. Filter sizing must be considered when designing the HVAC system to ensure that the system can handle the associated pressure drop, especially with high MERV filters. Increasing the filter surface area will decrease the pressure drop. Options for increasing surface area could include using filters with deeper pleats or filters with larger dimensions. Filters must be sized using the Air Conditioning Contractors of America ([ACCA Manual D](#) and/or [ACCA Manual RS](#). For more information on furnace/heat pump filter types, MERV ratings, and sizing, [see this guide](#).

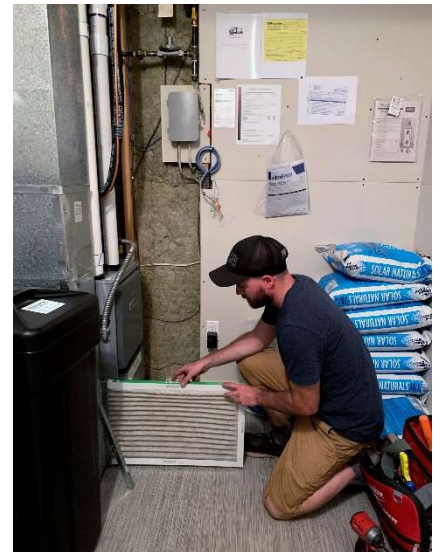


Image by: [Phyxtar.ai](#)

Inaccessible Locations

If the furnace air handler is in an inaccessible location, such as a crawlspace or attic without a staircase, a furnace/heat pump filter should be placed in each return grille, typically referred to as “filter grills.” Filters for return grills are best when at least two inches deep to reduce static pressure in the return ducts.



Image by: [HomeSpot HQ](#)

Fresh Air Intake

If a fresh air intake is ducted to the air handler, a filter should be installed at the intake in an easily accessible location for replacement and cleaning as needed, particularly when the central system uses filter grills. If the furnace/heat pump has filters installed at the air handler, then a screen is acceptable at the fresh air intake to prevent pests and large debris from being drawn into the duct system.

Filter Installation

For more information on how to install filters for the scenarios described above, please visit the Building America Solution Center guide for [Proper Installation of Furnace and Air-Handler Filters](#).

Sources:

<https://basc.pnnl.gov/resource-guides/proper-installation-furnace-and-air-handler-filters>

<https://www.epa.gov/indoor-air-quality-iaq/air-cleaners-and-air-filters-home>