Certified Testing Services
Indoor Air Quality (IAQ), Particulate Matter (PM)
Mold, Asbestos, Carbon Dioxide (CO^2)
Hydrogen Sulfide (H^2S), Carbon Monoxide (CO)
Radon, Radiation, EMF (electric magnetic field)
Remediation & Mitigation Consultation
Commercial and Residential

Respirator Safety Mask … and filter ratings

What is a respirator and what is a NIOSH-approved/rated respirator?

The **National Institute for Occupational Safety and Health** (**NIOSH**) is the federal agency responsible for conducting research and making recommendations for the prevention of work related injury and illness. NIOSH is part of the Centers for Disease Control and Prevention (CDC) within the U.S. Department of Health and Human Services (DHHS).
Many NIOSH standards are also recognized in Canada.

A respirator is a personal protective equipment (PPE) device that is worn on the face, covers at least the nose and mouth, and is used to reduce the risks of inhaling hazardous airborne particles, including dust particles and infectious agents, and gases or vapors.
The various types of respirators available include:
(1) **Gas Masks**, which filter out chemicals and gases;
(2) **Air-line Respirators**, which use compressed air from a remote source;
(3) **Self-contained Breathing Apparatus**, which includes its own air supply;
(4) **Particulate Respirators**, which filter out airborne particles.
"Particulate Respirators" can be further divided into 3 types:
(a) "disposable or filtering facepiece respirators", where the entire respirator is discarded when it becomes unsuitable for further use due to resistance, sorbent exhaustion, or physical damage;
(b) "reusable or elastomeric respirators", where the facepiece is cleaned and reused but the filter cartridges are discarded and replaced when unsuitable for further use;
(c) "powered air purifying respirators (PAPRs)", where a battery-powered blower moves air through the filters.
Particulate respirators are also known as "air-purifying respirators" because they protect by filtering particles out of the air as you breathe. These respirators **protect only against particles**, and **not gases or vapors**. Since airborne biological agents such as bacteria or viruses are particles, they can also be filtered by particulate respirators.

Particulate Respirator Filter Ratings

Respirators that filter out at least 95% of airborne particles during "worse case" testing, using a "most-penetrating" sized particle (0.3 microns), are given a 95 rating. Those that filter out at least 99% receive a "99" rating. And those that filter at least 99.97% (essentially 100%) receive a "100" rating. A 99.97% rating is also referred to as "HEPA" (High Efficiency Particulate Arrestance or High Efficiency Particulate Air).

Particulate Respirators are also rated by NIOSH as N, R, or P for protection against oils. This is important in industry because some industrial oils can degrade filter performance so it doesn't filter properly. *Respirators are rated "N" if they are not resistant to oil, "R" if somewhat resistant to oil, and "P" if strongly resistant (or oil proof). Accordingly, there are 9 NIOSH ratings for disposable particulate respirators:

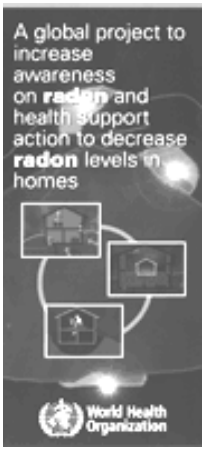
(Less effective >>>> More effective)

N-95	N-99	N-100
R-95	R-99	R-100
P-95	P-99	P-100

EPA-Environmental Protection Agency
Radon Protocol
EPA IAQ

Health Canada
Radon - IAQ
Its Your Health

NEHA
National Environmental Health Association
NRPP
National Radon Proficiency Program

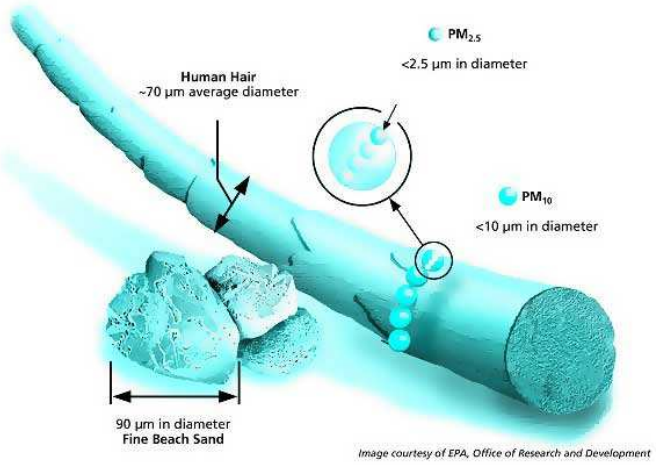


WHO
IRP-International Radon Project
WHO International EMF Project
IAQ Guidelines

NIOSH uses very high standards to test and approve respirators for occupational uses. NIOSH-approved disposable respirators are marked with the manufacturer's name, the part number (P/N), the protection provided by the filter (e.g. N-95), and "NIOSH". This information is printed on the facepiece, exhalation valve cover, or head straps. A listing of all NIOSH-approved disposable respirators is available at: http://www.cdc.gov/niosh/. If a disposable respirator does not have these markings and does not appear on one of these lists, it is **"not certified"** by NIOSH. NIOSH also maintains a database on its website of all NIOSH-approved respirators and protection equipment. The Certified Equipment List can also be accessed at: http://www.cdc.gov/niosh/.
Other detailed respirator information is also published by Occupational Safety and Health Administration (OSHA) at: http://www.osha.gov/SLTC/etools/respiratory/index.html.

"HEPA" and other Air Filter Ratings

(HEPA = High Efficiency Particulate Arrestance or High Efficiency Particulate Air).
There are many types of air filters, but any filter that is labeled "HEPA" has a very specific rating. The HEPA standard states that a HEPA air filter must trap 99.97% of all airborne contaminants that are 0.3 microns. This means that for every 10,000 air particles that are 0.3 microns, the HEPA filter will only allow 3 of them to pass through.
HEPA air filters are the most efficient type of air filter because they can trap most air particles including bacteria and viruses.



How Big is a Micron? (Micron/Micrometer symbol = µm)
A micron is also referred to as "micrometer", and is 1 millionth of a meter, or about 0.00003937 inches, which means there are 25,400 microns in an inch. This dot (.) is about 615 microns.
The human eye can see particles as small as 10 microns, and an optical microscope allows us to see things as small as 0.1 micron. Electron microscopes allow us to see things as small as 0.001 microns.

Other Types of Air Filters
HEPA filters are classed as a mechanical air filter. Other types of air filters include Electronic or Electrostatic Air Cleaners and Gas-phase Absorption Air Filters. The American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) developed a rating system for each type of air filter. This rating system is referred to as Minimum Efficiency Reporting Values (MERV), and most air filter manufacturers now label their products with a MERV rating. Typical disposable air filters are rated between MERV 1 and MERV 10, with the higher ratings indicating a more efficient air filter.
The HEPA standard exceeds the MERV specifications because it assures that a HEPA rated filter has an efficiency of 99.97% at 0.3 microns. This means that a "HEPA" rated filter is at least 50% more effective than any other type of mechanical air filter.

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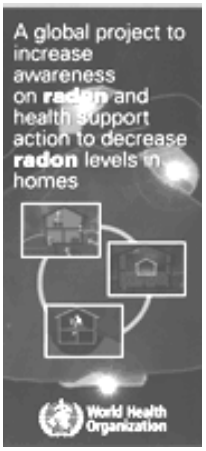

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