

Selecting Respirators

Respiratory protection must be worn whenever you are working in a hazardous atmosphere. The appropriate respirator will depend on the contaminant(s) to which you are exposed and the protection factor (PF) required. Required respirators must be NIOSH-approved, and medical evaluation and training must be provided before use.

These general guidelines are to be used by the Northwestern University (NU) Safety Professional and user in selecting an appropriate respirator for the hazard. Types of respirators include:

Air-purifying respirators, which remove contaminants (particulate or gas/vapor) from an otherwise-breathable atmosphere, and

Supplied-atmosphere systems, which supply breathable air.

Major Types of Respirators

Air-purifying respirators, which remove contaminants from the air.



Half mask/Dust mask
APF=10
Needs to be fit tested



Half mask (Elastomeric)
APF=10
Needs to be fit tested



Full facepiece (Elastomeric)
APF=50
Needs to be fit tested




Original illustrations created by Attilis & Associates

Assigned Protection Factors (APFs) are the level of protection a properly functioning respirator would be expected to provide to a population of properly fitted and trained users (e.g., an APF of 10 means a user could expect to inhale no more than one tenth of the airborne contaminant present). NU Safety Professionals must use the APFs listed in the **Respirator Selection Table** to select a respirator that meets or exceeds the required level of employee protection. When using a combination respirator (e.g., airline respirators with an air-purifying filter), NU Safety Professionals must ensure the APF is appropriate to the mode of operation in which the respirator is being used.

Questions?




Contact Environmental Health and Safety at ehs@northwestern.edu

Respirator Selection Table

Respirator Type	Example	Description	APF
<p>Dust mask (non-NIOSH approved)</p>		<ul style="list-style-type: none"> • Loose-fitting mask for single-use only. • Flexible pad held over the nose and mouth by an elastic or rubber strap to protect against dusts encountered during construction or cleaning activities (i.e., dusts from drywall, brick, wood, or sweeping). • Cannot protect against hazardous atmospheres. • <i>Non-NIOSH-approved, disposable dust masks are not approved for use at Northwestern.</i> 	<p>N/A</p>
<p>Particulate respirator/ filtering facepiece (NIOSH-approved)</p>	 <p>(e.g., N-95, N-99, P-100)</p>	<ul style="list-style-type: none"> • Negative-pressure particulate respirator (i.e., respirator that needs a tight seal between the respirator and face and/or neck of the user in order to work properly that has negative air pressure with respect to the ambient air pressure outside the respirator during inhalation) with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium. • Captures particles in the air (i.e., dusts, mists, and fumes), but does not protect against gases or vapors. • Should be disposed of and replaced with a new one each time they are removed. • Medical clearance is not required. 	<p>5</p>
<p>Half-face mask</p>		<ul style="list-style-type: none"> • Tight fitting, air-purifying filtration respirator that does not provide eye or face protection. • Can be used with particulate filters. • Can be used with gas/vapor canisters. <ul style="list-style-type: none"> ○ Are normally used when there are only hazardous gases and vapors in the air. ○ Use chemical filters (i.e., cartridges or canisters) to remove dangerous gases or vapors; cartridges must be matched to the hazard. ○ Do not protect against airborne particles. ○ Only protect against specific gases or vapors. ○ Provide protection only as long as the filter's absorbing capacity is not depleted. ○ Service life of the filter depends upon many factors and can be estimated in various ways. • Can be used with combination particulate filter/gas canisters. 	<p>10</p>


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Respirator Type	Description	APF
<p>Full-facepiece</p> 	<ul style="list-style-type: none"> • Tight fitting, air-purifying filtration respirator that provides eye and face protection from irritants and contaminants when properly fitted and sealed. • Can be used with particulate filters. • Can be used with gas/vapor canisters. <ul style="list-style-type: none"> ○ Are normally used when there are only hazardous gases and vapors in the air. ○ Use chemical filters (i.e., cartridges or canisters) to remove dangerous gases or vapors; cartridges must be matched to the hazard. ○ Do not protect against airborne particles. ○ Only protect against specific gases or vapors. ○ Provide protection only as long as the filter's absorbing capacity is not depleted. ○ Service life of the filter depends upon many factors and can be estimated in various ways. • Can be used with combination particulate filter/gas canisters. 	<p>50</p>
<p>Powered air purifying respirator (PAPR)</p> 	<ul style="list-style-type: none"> • Air-purifying respirator that uses a battery-powered blower to force ambient air through the air-purifying elements to the inlet covering and then pushes the filtered air into the facepiece, which covers all of the user's face. • Since it is loose-fitting, it does not need to be fit tested and can be used by most workers with facial hair. • Another type is the tight-fitting full-facepiece PAPR, which has an elastomeric facepiece made of rubber or silicone, filters, and a blower that operate as they do on a loose-fitting facepiece PAPR; because this PAPR has a tight-fitting facepiece, it must be fit tested. • There are also half-mask PAPRs and PAPRs that have a helmet or hood. • PAPR is a common substitute for users deemed medically unable to wear other types of respirators. 	<p>Half-face mask: 50</p> <p>Full-facepiece: 1,000</p> <p>Helmet/hood: 425/1,000</p> <p>Loose-fitting facepiece: 25</p>
<p>Self-contained breathing apparatus (SCBA)</p> 	<ul style="list-style-type: none"> • Provide breathing air independent of the environment. • Are to be used when the contaminant has insufficient odor, taste, or irritating warning properties or when the contaminant is of such high 	<p>Half-face mask: 10</p> <p>Full-facepiece (demand mode): 50</p>

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Respirator Type	Description	APF
	<p>concentration or toxicity that an air-purifying respirator is not adequate.</p> <ul style="list-style-type: none"> • While this offers the greatest degree of protection, it is also the most complex; training and practice in its use and maintenance is essential, and it is only for in emergency situations and oxygen-deficient or Immediately Dangerous to Life or Health (IDLH) atmospheres. • All work locations where there are atmospheres that are categorized as IDLH require the use of a full-facepiece, positive-pressure, demand SCBA certified by NIOSH for a minimum service life of 30 minutes or a combination full-facepiece, pressure-demand, supplied-air respirator (SAR) with an auxiliary self-contained air supply. 	<p>Full-facepiece (pressure-demand): 10,000</p> <p>Helmet/hood (demand mode): 50</p> <p>Helmet/hood (pressure-demand): 10,000</p>
<p>Emergency escape-use breathing apparatus</p>	 <ul style="list-style-type: none"> • Self-contained, compressed air apparatus for escape from a contaminated environment (e.g., 10-minute escape). 	<p>N/A</p>

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