

Respirators

Chapter 296-842 WAC

Resources

Helpful Tools

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Information About Respirator Selection and Classification

Use with Chapter 296-842 WAC, Respirators

This tool provides guidance about respirator selection and classification for users who aren't familiar with these topics.

When do respiratory hazards occur?

Respiratory hazards that require use of respirators can occur during:

- Routine tasks
- Tasks that occur infrequently such as monthly cleaning of a reactor vessel or chemical storage tank
- Emergencies such as rescue, response to a chemical spill, or circumstances where employees must escape from toxic atmospheres.

Am I qualified to select respirators?

To determine this, you'll need to consider:

- The complexity of your employees' exposures to respiratory hazards and respirator use circumstances.
- If you have a suitable level of technical knowledge and experience with respirators to address respiratory hazards and use circumstances.

For example, individuals selecting respirators solely for wood dust exposure wouldn't need as high a level of knowledge and experience as individuals selecting respirators for multiple contaminants or for highly hazardous circumstances such as emergencies.

What types of respirators are available?

All respirator types can be sorted into 2 main categories as shown.

Examples are provided to represent basic types available. Some respirator models aren't shown, such as models that combine features from both categories.

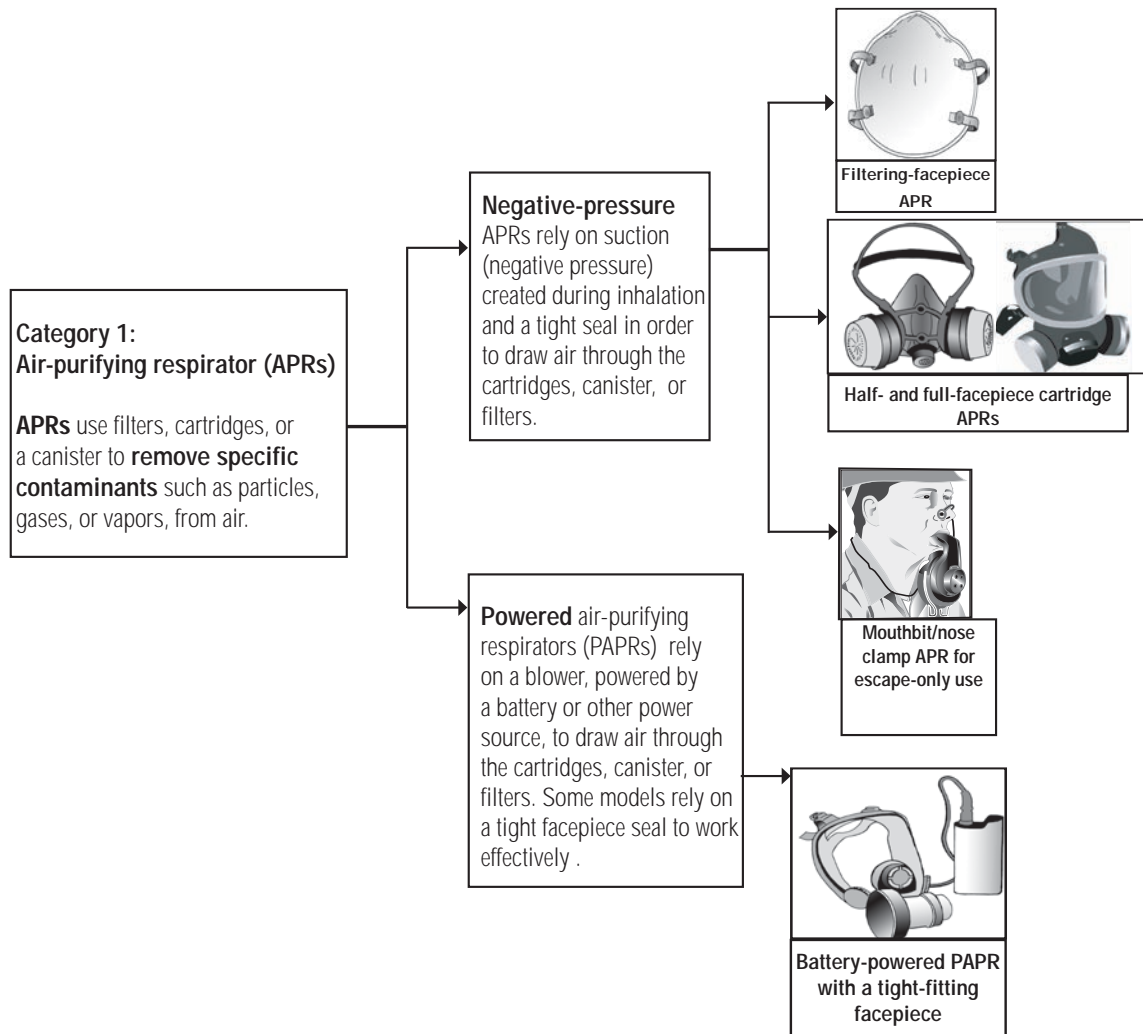
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Information About Respirator Selection and Classification

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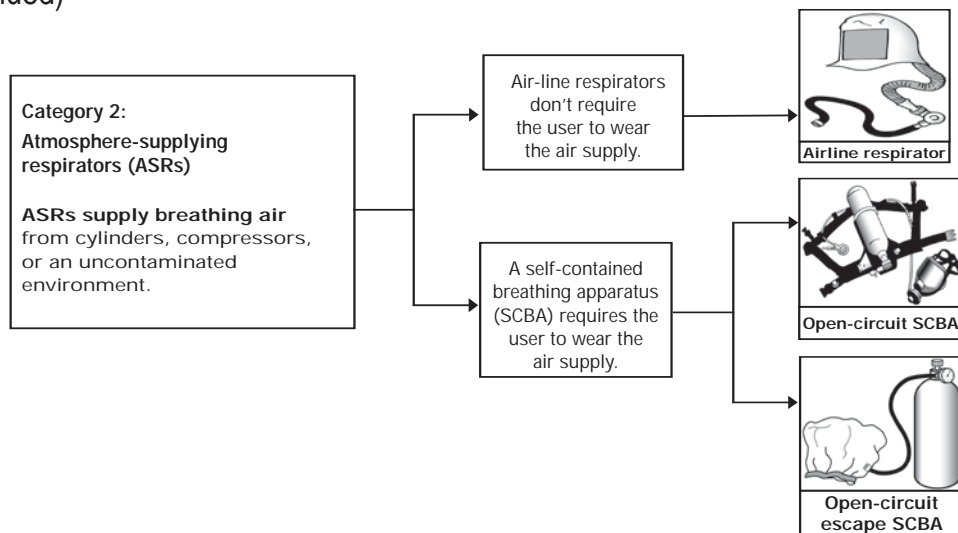
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Information About Respirator Selection and Classification

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Where can I find more information about respirators and selection?

Resources include:

- OSHA's Respiratory Protection Advisor. - Visit www.osha.gov
- NIOSH's 1987 Decision Logic. - Visit www.cdc.gov/niosh
- The Centers for Disease Control and Prevention (CDC).- Visit www.cdc.gov to find information on biological agents such as TB, hanta virus, psittacosis, avian flu, and anthrax
- Respirator manufacturers' on-line selection guides and other information. – Visit www.lni.wa.gov/wisha and select the Respiratory Protection topic page to find a list of respirator manufacturers and website links
- The American National Standard for Respiratory Protection, ANSI Z88.2-1992, or most recent edition. - Visit www.ansi.org to find out how to obtain a copy or contact your local librarian for access.
- WISHA. Visit www.lni.wa.gov/wisha/consultation for a list of WISHA consultants available for assistance.
- Experienced respirator distributors, and private industrial hygiene consulting services listed in your local phone book.

Notes

Using Assigned Protection Factors (APFs) for Respirator Selection

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How to use this tool:

Follow guidance in this tool if you need help using the APFs in Table 5 of Chapter 296-842 WAC, Respirators. **When you finish using this guidance, return to WAC 296-842-13005 to complete the respirator selection process.**

This tool is designed to compare hazard ratios (these are values that rate the level of employee protection **needed**, based on workplace exposure evaluation results) to APFs (these are values that rate the **expected** level of protection **provided** by different types of respirators under ideal conditions) as part of the respirator selection process specified in WAC 296-842-13005.

You can use this guidance conservatively by selecting a single hazard ratio that applies to all exposures that require respirator use. It can also be used to determine a single hazard ratio for exposures during a particular task or operation.

The steps below address exposures to a single contaminant and multiple contaminants with **separate** or **additive health effects**. The steps don't address circumstances where multiple contaminants interact to boost the toxicity of the mixture beyond the level expected from additive interactions. To find out more about this possibility, contact your local DOSH consultant.

- See www.lni.wa.gov/wisha/consultation for a list of consultants to assist you or
- Go to the Resources section of Chapter 296-800 WAC, Safety and Health Core Rules, for a list of service locations in your area.

Step 1: Start by having this information available for *each* contaminant and exposure duration of concern:

- Those *exposure evaluation results* that indicate employee exposure above a WISHA Permissible Exposure Limit (PEL) value.



Reference:

If you haven't completed an exposure evaluation, see requirements in Chapter 296-841 WAC, Airborne Contaminants.



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- The WISHA PEL values relevant to your exposure evaluation results. These values are found in Table 3 of WAC 296-841-20020.
 - * When no WISHA PEL values have been established for an airborne contaminant, use relevant available information and informed professional judgment to determine an acceptable exposure limit value to use for calculating hazard ratios. For example, you may use exposure limit values established by the American Conference of Governmental Industrial Hygienists (ACGIH).

Step 2: Substitute the values from Step 1 into the following formula and calculate separate hazard ratios for **each** airborne **contaminant** and exposure **duration** of concern.

$$\text{Hazard ratio} = \frac{\text{Exposure evaluation result}^*}{\text{PEL}^*}$$

Using Assigned Protection Factors (APFs) for Respirator Selection

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Use this key to understand the terms used in the formula.

Table HT-1 Key to Formula symbols	
The term	Is the
Exposure evaluation result	Estimated or measured concentration of an airborne contaminant for an 8-hour or other exposure period. This result comes from the exposure evaluation required by another chapter in WAC 296-841-20005.
PEL	WISHA Permissible Exposure Limit (PEL) established for the airborne contaminant. Use the PEL value (such as TWA ₈ , STEL, or Ceiling limit) applicable to your exposure evaluation result. PELs are found in another chapter in WAC 296-841-20020.
*	Measurement unit, such as parts per million (ppm), associated with the exposure evaluation result and PEL values. The measurement units for both values must match. Ppm is the measurement unit commonly used to express concentrations of gases or vapor. Other measurement units may be used. For example, milligrams per cubic meter (mg/ m ³) is commonly used to express particle contaminant concentrations. Contact your laboratory or your DOSH consultant if you need assistance with converting measurement units.

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Using Assigned Protection Factors (APFs) for Respirator Selection

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- If you are uncertain about this step, review Example 1:

Example 1: Calculating Hazard Ratios

You receive exposure evaluation results from the laboratory that indicate employees are exposed to a **single airborne contaminant** as follows:

300 mg/m³ averaged over an 8-hour exposure period

600 mg/m³ averaged over a 15-minute (short-term) exposure period

You look up the 8-hour and 15-minute WISHA PEL values for the contaminant and durations of concern. They are:

50 mg/m³ = TWA₈ (an 8-hour limit)

150 mg/m³ = STEL (a 15 minute limit)

Substitute the appropriate values into the formula to calculate **separate** hazard ratios for the 8-hour and 15-minute exposure. Then proceed to Step 3.

$$\frac{\text{Concentration}}{\text{PEL(TWA}_8\text{)}} = \frac{300 \text{ mg/M}^3}{50 \text{ mg/M}^3} = \text{A hazard ratio of } \mathbf{6} \text{ for the 8-hour exposure period}$$

$$\frac{\text{Concentration}}{\text{PEL(STEL)}} = \frac{600 \text{ mg/M}^3}{150 \text{ mg/M}^3} = \text{A hazard ratio of } \mathbf{4} \text{ for the 15-minute exposure period}$$



Note:

If your exposures of concern involve an airborne **mixture** of contaminants, **repeat this step** for each contaminant in the mixture.

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Using Assigned Protection Factors (APFs) for Respirator Selection

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Step 3: Decide which of the following applies to the exposure of concern and proceed as instructed.

- Exposure is to a **single** contaminant and you have calculated **one** hazard ratio. Skip to Step 5.
- Exposure is to a **single** contaminant and you have calculated **two or more** hazard ratios. Select the higher hazard ratio value and skip to Step 5.
- Exposure is to a **mixture** of airborne contaminants and you have determined health effects are additive. Follow Step 4.
- Exposure is to a **mixture** of airborne contaminants and you have determined health effects are **not additive**. Select the highest hazard ratio value and skip to Step 5.



Reference:

If you **haven't evaluated** the contaminants in the airborne mixture to find out if they have additive health effects, **follow the guidance** in a separate Helpful Tool, Mixtures of Airborne Contaminants, found in the Resources section of Chapter 296-841 WAC, Airborne Contaminants.

Step 4: When the contaminants of an airborne mixture have additive health effects:

- Add the hazard ratios of all additive contaminants to get a total for **each exposure duration**.
 - 5 When you have one total, use this to represent the overall hazard ratio when completing Step 5.
 - 5 When you have **more than one total**, select the **highest total** and use this to represent the overall hazard ratio for the exposures of concern.

Using Assigned Protection Factors (APFs) for Respirator Selection

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If you are uncertain about this step, review Example 2.

Example 2: Determining Hazard Ratios For Exposures to Mixtures of Contaminants with Additive Health Effects	
<p>Your employees are exposed to 2 contaminants at the same time (a mixture).</p> <p>You have followed Step 2 to calculate all hazard ratios needed and have determined that both contaminants have additive health effects as mentioned in Step 3.</p> <p>Add up hazard ratios as follows and select the highest total to represent the overall hazard ratio. Then proceed to Step 5.</p>	
Hazard Ratios for the 8- hour exposure duration	Hazard ratios for a 15-minute exposure duration
$\begin{array}{r} 6 \text{ (Contaminants)} \\ +9 \text{ (Contaminants)} \\ \hline 15 \text{ (total)} \end{array}$ <p>Select 15 to represent the overall hazard ratio</p>	$\begin{array}{r} 4 \text{ (Contaminants)} \\ +1 \text{ (Contaminants)} \\ \hline 5 \text{ (total)} \end{array}$

Step 5: Compare your hazard ratio (or overall hazard ratio) to the Assigned Protection Factors (APFs) in Table 5 of WAC 296-842-13005.

- Identify any respirator types in with an APF **at least as high** as your hazard ratio. These respirator types are capable of providing a sufficient protection level for your workplace exposures, **pending further respirator selection restrictions**.
- Continue to **follow other selection requirements** found in WAC 296-842-13005 of this chapter to determine your **final** respirator selection outcome.

If you are uncertain about this step, review Example 3.

Using Assigned Protection Factors (APFs) for Respirator Selection

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Example 3: Using Hazard Ratios to Select Appropriate APFs

An overall hazard ratio of 15 has been determined.

Compare this hazard ratio to the APF values shown in Table 5 of WAC 296-842-13005.

- Exclude respirator types with an APF of 5 or 10, since these values are lower than your hazard ratio of 15.
- Note respirator types with an APF of 25 or more, since their APF are higher than your hazard ratio of 15. These are acceptable for further selection consideration.
- Proceed with this information to Step 8 of WAC 296-842-13005, to continue the selection process.



Notes

Key Information About NIOSH Certified Respirators

Use with Chapter 296-842 WAC, Respirators



This tool will help you understand how to find and use NIOSH certification information.

Why is NIOSH certification important?

NIOSH-certified respirators are rigorously checked and tested to make sure they can perform well and are suitable for workplace use. These assurances don't extend to respirators that aren't NIOSH certified.

How do I know if a respirator has been NIOSH certified?

If the respirator is NIOSH certified, it'll have an approval label printed somewhere on the respirator, product box or in the user manual or other written materials contained in the box.

The label will include a "TC" number or a chart showing TC numbers that correspond to various respirator components that make up a certified assembly. In addition, important information about the respirator's capabilities and limitations for use will be included.

How do I use TC numbers?

These numbers help you identify which cartridges, airline hoses, or other respirator parts are approved for a specific respirator assembly.

When replacing parts or making repairs, make sure you select only replacement parts listed under the TC number for the assembly chosen, otherwise, you will create a non-certified respirator assembly.

Each respirator assembly has one TC number. If more than one TC number is listed on the approval label, this means more than one NIOSH-certified assembly is available.

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Key Information About NIOSH Certified Respirators

Use with Chapter 296-842 WAC, Respirators

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Does NIOSH certification expire?

No. However, NIOSH certification is voided when:

- Users don't follow the approval label's use specifications, including listed cautions and limitations.
- Respirator parts used aren't listed under the respirator assembly's TC number.

NIOSH occasionally withdraws certification for a respirator assembly. When this happens, a user notice is posted on their website at www.cdc.gov/niosh/respnotices.html

What do the designations N, R, and P mean?

N, R, and P are NIOSH-certification categories that apply to non-powered air-purifying respirators designed to protect against hazardous particles. They do not apply to powered air-purifying respirators (PAPRs).

You'll need to follow the use restrictions for these categories shown in Table HT-1 during respirator selection and use.

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Key Information About NIOSH Certified Respirators

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Table HT-1 Use Restrictions for N, R, and P Respirator Categories	
Use	When
N	No oil is present in the air.
R	Oil is present, but only for a single shift or 8 hours of continuous or intermittent use. Note: Reuse beyond a single shift or 8 hours is not recommended.
P	Oil is present, but follow the manufacturer's time use limitations if you want to reuse these.

For more information about limitations and capabilities associated with these categories, see the May 2, 1997 NIOSH Respirator User's Notice, "Letter to All Users of P-Series Particulate Respirators".

Visit: www.cdc.gov/niosh

What do the designations 100, 99, and 95 mean?

These designations refer to the expected filter efficiency ratings of non-powered air-purifying respirators used to remove dusts, sprays, mists, fume, and other types of particles.

The higher the number, the higher the efficiency expected.

An efficiency rating of 95 means the filter is expected to trap 95 particles out of every 100. An efficiency rating of 100 is equivalent to that of a High Efficiency Particulate Air (HEPA) filter.

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Key Information About NIOSH Certified Respirators

Use with Chapter 296-842 WAC, Respirators

Can I still use particulate respirators certified for “dust” or “dust, fumes and mists”?

These types of air-purifying respirators were certified under NIOSH’s former certification standard, 30 CFR Part 11 (replaced by 42 CFR Part 84 in 1995), and can no longer be sold for occupational use.

Furthermore, these respirators can be used in occupational settings only when the size of the particulate contaminant(s) involved is 2 μm or larger. If the size of the particle contaminant is smaller, you’ll need to use an N, R, or P series respirator instead.

Where can I find NIOSH certification requirements?

NIOSH certification requirements are found in the Code of Federal Regulation (CFR); Title 42 CFR, Part 84, Respiratory Protective Devices.

You can find this CFR, in its entirety by visiting:
<http://www.gpoaccess.gov/executive.html>

Planning for Medical Evaluations

Use with Chapter 296-842 WAC, Respirators

This information can help you prepare for employee medical evaluations required by Chapter 296-842 WAC, Respirators. This information doesn't apply to medical evaluation requirements found in other DOSH rules.

Who is allowed to perform medical evaluations?

Only licensed health care professionals (LHCPs) are allowed to perform these evaluations. You may use:

- On-site medical staff
- **or**
- Medical staff from outside services

In Washington state LHCPs include:

- Physicians
- Physician Assistants (PAs)
- Advanced Registered Nurse Practitioners (ARNPs)
- Registered Nurses

What medical questionnaire is required?

Use any of the following:

- The Medical Evaluation Questionnaire provided in WAC 296-842-22005, of this chapter.
- The OSHA Respirator Medical Evaluation Questionnaire found in Appendix C of 29 Code of Federal Regulations (CFR), Part 1910.134, Respiratory Protection.
- Questionnaires developed by other parties, such as on-line services, if these questionnaires include the same questions found in Parts 1-3 of the Medical Evaluation Questionnaire found in WAC 296-842-22005.
 - A LHCP may add questions or change the order of required questions.
 - In some cases, questions added by the LHCP before administering the questionnaire can minimize the need for LHCP follow-up.

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Planning for Medical Evaluations

Use with Chapter 296-842 WAC, Respirators



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Is there an alternative to using a questionnaire for employee evaluations?

Yes. You can choose to have medical examinations conducted instead of using the questionnaire, as long as you make sure the examination obtains the same information as found in the questionnaire.

Why is confidentiality important?

Aside from legal considerations, confidentiality encourages employees to provide complete and correct health information for the LHCP's evaluation. This helps make sure reliable medical evaluations are provided.

How do I maintain confidentiality during questionnaire administration?

Here are some strategies to consider when planning for evaluations:

- Make arrangements to have a LHCP administer the questionnaire at the workplace.
- Allow the employee to self-administer the questionnaire and mail it, postage paid, to the LHCP.
- Employees may use an on-line questionnaire service that meets the requirements in WAC 296-842-14005, Provide Medical Evaluations.
 - Since employees may have questions about medical issues, arrange for an LHCP to be available by telephone or e-mail during the time the questionnaire is being administered.
- If you decide to have an individual administer the questionnaire who isn't a LHCP:
 - Instruct the individual **not** to look at the employee's questionnaire at any time
 - Provide pre-addressed, stamped envelopes for completed questionnaires. Instruct employees to place their completed questionnaires in the envelope, seal it, and mail or forward it to the LHCP.

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Planning for Medical Evaluations

Use with Chapter 296-842 WAC, Respirators



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What if my employee can't read the questionnaire?

Find out if language translation services are needed, or if employees need help with reading.

- If **language translation** services are needed, you can use:
 - An interpreter. It's not necessary to provide a professional interpreter. Interpreters can be an individual trusted by the employee such as a co-worker, friend, family member, or the LHCP.
 - The Spanish-language version of the questionnaire is in WAC 296-842-22005. Visit <http://www.lni.wa.gov/> to find this version.
- If **reading assistance** is needed, make arrangements ahead of time to use an individual trusted by the employee such as a co-worker, friend, family member, or the LHCP, to assist them while filling out the questionnaire.

While making these arrangements remember to address any possible confidentiality issues that could arise.

Notes
