



# Session 6B: Selecting Respirators

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**Understanding how respirators work and their differences will help you select the right one and determine what elements of a Respiratory Protection Program you need to have**

# Respirators for Silica Exposure

- Since silica is a dust respirators must offer protection for *particle* exposures
  - If you also need protection for gas/vapor exposures, additional protection is necessary
- Many options available
  - Air purifying styles
    - Disposable filtering facepiece
    - Elastomeric facepiece (1/2 mask or full mask)
    - Powdered air purifying
  - Air supplied styles
  - Tight fitting & loose fitting styles



# Tight Fitting Styles



Requires a tight seal where the respirator comes in **contact** with the face in order to work.

# Loose Fitting Styles



Loose fitting styles do not depend on a seal to the face to keep contaminants out. Air is pushed into the facepiece via a fan or by flowing, breathable air.

# Negative Pressure Styles



During inhalation, a negative pressure is created in the facepiece. If the unit does not properly seal/fit, contaminants can leak in with each breath.

# Positive Pressure Styles



The facepiece always has a positive pressure in the facepiece, even during inhalation. The positive pressure is created by a fan or source of air flowing into the facepiece.



# Air Purifying Styles



Contaminants are removed by a filter (particles), chemical cartridge (gases & vapors) or a combination of both. NO source of **breathable** air is supplied.

# Air Supplying Styles



A source of **breathable** air is supplied to the facepiece. Only air supplied styles can be used in IDLH environments.

# Disposable



While they can be used more than once, these types are usually thrown out frequently. They cannot be worn by more than one person.

# Reusable



Designed to be used many times. Can be used by more than one person only **if** properly cleaned & disinfected.



# Air Purifying Particulate Filters

- N, P and R series
  - **N = Not resistant to oil**
  - R = Resistant to oil
  - P = Oil proof
- 95, 99, 100 ratings
  - **95 = 95% removal**
  - 99= 99% removal
  - 100 = 99.97% removal (These are equivalent to “HEPA” filters. If you also have overexposure to lead, you have to choose this type)



# Filtering Facepiece Respirators (FFP)

- OSHA definition of FFPs

"a negative pressure *particulate* respirator with a filter as an *integral part of the facepiece* or with the entire facepiece composed of the filtering medium." (italics added)

- Commonly called “dust masks” but these are FFP Respirators

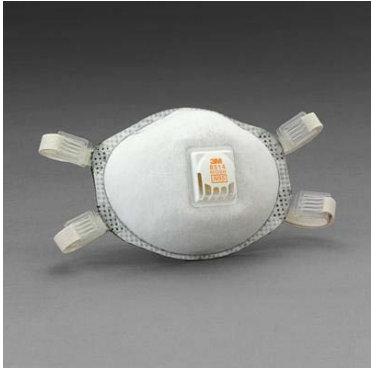
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- From <https://www.osha.gov/qna.pdf>

- Q. Does OSHA consider a disposable paper respirator (or **dust mask**) a **negative pressure respirator**?
- A. Yes, this type respirator is referred to as a **filtering facepiece in the final standard** and is defined as a *negative pressure particulate respirator* with a filter that is an integral part of the facepiece or with the entire facepiece composed of the filter medium.

- In marketing materials FFP styles may not be called respirators

# Examples of FFP Respirators



# The Great Divide in Respirator Programs

**Required Use**

**OR**

**Voluntary Use**



# Required Use

Respirators must be used when a **hazardous** atmosphere is present

The chemical (dust, fume, gas, vapor or mist) exposure exceeds an exposure limit or IDLH level (this includes an oxygen deficient environment)

**OR**

The employer requires use even if *no hazard exists*

# Voluntary Use

There is **NO** **hazardous atmosphere present**

AND....

The employer allows employees to wear a respirator in these situations

# Why is This Important?

- Respirator Program elements depend on whether use is *voluntary* or *required*
  - Voluntary use
    - The Program elements depend on type of respirator used
  - Required use
    - Almost all Program elements are required
- Be careful about “recommending” respirators or posting respirator signs
  - Have you crossed the line and implied *required* usage?
  - Be sure to clearly communicate to employees, supervisors and managers whether or not usage is required or voluntary





# Voluntary Use-What Types Do You Allow?

Filtering  
Facepiece  
(FFP)  
styles



Any  
other  
style

# Voluntary Use of FFP Respirators

- You must share Appendix D of the standard with all employees that use them
  - Control access-where are they & who can get one?
  - Don't overlook dispensing machines-who has access to these respirators?
- They must be kept clean & maintained
- No other formal Written Program Elements are required
- What about 1 strap units for voluntary use?
  - OSHA does not require NIOSH certification for voluntary use, however, they “strongly recommend” it
  - Few, if any, one strap units have a NIOSH certification



# What About Voluntary Use of Other Styles?

- Examples
  - Elastomeric facepiece styles (1/2 & full face)
  - Supplied air units
  - PAPRs (Powered Air Purifying Respirators)
- If the respirator is NOT a FFP then the following are required
  - A Written Program
  - **Medical evaluation** before use
  - Maintenance and storage policies/procedures
  - Sharing of Appendix D with all users

# OSHA Insights on Voluntary Use

- “Some manufacturers market unapproved respirators as “face masks” or by using other terminology. These are *still considered respirators* (italics added) and the information in Appendix D of the standard must be given to users of these unapproved respirators”.
- “In cases where an employee is voluntarily using a respirator other than a filtering facepiece (dust mask) respirator, the employer must provide employees with information in Appendix D of the standard”.
- “Merely posting Appendix D is not considered adequate.”
- Use of elastomeric or supplied-air respirators, even when voluntary on the part of the employee, will require the employer to include all applicable elements in a written program to ensure that use of the written respiratory protection program will vary by the type of respirator used but must include at least the medical evaluation, cleaning, maintenance, and storage components”

from p. 11 & 12 of the OSHA Respirator CPL

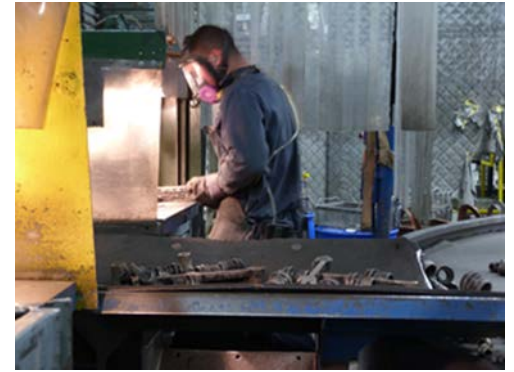
# Required Use of Respirators



- Applications
  - When there are overexposures (e.g. a health hazard exists) and OSHA requires the use of respirators **OR**
  - Company policy requires usage
- OSHA assumes
  - A hazard assessment has taken place
  - If there are overexposures they will be fixed
- All elements of a Program are needed
  - Written Program
  - Designation of a Program Administrator
  - Selection of respirators
  - Medical evaluations
  - Fit testing of tight fitting styles
  - Training
  - Use, maintenance & storage

# Selecting Respirators

- Respirators are selected based on
  - Type of hazard(s)
  - Amount of exposure
- Hazard types
  - **Particles**
  - Gases/Vapors
  - Combinations of particles and gases/vapors
  - Oxygen deficient and other IDLH environments
  - Emergency situations
- Amount of exposure
  - Air sampling or other *objective* means of assessment must be used



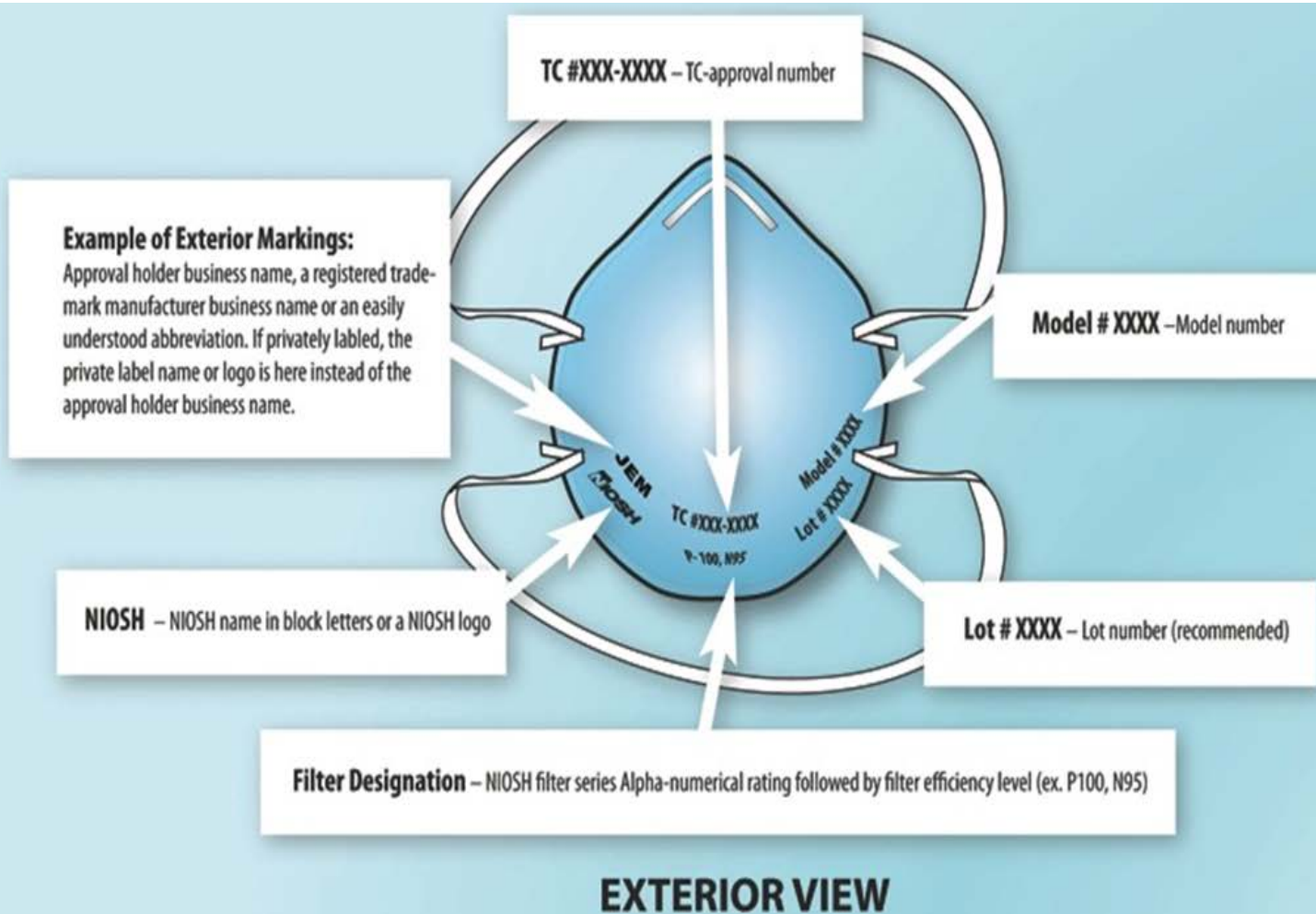


# NIOSH Certification



- NIOSH (National Institute of Occupational Safety & Health) approves respirators
- The approval extends to ALL components of the respirator
  - Facepieces
  - Filters
  - Cartridges
  - Airlines
  - Connectors
  - Hoods/helmets
- If they are sold cheaply, they are probably NOT NIOSH certified
- You can search the [NIOSH Certified Equipment](#) list if you are not sure

# NIOSH Certification



# Selection- Assigned Protection Factors (APFs)

- The APF is a number that indicates how much protection will be provided by a *class* of respirators
- To use the assigned APF, there is an assumption that there is a “continuing, effective respiratory protection program” in place

# OSHA's Assigned Protection Factors (APF)

Type of Respirator <sup>1, 2</sup>	Quarter mask	Half Mask	Full facepiece	Helmet/ hood	Loose fitting facepiece
Air Purifying Respirator	5	<sup>3</sup> 10	50	-	-
Power Air Purifying Respirator (PAPR)		50	1,000	<sup>4</sup> 25/1,000	25
Supplied air respirator (SAR) or Airline Respirator <ul style="list-style-type: none"> <li>• Demand mode</li> <li>• Continuous flow mode</li> <li>• Pressure-demand or other positive-pressure mode</li> </ul>		10 50 50	50 1,000 1,000	- <sup>4</sup> 25/1,000 -	- 25 -
Self Contained Breathing Apparatus (SCBA) <ul style="list-style-type: none"> <li>• Demand mode</li> <li>• Pressure-demand mode or other positive-pressure mode (e.g. open/closed circuit)</li> </ul>		10	50 10,000	50 10,000	- -

See notes on next slide

## Notes:

1. Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.
2. The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this Section (29 CFR 1910.134) including training, fit testing, maintenance, and use requirements.
3. This APF category includes filtering facepiece, and half masks with elastomeric facepiece
4. The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to achieve an APF of 1,000. This level of performance can be best demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.
5. These APFs do not apply to respirators used solely for the purpose for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)((2)(ii))

# Using APFs for Silica

Respirator Selected	APF	OSHA PEL	Maximum Use Concentration
½ mask air purifying (elastomeric facepiece or disposable)	10	100 µg/m <sup>3</sup> 50 µg/m <sup>3</sup>	1,000 µg/m <sup>3</sup> 500 µg/m <sup>3</sup>
PAPR, helmet or hood (check with manufacturer to determine what APF their unit has)	25	100 µg/m <sup>3</sup> 50 µg/m <sup>3</sup>	2,500 µg/m <sup>3</sup> 1,250 µg/m <sup>3</sup>
PAPR, ½ or full facepiece elastomeric	1,000	100 µg/m <sup>3</sup> 50 µg/m <sup>3</sup>	100,000 µg/m <sup>3</sup> 50,000 µg/m <sup>3</sup>
Airline, continuous flow mode, hood	50	100 µg/m <sup>3</sup> 50 µg/m <sup>3</sup>	5,000 µg/m <sup>3</sup> 2,500 µg/m <sup>3</sup>
	1,000	100 µg/m <sup>3</sup> 50 µg/m <sup>3</sup>	100,000 µg/m <sup>3</sup> 50,000 µg/m <sup>3</sup>



# Questions?

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