COMMON ISSUES FOUND WITH RESPIRATOR PROGRAMS

Common Issues

- Respirator Program
- Fit Testing
- Clean, Store and Maintain
- Supplied Air Respirators
- Change Out Schedule for Chemical Cartridge APRs
- Voluntary Use of Respirators
- Employee Training
- The “BIG” one…….Facial Hair

Respirator Program Issues

- Lack of Written Program, Incomplete Program or Program Elements not carried out (Training, Medical Evaluation….etc.)
- Out of Date – Respirators in use do not correspond to Program, Program Administrator change
- Lack of exposure information – No air sampling data to properly select a respirator

Small Entity Compliance Guide for the Respiratory Protection Standard

https://www.osha.gov/Publications/3384small-entity-for-respiratory-protection-standard-rev.pdf

Fit Testing Issues

Fit Testing not done or most likely done incorrectly

Fit Testing not done annually

Facial Hair – “I will shave if I don’t pass!”

No Fit Test Records

Ask employer to demonstrate their fit test protocol

RESPIRATOR FIT TEST PROTOCOL – QLFT

A QLFT fit test is done in three parts

- Select the model of respirator & size of the respirator facepiece – small, medium or large.
- Sensitivity test – to see if you can taste Saccharin or Bitrex, WHILE NOT WEARING A RESPIRATOR.
- Actual fit test – a series of 7 exercises are done for 1 minute each, WHILE WEARING A RESPIRATOR.

Fit Testing Issues

Again….Ask employer to demonstrate their fit test protocol

QLFT: *Most Common QLFTs Seen are Saccharin and Bitrex*

Sensitivity and Fit Test Solutions Incorrect
Sensitivity Test not done
All 7 Exercises not completed
Exercises not done for 1 minute each
Maintain Solution Concentration (squeezes)

RESPIRATOR FIT TEST PROTOCOL

Respirator Sensitivity and Fit Tests

Equipment Overview

Here is the equipment that will be used to perform the Saccharin or Bitrex sensitivity and fit tests:

1. Sensitivity and fit test solutions.
   The sensitivity solution is more dilute than the fit test solution.

2. Nebulizer: used to generate a Saccharin or Bitrex mist for both the sensitivity and fit tests. Nebulizer should be filled with approximately 2 oz. of solution.

3. Fit test hood

RESPIRATOR FIT TEST PROTOCOL

SENSITIVITY TEST

The sensitivity test is done by generating a saccharin mist into a hood while you are not wearing a respirator.

You should mouth breath with you tongue slightly extended.

Let the tester know when you taste the saccharin.

Perform
10, 20 or 30
Nebulizer
Squeezes

Note as (T) the number of nebulizer squeezes to taste Saccharin or Bitrex

RESPIRATOR FIT TEST PROTOCOL

Sensitivity Test

(Done without wearing a respirator)

T = Taste Threshold – Number of Nebulizer Squeezes (10, 20, or 30)

- If individual tastes Saccharin or Bitrex in 10 or fewer squeezes in taste threshold screening, **T=10**
- If individual tastes Saccharin or Bitrex anywhere between 11 and 20 squeezes in taste threshold screening, **T=20**
- If individual tastes Saccharin or Bitrex anywhere between 21 and 30 squeezes in taste threshold screening, **T=30**

RESPIRATOR FIT TEST PROTOCOL

Exercises

- Perform each exercise for 1 minute.
- Mist Saccharin or Bitrex into hood at beginning of fit test using the same number of squeezes to taste Saccharin or Bitrex during the sensitivity test, T (10, 20, 30). Then every 30 seconds mist Saccharin or Bitrex into hood using ½ T until the fit test is completed. Exercises include:
    - Normal Breathing
    - Deep Breathing
    - Turning Head Side to Side
    - Moving Head Up and Down
    - Talking – Pledge of Allegiance
    - Bending Over or Jogging in Place
    - Normal Breathing
- Remember, if you taste Saccharin or Bitrex at any time, let tester know.

RESPIRATOR FIT TEST PROTOCOL

Timing and Number of Nebulizer Squeezes – (T=10, 20, 30)

Time (Mins:Secs)	Test Exercise	Nebulizer Squeezes
0:00	Normal Breathing	T Squeezes
0:30		½ T Squeezes
1:00	Deep Breathing	½ T Squeezes
1:30		½ T Squeezes
2:00	Head Side to Side	½ T Squeezes
2:30		½ T Squeezes
3:00	Head Up and Down	½ T Squeezes
3:30		½ T Squeezes
4:00	Talking	½ T Squeezes
4:30		½ T Squeezes
5:00	Bend Over/Jog	½ T Squeezes
5:30		½ T Squeezes
6:00	Normal Breathing	½ T Squeezes
6:30		½ T Squeezes
7:00	End of Test	

Fit Testing Issues

QLFT: *Irritant Smoke*

- Use of an Enclosure
- HEPA Filters not used
- Sensitivity Test not repeated

QLFT: IAA – Banana Oil

- Good QLFT but you need well ventilated area
- Protocol requires 0.75 ml of IAA; but ampules are generally 0.50 ml

Fit Testing Issues

QNFT: *Most common QNFT today is Ambient Aerosol Condensation Nuclei Counter (CNC) and Controlled Negative Pressure (CNP)*

TSI Portacount

OHD Quantifit

Fit Testing Issues

QNFT:

- Manufacturer calibration out of date
- Daily check not done prior to fit testing
- Wrong Fit Factor used (100 or 500)
- N95 box not checked

OSHA Accepts both QLFT and QNFT Protocols

Clean, Store & Maintain Issues

- Emergency use respirators (SCBA) not inspected monthly – *out of sight out of mind*
- Most Programs require employees to clean, store and maintain their respirators – Employees lack proper training
- Improper storage of respirators – on the work floor – this is especially a problem with chemical cartridge APRs
- Add or remove parts, negating the NIOSH approval
- Air Quality Testing for SARs & SCBAs

Supplied Air Respirator Issues

Most SAR operate in the continuous flow mode
Typically, SAR not operated as per the NIOSH approval

- Hose Length – manufacturers usually provide hose in 25, 50, and 100 feet lengths. Maximum length is 300 feet but SAR may be approved for less (say 100 feet)

- Hose Diameter – can be 3/8, 1/2, 5/8 or 7/8 inches
- Number of Couplings – Could be….three 100 foot lengths of hose or six fifty foot lengths of hose or other….varies with manufacturer & respirator

Supplied Air Respirator Issues

Typically, SAR not operated as per the NIOSH approval:

- Pressure – The maximum operating pressure is 125 psi. Depending on manufacturer, type of SAR, hose length and hose diameter actual operating pressure varies

- Accessories – Are part of the NIOSH approved assembly…..vortex tubes, eye glasses, SCBA cylinder, nose cup…..etc.

Always ask for the NIOSH approval label/information when evaluating SAR usage. Typically, in manual. If not, you can get it from the manufacturer

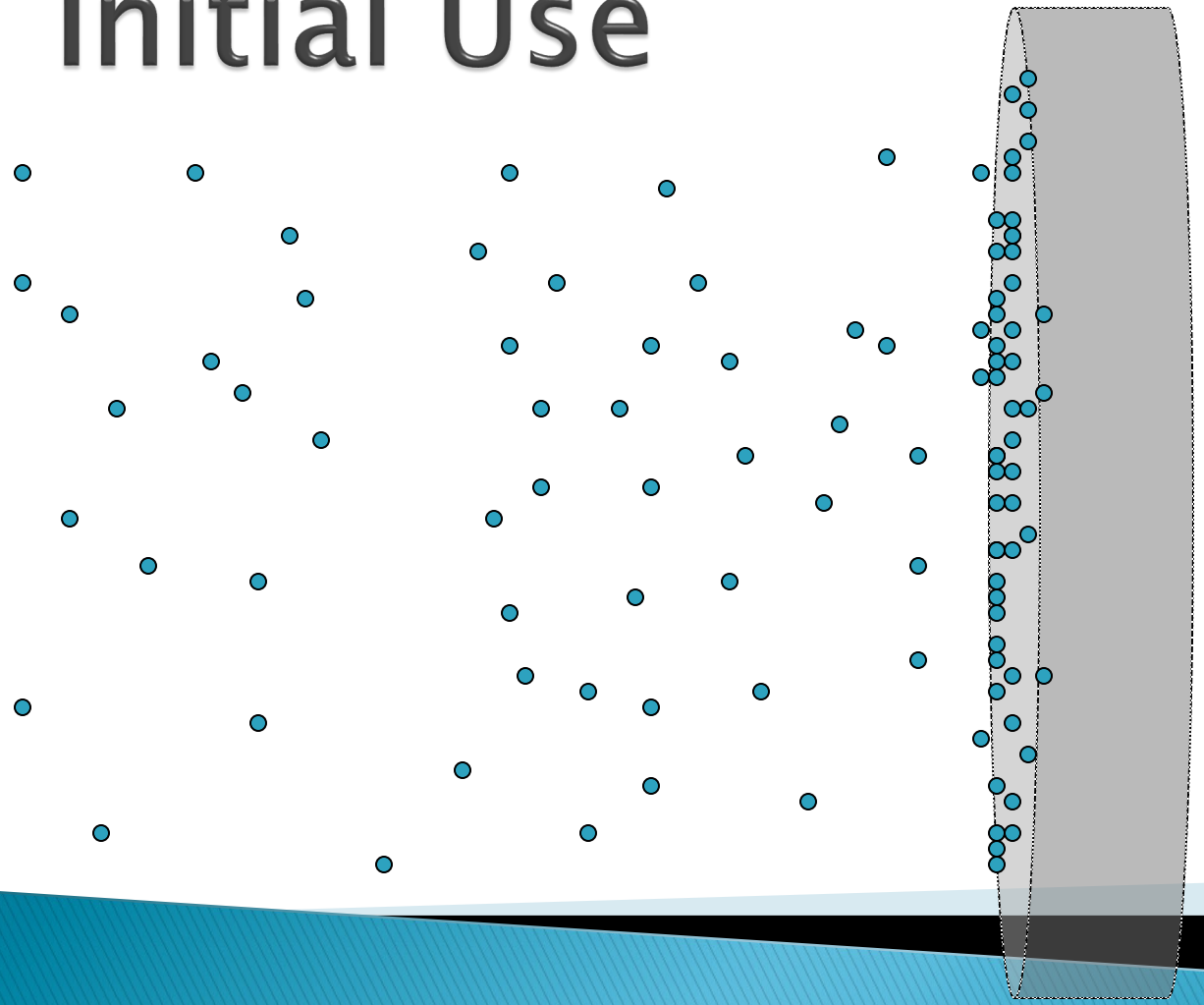
Change Out Schedule for Chemical Cartridge APRs Issues

- Typically, no change out schedule in place
- Pre-1998 reliance on warning properties (odor, irritation) to change cartridges……many employers still use this method
- Storage of respirators in the workplace or locker – Humidity will quickly end service life for organic vapor cartridges

Most respirator manufacturers and NIOSH have change out schedule software available and they are easy to use

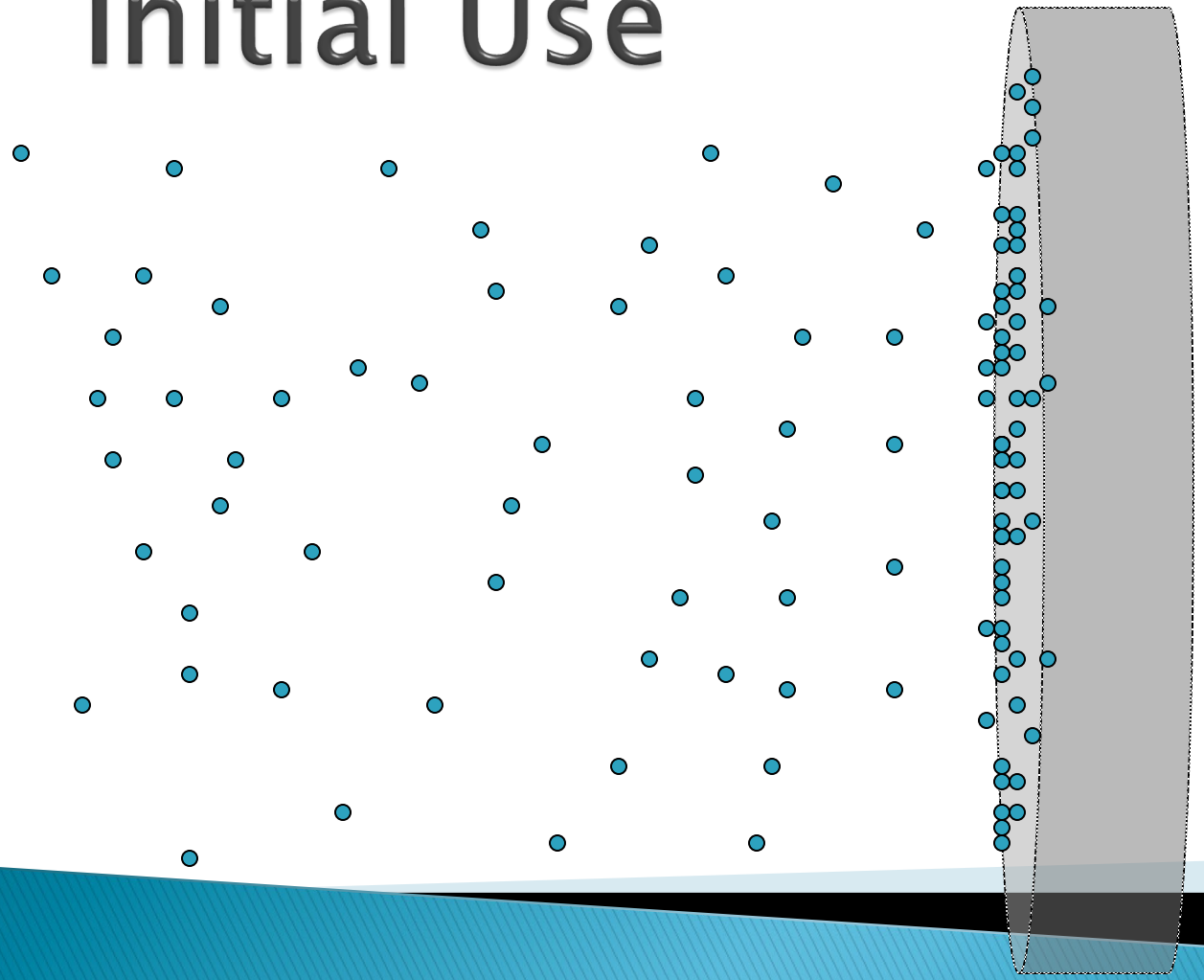
Most change out schedule software can be for multiple contaminants

Initial Use



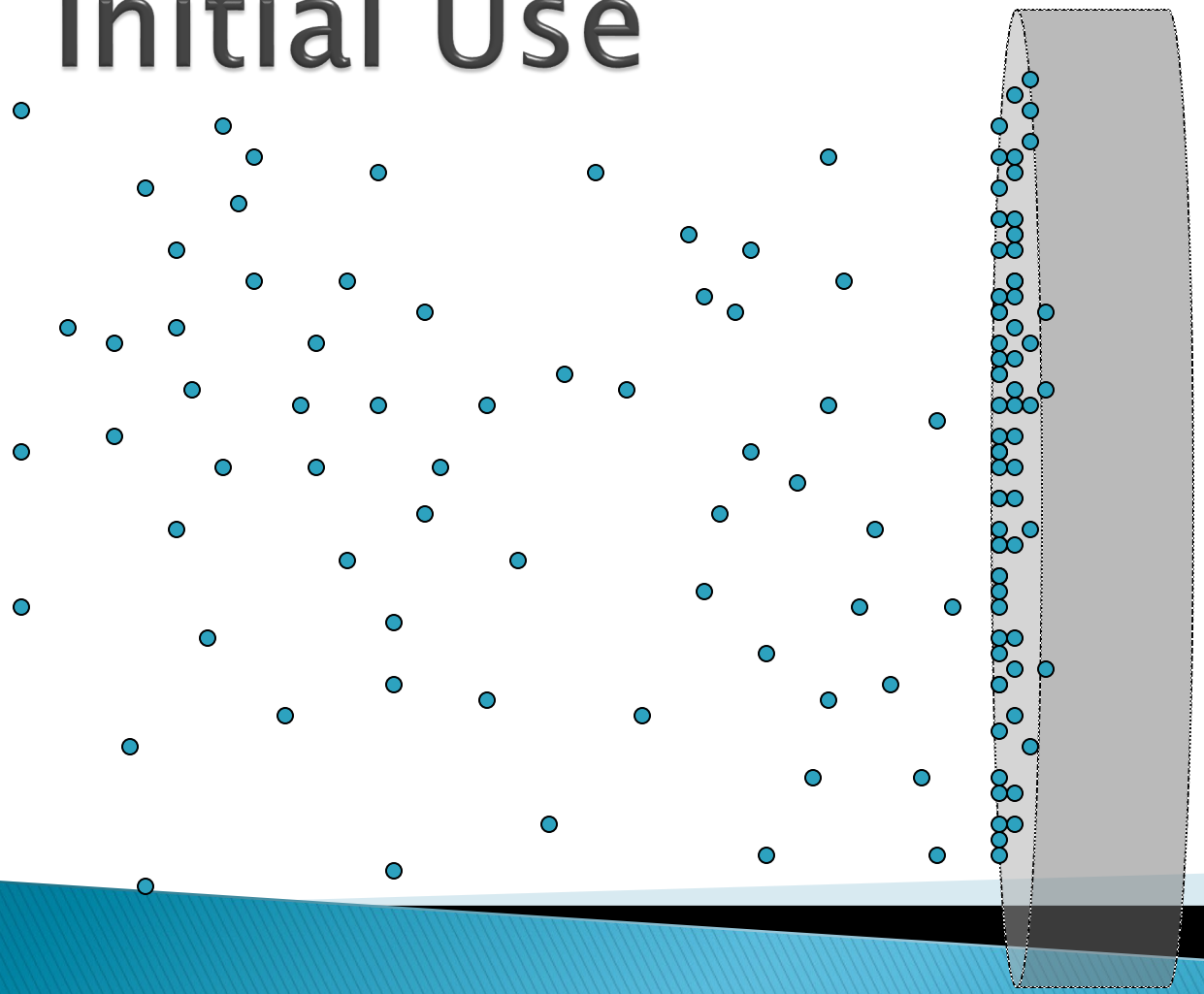
Air flow

Initial Use



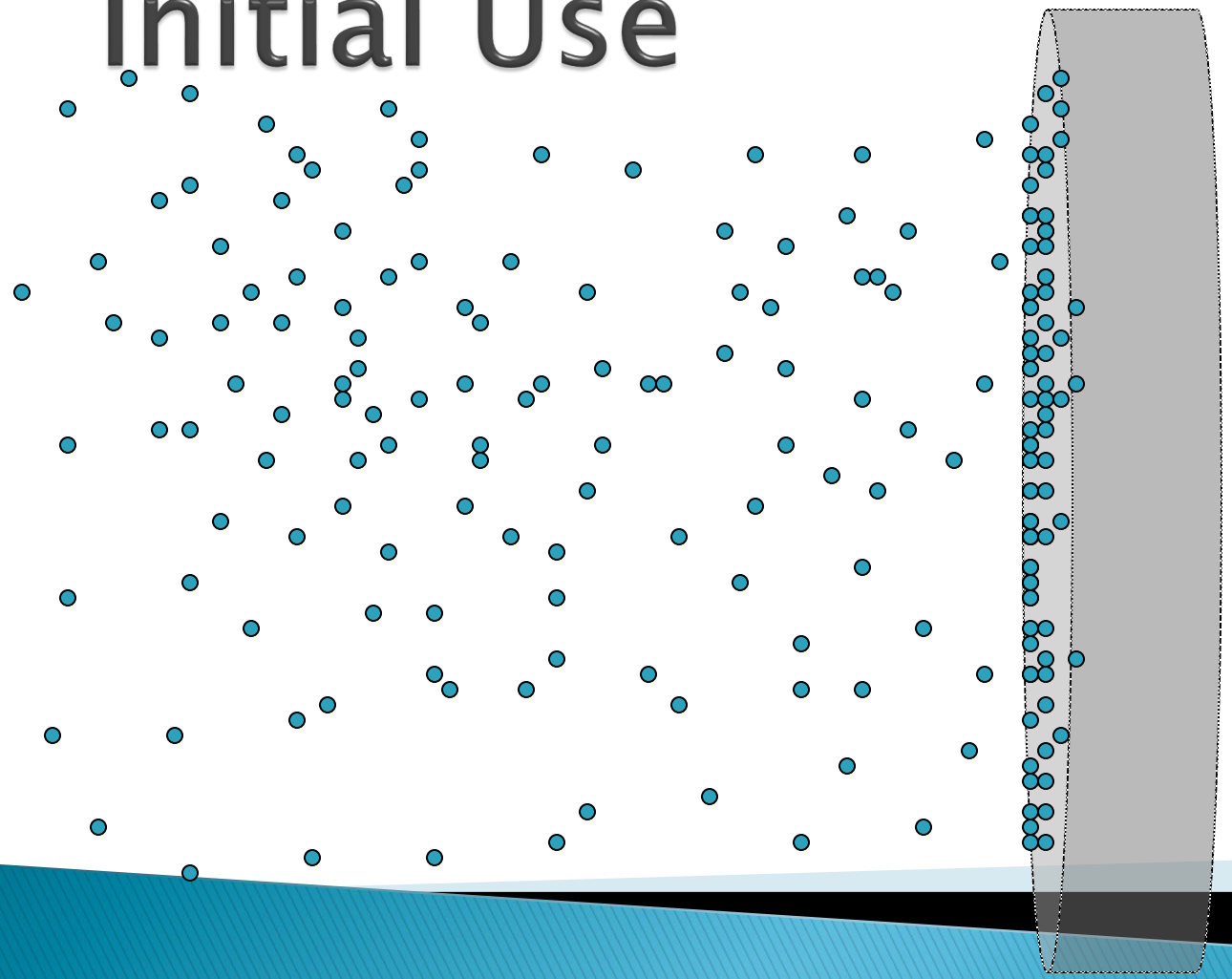
Air flow

Initial Use



Air flow

Initial Use



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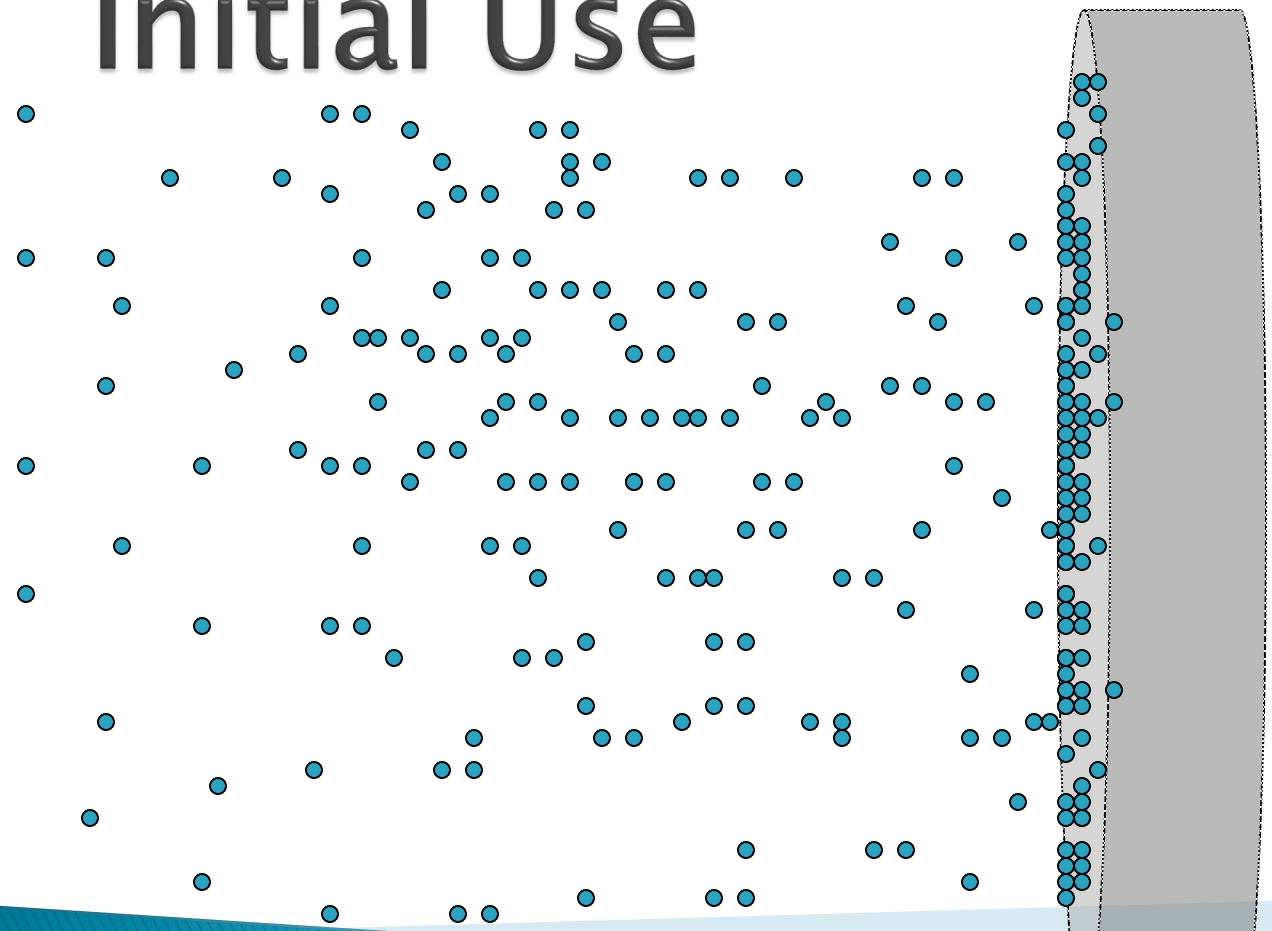

Air flow

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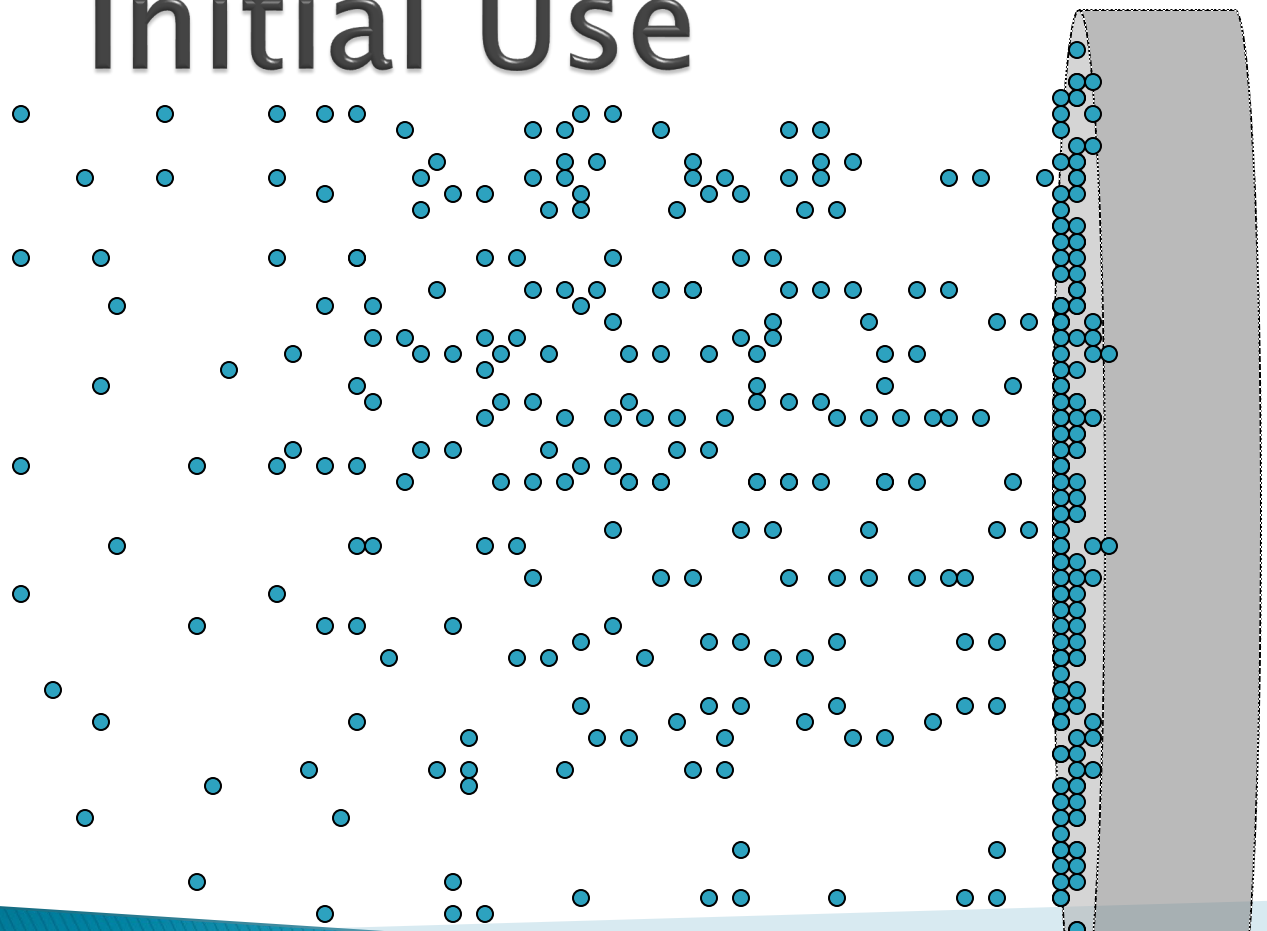
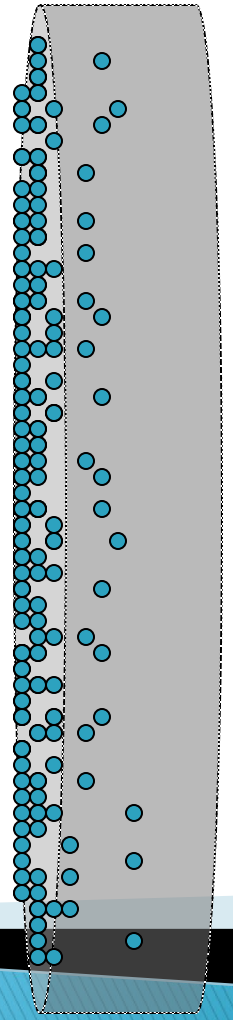


Air flow

Initial Use

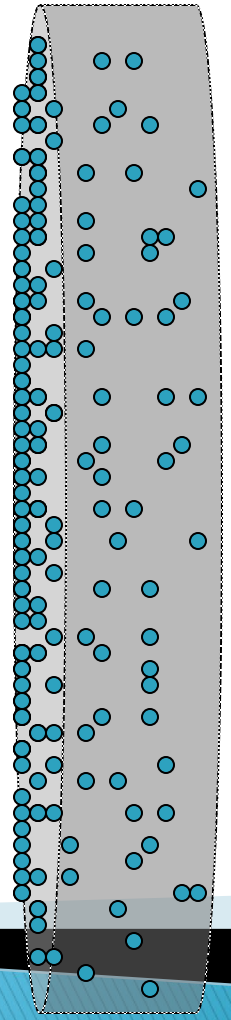
Air flow

Storage



No air flow

Storage



No air flow

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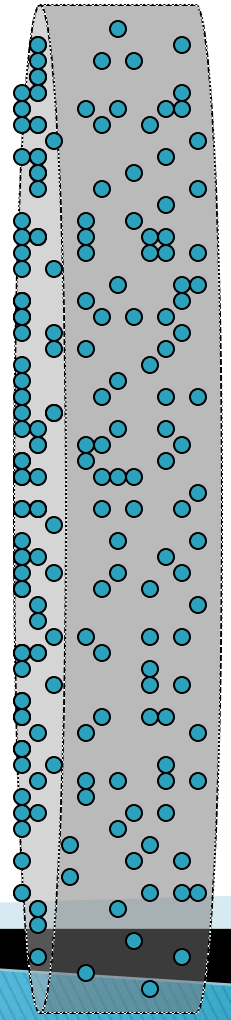
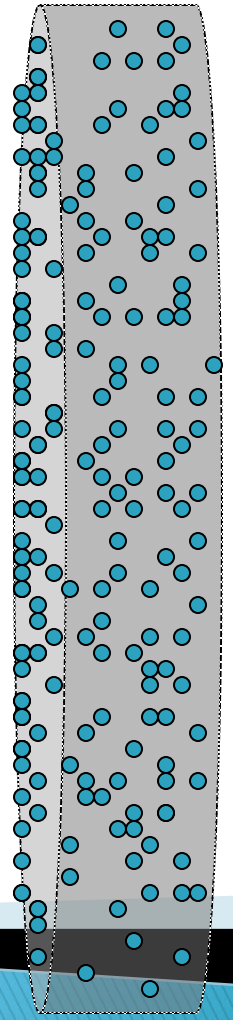


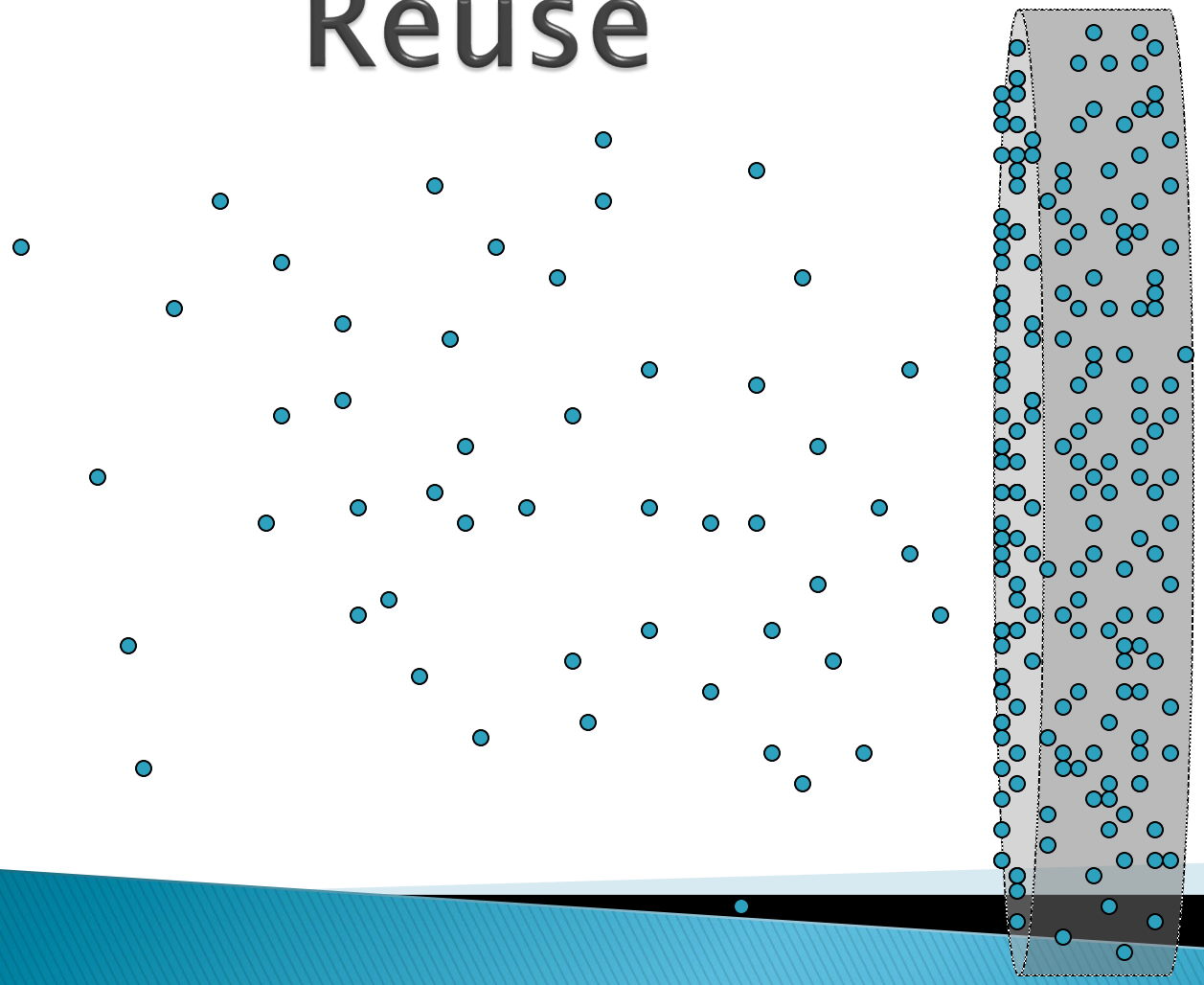
No air flow

Storage

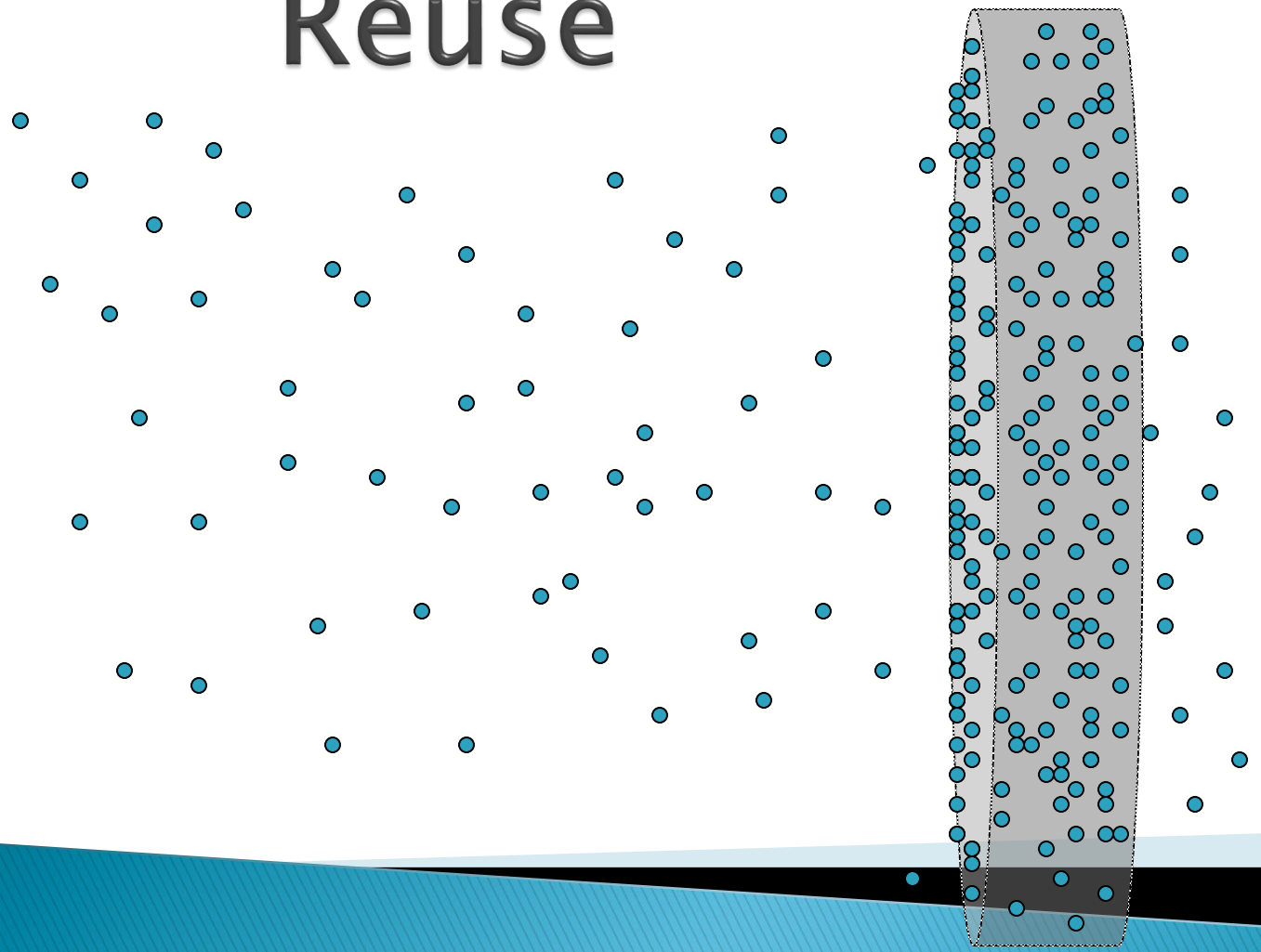


No air flow

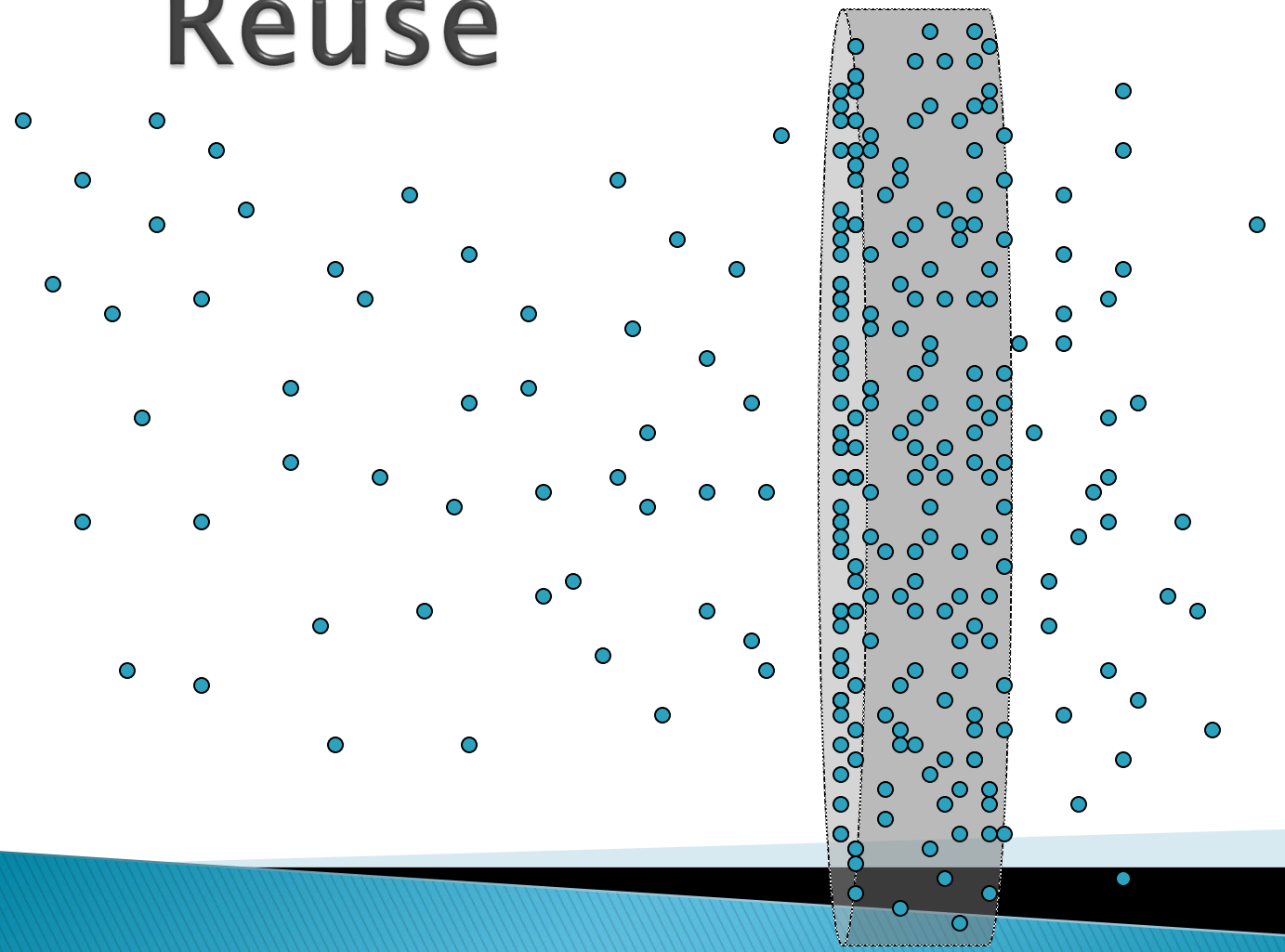
Reuse



Reuse



Reuse



Factors Affecting Chemical Cartridge Service Life

- Service life varies depending on:
  - carbon characteristics
  - carbon mass
  - contaminant species
  - contaminant concentration
  - airflow (breathing rate)
  - relative humidity
  - temperature
  - presence of other vapors

Humidity or water vapor has the most detrimental effect on most respirator cartridges, especially organic vapor cartridges

Methods for Determining Service Life of Chemical Cartridges

- Estimate with rules of thumb
- Test in laboratory using “simulated” workplace
- Calculate using breakthrough equations
- Test cartridge in the workplace
- Test cartridge after use
- Manufacturer’s software

Change Out Schedule Software Available

Manufacturer's software is respirator specific

- 3M™: Respirator Service Life Software
- MSA: Cartridge Life Expectancy Calculator
- North: ESlife™
- Scott: SureLife™ Cartridge Calculator
- Sperian: Cartridge Service Life Program
- Willson: Cartridge Service Life Program
- Draeger: End-of-ServiceLife-Calculator

Voluntary Use of Respirators Issues

Most employers providing N95 filtering facepiece respirators for voluntary usage

- Many times employers provide employees with respirators on a voluntary basis; but do not follow voluntary usage requirements. They just say, “It is voluntary, so a program is not needed……Right?”
- No respirator hazard evaluation – most of time respirator use does not pose a hazard; but still required to be done
- No Appendix “D” provided to the employee
- If required, for elastomeric facepiece…….No medical evaluation, clean, store or maintain provided

Employee Training

- Initial and annual employee training not done or is inadequate
- Employees do not know how to:
  - **Don and Doff respirator – especially true with N95 filtering facepiece respirators – nose bar, straps**
  - **Clean and maintain respirators – Parts missing or even added**

The “BIG” one…….Facial Hair Issues

- This is the largest issue related to respirator usage and Respirator Program Administration
  - Without exception, facial hair is always an issue.
    - Even if a male employee is clean shaven at fit testing, in a short period of time facial hair problems are evident
      - You still can get inward leakage with positive pressure respirators

Questions?
Let's Go Fishing!

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