3M™ Select Software – United States

Introduction to Select and Service Life Software

3M™ Select Software is designed to help you choose the appropriate 3M respirator cartridge or filter for your work environment. This help information is for the 3M Select Software.

3M™ Service Life Software is designed to help you estimate the service life of 3M gas/vapor respirators and cartridges. Help information for Service Life software is available from within the Service Life Software program.

Select Software

WARNING: Misuse of respirators may cause sickness or death!
This information is intended only as a guide. Selection of the most appropriate respirator will depend on the particular situation. It should be made only by a person familiar with the working conditions and the benefits and limitations of respiratory protection products. Respirators must be used in conjunction with a respiratory protection program that meets all the requirements of OSHA standard 29 CFR 1910.134. This includes but is not limited to proper respirator selection, medical evaluation, fit testing, training, respirator maintenance, program evaluation, etc.

This program is only for selecting applicable respirator cartridges and filters. You must determine the appropriate level of protection (e.g. half mask, full facepiece, powered or supplied air, etc.) and comply with all applicable regulations, exposure limits, respirator protections factors and respirator User Instructions.

If a chemical can be absorbed through the skin, skin protection may be required in addition to respiratory protection. Eye protection may also be necessary if not provided by the respirator. Failure to provide adequate skin and eye protection can invalidate established exposure limits and make respirator use ineffective for preventing adverse health effects.

If you have any questions related to proper selection and use of 3M respirators, contact your local 3M representative or call 3M Technical Service at 1-800-243-4630.

The general process to use this software is:

- confirm that there is no potential for oxygen deficiency
- enter one or more contaminants
- answer other questions depending on the contaminants which you have selected
- choose from among the possible solutions

Contaminant Page

OSHA defines oxygen deficient environments as atmospheres containing less than 19.5% oxygen. If you have a potentially oxygen deficient atmosphere, then a self-contained breathing apparatus (SCBA) or combination supplied air respirator with auxiliary SCBA must be used.

The software contains a database of chemical names, chemical abstract service registry numbers (CAS #s), Immediately Dangerous to Life or Health (IDLH) levels, occupational exposure limits (OELs), suggested 3M cartridge or filter and other comments.

IDLH specifically refers to acute respiratory exposure that poses an immediate threat to loss of life, immediate or delayed irreversible adverse effects on health, or acute eye exposure that would prevent escape from a hazardous atmosphere. These values have been developed for selection of respiratory protection only. This software uses the IDLH concentrations published in the National Institute for Occupational Safety and Health (NIOSH) Publication No. 90-117 (1990). NIOSH also published IDLH values in NIOSH Publication No. 94-116 (1994). The 1994 values are not used in the software because OSHA considers them as interim values and is still using the values from the 1990 publication for enforcement (OSHA memorandum August 3, 1998). When no IDLH exists, the lower explosive limits (LELs) from the NIOSH Pocket Guide, Publication No. 2005-149, and the Workplace Environmental Exposure Level Guides were used.

The OELs used in this software are the maximum airborne contaminant concentration allowed in the breathing zone of the worker. There are different types of OELs depending on the duration of the exposure: 8 hour time weighted average (TWA) exposure limits, 15 minute short term exposure limits (STEL) and/or ceiling (instantaneous) exposure limits. One or more type of OEL is shown next to each contaminant. The OEL units are either parts of contaminant per million parts of air (ppm), milligrams per cubic meter of air (mg/m^3), or fibers per cubic centimeter (f/cc).

The OELs used in this system are the lowest value of either the ACGIH® Threshold Limit Values (TLVs®), OSHA Permissible Exposure Limits (PELs), or American Industrial Hygiene Association Workplace Environmental Exposure Levels (AIHAWEELs). TLVs are from ACGIH®, 2019 TLVs® and BEIs® Book. Copyright 2019. Reprinted with permission.

Chemicals without established occupational exposure limits and chemicals that are mainly used as pesticides are not included. Call the 3M technical service at 1-800-243-4630 for information on these chemicals.

Cartridge/Filter Page

Depending on the contaminants entered, you may be asked additional questions to refine your results.

If any of your contaminants are particles, you will be asked whether or not oily mists may be present. Oil is defined as a mineral, vegetable, synthetic substance, animal fat, or vegetable fat that is slippery, combustible, viscous, liquid or liquefiable at room temperatures, soluble in various organic solvents such as ether but not in water. In the workplace, oil mists may be generated from cutting or lubricating fluids. If you answer that oil mist may be present, then “N” type particle filters will not be recommended; “R” or “P” type particle filters will be recommended instead.

If all of the contaminants entered are particles (none are gases or vapors), then you will be asked if you also need relief from odors that are noticeable, but not above the exposure limit.

If all of the contaminants entered are gases or vapors (none are particulates), then you will be asked if there are also any particles present in the environment (e.g., mist from spray painting).

Cartridges and filters are shown that may be used to help reduce exposure to all of the contaminants entered. Supplied air respirators are suggested instead if it is required in a regulation, there is no appropriate cartridge or filter for any single contaminant, or there is no cartridge or filter for all of the selected contaminants together.

Review Page

If available, additional comments are displayed next to each contaminant. In some cases, the comment may include "see comment A in Help document", etc. Comments A thru H are explained below:

A. Short service life means predicted cartridge life of less than 30 minutes at concentrations of ten times (10X) the OEL, or the contaminant's boiling point is less than 65C. Actual service life will vary considerably depending on concentration levels, temperature, humidity, work rate, etc. See the following literature references for specific details on the conditions and limitations of these estimates:
1. 3M Company. 3M Service Life Software. 3M.com/sls
2. Nelson, G.O. and C.A. Harder. Respirator Cartridge Efficiency Studies: V. Effect of Solvent Vapor. Am. Ind. Hyg. Assoc. J. 35(7): 391-410 (1974).

Sometimes, a supplied air respirator is recommended because the service life may be so short that the frequency required for changing the cartridges may not be practical.

References to Ineffective sorbents or Unknown sorbent effectiveness indicate 3M does not make chemical cartridge respirators appropriate for these substances at this time or it is not known how effective the sorbents would be for these materials.

B. References to a respirator not being specifically approved refer to approvals for that particular substance only. All respirators listed in this guide are NIOSH approved for specific substances and/or conditions.

C. {Comments regarding warning properties have been removed as OSHA allows air purifying respirators to be used against gases and vapors with poor or unknown warning properties. Instead cartridge change schedules based on objective information and data must be established.}

D. These compounds have been identified as possibly existing in both particulate and vapor phase in the workplace. For these compounds, 3M recommends that a gas/vapor cartridge be used in addition to the traditionally accepted particulate filter. It is the user's responsibility to determine whether both forms coexist. Both chemical properties and use conditions/processes can affect the physical form in the workplace. Users should consider specific exposure data and

workplace conditions before making their final selection.* If a chemical cartridge is used, a change schedule must be established to replace the cartridges before the end of their service life.

E. These compounds have been identified as possibly existing in both vapor and particulate phase in the workplace. Even though these chemicals would be expected to be in the vapor phase, when other aerosols are present or there is high humidity, it is possible that the vapor may be adsorbed onto these coexisting particles or dissolved in available water droplets; therefore, 3M recommends a filter for the particulate phase be used in addition to the traditionally accepted chemical cartridge. It is the user's responsibility to determine whether both forms coexist. Both chemical properties and use conditions/processes can affect the physical form in the workplace. Users should consider specific exposure data and workplace conditions before making their final selection.*

F. It is believed that an N-series filter is sufficient since these materials will not coat the filter fibers, but since this material may contain oil aerosols, an R- or P-series filter is recommended until further research or a regulatory agency takes a specific position.

G. R- or P-series filters have been recommended pending more research as to how these materials affect the filter fibers.

H. Listing of 3M 3510, 3530, 3550, or 3720 refers to a 3M™ Personal Air Monitor with Pre-Paid Analysis.

* See Perez, C. and S. C. Soderholm: Some Chemicals Requiring Special Consideration When Deciding Whether to Sample the Particle, Vapor, or Both Phases of an Atmosphere. Appl. Occup. Hyg. 6(10): 859-864 (1991).

SERVICE LIFE SOFTWARE

If you have selected a gas/vapor cartridge, you may wish to click on the button to calculate estimated cartridge service life. According to 29 CFR 1910.134, OSHA requires a cartridge change schedule instead of relying on warning properties from the contaminant such as odor or irritation. If a chemical cartridge change schedule cannot be established, a supplied air respirator or other atmosphere supplying respirator must be used instead.

The service life software is not for particle filters. Instead, these are changed according to physical damage, increased breathing resistance, or time limitations in the presence of oily aerosols. Please see respirator or filter user instructions for more information.

QUESTIONS?

If you have any further questions regarding this software or 3M respirators, please contact your local 3M representative or call 3M technical service at 1-800-243-4630.

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