

UCR Respirator Decision Logic Sequence

After all criteria have been identified and evaluated and after the requirements and restrictions of the respiratory protection program have been met, the following sequence of questions can be used to identify the class of respirators that should provide adequate respiratory protection:

1. Is the respirator intended for use in an oxygen-deficient atmosphere, i.e., less than 19.5% oxygen at sea level?
 - a. If yes, stop. This is an IDLH (immediately dangerous to life and health) environment. Employees are not authorized to enter.
 - b. If no, proceed to Step 2.
2. Is the respirator intended for use during emergency situations?
 - a. If yes, an atmosphere-supplying respirator is recommended.
 - b. If no, proceed to Step 3.
3. Is the exposure concentration of the contaminant, as determined by acceptable industrial hygiene methods, less than the applicable exposure limit? (Whenever a worker is given a respirator to use on a voluntary basis when ambient levels are below applicable limits, OSHA requires the implementation of a complete respiratory protection program, which includes medical evaluation, training, fit testing, periodic environmental monitoring.
 - a. If yes, a respirator would not be required except for an escape situation. Proceed to Step 4.
 - b. If no, proceed to Step 5.
4. Are conditions such that a worker who is required to wear a respirator can escape from the work area and not suffer loss of life or immediate or delayed irreversible health effects if the respirator fails, i.e., are the conditions not immediately dangerous to life or health (IDLH)?
 - a. If yes, conditions are not considered to be IDLH. Proceed to Step 5.
 - b. If no, conditions are considered to be IDLH. Stop. Employees are not authorized to enter or work in that environment.
5. Is the contaminant an eye irritant, or can the contaminant cause eye damage at the exposure concentration?
 - a. If yes, a respirator equipped with a full facepiece, helmet, or hood is recommended. Proceed to Step 6.
 - b. If no, a half-face respirator may still be an option, depending on the exposure concentration. Proceed to Step 6.

6. Divide the 8-hour time-weighted average (TWA) exposure concentration for the contaminant (or maximum exposure concentration for a contaminant with a ceiling limit) determined in Step 4 by the applicable exposure limit to determine the minimum protection factor has been calculated, proceed to Step 7.
7. If the physical state of the contaminant is a particulate (solid or liquid) during periods of respirator use, proceed to Step 8; if it is a gas or vapor, proceed to Step 9; if it is combination of gas or vapor and particulate, proceed to Step 10.

8. Particulate Respirators

- 8.1. Is the particulate respirator intended only for escape purposes?
 - a. If yes, use pre-determined “escape only” respirators.
 - b. If no, the particulate respirator is intended for use during normal work activities. Proceed to Step 8.2.
- 8.2. An atmosphere-supplying respirator, OR a NIOSH-certified filter medium that will provide protection against exposure to the particulate in question is recommended. Refer to the respiratory protection equipment inventory list when choosing the filter. Proceed to Step 8.3.
- 8.3 Respirators that have assigned protection factors (APFs) equal to or greater than the minimum protection factor determined in Step 6 are recommended. Maximum airborne concentrations for each level of respiratory protection can be calculated by multiplying the applicable exposure limit by the APF for that class of respirators. Refer to the respiratory protection equipment inventory list when choosing the filter.

9. Gas/Vapor Respirators

- 9.1 Is the gas/vapor respirator intended for “escape only” purposes?
 - a. If yes, use pre-determined “escape only” respirators.
 - b. If no, the gas/vapor is intended for use during normal work activities. Proceed to Step 9.2
- 9.2 Are the warning properties for the gas/vapor contaminant adequate at or below the applicable exposure limit?
 - a. If yes, proceed to Step 9.3
 - b. If no, an atmosphere-supplying respirator, OR an air-purifying respirator equipped with a NIOSH-certified end-of-service-life indicator (ESLI) for the contaminant is recommended. (Note: In the absence of ESLI, a cartridge/canister change schedule based on objective information or data shall be implemented). Refer to the respiratory

protection equipment inventory list when choosing the respirator.
Proceed to Step 9.4

9.3 An air-purifying chemical cartridge/canister respirator, is recommended that has a sorbent suitable for the chemical properties of the anticipated gas/vapor contaminants and for the anticipated exposure levels. The air-purifying chemical cartridge/canister respirator shall be equipped with a NIOSH-certified end-of-service-life indicator (ESLI) for the contaminant. (Note: In the absence of ESLI, a cartridge/canister change schedule based on objective information or data shall be implemented). Refer to the respiratory protection equipment inventory list when choosing the respirator. Proceed to Step 9.4.

9.4 Respirators that have APFs equal to or greater than the minimum protection factor determined in Step 6 are recommended. Maximum airborne concentrations for each class of respiratory protection can be calculated by multiplying the applicable exposure limit by the APF for that class of respirators. The calculated maximum use concentration limits should not be exceeded. Refer to the respiratory protection equipment inventory list when choosing the respirator.

10. Combination Particulate and Gas/Vapor Respirators

10.1. Is the combination respirator intended for “escape only” purposes?

- a. if yes, use pre-determined “escape only” respirators.
- b. If no, the combination respirator is intended for use during normal activities. Proceed to Step 10.2.

10.2. Does the gas/vapor contaminant have adequate warning properties at or below the applicable exposure limit?

- a. If yes, proceed to Step 10.3.
- b. If no, an atmosphere-supplying respirator, or an air-purifying respirator equipped with a NIOSH-certified end-of-service-life indicator (ESLI) for the contaminant is recommended. (Note: In the absence of ESLI, a cartridge/canister change schedule based on objective information or data shall be implemented). Refer to the respiratory protection equipment inventory list when choosing the respirator. Proceed to Step 10.4

10.3 An air-purifying chemical cartridge/canister is recommended that has a particulate prefilter suitable for the specific type(s) of gas/vapor and particulate contaminant(s) and for the exposure concentrations. The air-purifying chemical cartridge/canister respirator shall be equipped with a NIOSH-certified end-of-service-life indicator (ESLI) for the contaminant. (Note: In the absence of ESLI, a cartridge/canister change schedule based on objective information or data shall be implemented). Refer to

the respiratory protection equipment inventory list when choosing the respirator. Proceed to Step 10.4.

- 10.4. Respirators that have APF's equal to or greater than the minimum protection factor determined in Step 7 are recommended. Maximum airborne concentrations for each level of respiratory protection can be calculated by multiplying the applicable exposure limit by the APF for that class of respirators. The calculated maximum use concentration limits should not be exceeded. Refer to the respiratory protection equipment inventory list when choosing the respirator.