

Office of Compliance

Guidelines for Risk Assessment Codes (RACs)

July 29, 2004

Office of Compliance (OOC) inspectors assign a risk assessment code (RAC) to each hazard encountered during routine inspections. The RAC describes the relative risk of injury, illness or premature death that could result from exposure to a hazard. RACs vary between a RAC 1 for a relatively high risk and a RAC 5 for an insignificant risk. Because the OOC does not identify hazards that have insignificant risks (*de minimis* violations), we do not have RAC 5 findings.

A RAC uses a combination of the *probability* that an employee could be hurt and the *severity* of the illness or injury. The tables below outline the definitions of these elements and the process for combining the elements to determine a RAC. We use two methods: one for *safety* hazards, which could result in injuring an employee, and another for *health* hazards, which are conditions that could cause an occupational illness.

Table 1 shows the matrix used to determine RACs for safety hazards. The inspector finds the RAC by selecting the probability category from the first column and the worst-case severity category from the next four columns. The cell where the severity and probability descriptions intersect contains the appropriate RAC.

Probability Categories	Hazard Severity Categories			
	I	II	III	IV
Likely to occur immediately (A)	RAC 1	RAC 1	RAC 2	RAC 3
Probably will occur in time (B)	RAC 1	RAC 2	RAC 3	RAC 4
Possible to occur in time (C)	RAC 2	RAC 3	RAC 4	
Unlikely to occur (D)	RAC 3	RAC 4		

OOC has based the structure of the RAC tables (Tables 1 and 2) on information from John Zoldak of The Zoldak Group, Inc., and the definitions of the classifications and categories on the Department of Defense Instruction 6055.1, <http://www.dtic.mil/whs/directives/corres/pd2/i60551p.pdf>.

The definitions of the Hazard Severity categories from the DOD Instruction are as follows:

- *Severity Category I:* Death or permanent total disability.
- *Severity Category II:* Permanent partial or temporary total disability; off work more than 3 months.
- *Severity Category III:* Lost-workday or compensable injury.
- *Severity Category IV:* First aid or minor supportive medical treatment.

RACs for health hazards require a more complex approach. Health RACs include factors such as exposure conditions, routes of entry, medical effects, exposure duration, and the number of employees exposed. Table 2 below outlines the RAC categories for health hazards and Tables 3 through 8 give the process for calculating the probability and severity categories for Table 2.

Probability Categories	Hazard Severity Categories			
	I	II	III	IV
Likely (A)	RAC 1	RAC 1	RAC 2	RAC 3
Probable (B)	RAC 1	RAC 2	RAC 3	RAC 4
Possible (C)	RAC 2	RAC 3	RAC 4	
Unlikely (D)	RAC 3	RAC 4		

To determine the Hazard Severity for Table 2, add the factors in Tables 3 and 4, then use Table 5 to select the category.

Is an exposure route other than inhalation possible?	Exposure Conditions			
	< AL	Intermittently ≥ AL, but < OEL	≥ AL, but < OEL	≥ OEL
No	0 points	3 points	5 points	7 points
Yes	2 points	4 points	6 points	9 points

“AL” is the action level, which usually requires training, medical monitoring, records, and other measures. “OEL” is the occupational exposure limit that applies to the situation. These limits include OSHA permissible exposure limits (PELs), threshold limit values (TLV®s) from the American Conference of Governmental Industrial Hygienists (ACGIH), and short-term exposure limits (STELs) and ceiling limits from either OSHA or ACGIH.

Condition	Points
No medical effects (could include nuisance odors)	0
Temporary reversible illness requiring supportive treatment (e.g. eye irritation, sore throat)	1 to 2
Temporary reversible illness with limited period of disability (e.g., metal fume fever)	3 to 4
Permanent illness or loss of capacity (e.g., permanent hearing loss)	5 to 6
Severe disabling and irreversible illness or premature death (e.g., asbestosis)	7 to 8

Note: Be sure to use the correct medical effects for exposure conditions.
Use acute effects for exposures > STELs and chronic effects for exposures > time-weighted average OELs.

<i>Table 5. Health Hazard Severity Category (for use in Table 2)</i>	
Health Hazard Severity Category	Total points from Tables 3 and 4
I	13 to 17 points
II	9 to 12 points
III	5 to 8 points
IV	1 to 4 points

To determine the Health Hazard Probability for Table 2, add the factors in Tables 6 and 7, then use Table 8 to select the category.

<i>Table 6. Number of Exposed Employees (for use in Table 8)</i>	
Number of Exposed Employees	Points
< 5 exposed employees	1 to 2 points
5 to 9 exposed employees	3 to 4 points
10 to 49 exposed employees	5 to 6 points
> 49 exposed employees	7 to 8 points

<i>Table 7. Exposure Duration (for use in Table 8)</i>			
Exposure Frequency (during the year)	Exposure Duration (during a week)		
	1 to 8 hours/week	> 8 but < 30 hours/week	≥ 30 hours/week
Irregular, intermittent	1 to 2 points	4 to 6 points	8 points
Regular, periodic	2 to 3 points	5 to 7 points	8 points

<i>Table 8. Health Hazard Probability Category (for use in Table 2)</i>	
Health Hazard Probability Category	Total points from Tables 6 and 7
Likely	14 to 16 points
Probable	10 to 13 points
Possible	5 to 9 points
Unlikely	1 to 4 points

Guidance for Applying Risk Assessment Codes (RACs)

Apply RACs to Hazardous Conditions, Not to Generic Violation Categories

Inspectors should not attempt to match a RAC with a specific description of a violation without considering the conditions in which the violation exists. In other words, they should make no attempt to be consistent in assigning the same RAC to the same violation, unless the conditions involved in the violation are also consistent.

Example: A violation for exposure to asbestos in the air could result in a RAC 1, 2, 3, 4 or 5, depending on the conditions. Exposure to asbestos below the action level with no other contamination would have 8 medical-effects points and, therefore, a Severity Category of III. If a maintenance worker enters a closet with that level of asbestos for a couple of hours a month, the total Health Hazard Probability points would be 4, which would equate to “Unlikely.” The resulting RAC would be 5, which would be *de minimis*.

On the other hand, if a group of 6 people has that same asbestos exposure (below the AL with no other contamination) every workday, then the Health Hazard Probability points would be 11, which would equate to “Probable.” The resulting RAC would be 3.

Apply RACs to “Covered Employees”

Because the scope of OOC’s occupational safety and health inspections is limited to hazards to employees covered under the Congressional Accountability Act, our RACs are based only on those hazards. While other organizations might use RACs to track risks for the public or for potential facility damage, OOC RACs will not cover those types of hazards.

Example: A guardrail does not meet either the OSHA criteria to protect employees or the building code requirements to protect the general public. If the spacing between the railings poses a low risk for employees but a high risk for children, our RAC would be based on the low employee risk rather than the higher risk for members of the public.

Applying RACs for Unknown Exposure Conditions

When employees use substances that could expose them to hazardous levels but the employer has not measured or modeled the exposure, the inspector will need to either sample or estimate the level of exposure to determine the appropriate RAC. Unfortunately, odor levels and irritant levels can rarely be used to indicate levels that are hazardous; therefore, other means will usually be needed to estimate exposure levels.

The specific substance standards in 29 CFR Subpart Z that include permissible exposure limits (PELs) require the employer to determine the exposure level. They also require the employer to protect employees as though exposures exceed the PEL until exposure monitoring demonstrates otherwise. For violations of these standards, calculate the RAC using points for exposures above the PEL, unless there is a clear indication that exposures are less than the PEL.

For substances that do not have specific standards in Subpart Z, the inspector can use judgment

and experience to estimate the potential exposure after reviewing the method of application or use, vapor pressure of the material, process temperature, amount and rate of use, and volume of the area where the substance is used.

Applying a RAC for a Condition Having Multiple Risks

A violation will often have multiple potential outcomes. Examples include:

- Methylene chloride can cause both loss of consciousness during intermittent short-term exposures and long-term exposures can produce cancer.
- Many electrical violations can result in minor shock, major injury, death, localized fires or major facility fires.

To determine the appropriate RAC for such a violation, we look at two scenarios and use the highest RAC between them. We look at the scenario most likely to occur and determine that RAC. Then we look at the scenario with the most severe effects and determine that RAC. The highest of these two RACs (lowest number on our scale) is assigned to the violation.

Do Not Use RACs to Dictate an Abatement Schedule

A RAC provides information about the relative risk. More serious RACs (RAC 1 and RAC 2) should justify more resources and attention to correct hazards than less serious RACs (RAC 3 and RAC 4). We do not, however, use RACs to indicate a time-line for correcting a violation. If a RAC 4 violation can be corrected simply by eliminating an extension cord or by removing an obstruction, then the violation should be corrected immediately.

Do Not Reduce RACs to Reflect Reduced RACs for Interim Control Measures

Conditions that have been assigned serious RACs should usually require the employment of interim control measures. These measures should reduce the probability or severity of an injury or illness and result in a less serious (higher number) RAC. Employing offices will normally adjust these RACs as a part of managing their safety programs.

The OOC does not participate in adjusting RACs unless we receive a formal request to assist with this process.

Apply RACs to Direct, Indirect and Root Causes of Hazards

It is axiomatic that hazards, illnesses, and injuries usually have multiple causes and sources. Correcting a direct cause will physically eliminate the hazard or violation. For example, replacing a chemical that produces hazardous exposures with a chemical that does not produce such exposures addresses the direct cause of the hazard.

RACs also apply to indirect and root causes of hazards. Examples of indirect causes include missing MSDSs that would inform employees of hazardous materials that are otherwise not known, training that has not covered the procedures needed to avoid a hazard, lack of guidance regarding safe processes, an inadequate program in which the missing elements would reduce or eliminate the direct causes, etc.

Typical Examples of Risk Assessment Codes

Table 9 describes several sets of violations and conditions to show how we assign the RACs. These examples are instructional; therefore, no policy is implied by the conditions and hazards included in this table.

Table 9. Typical Examples of Risk Assessment Codes (RACs)			
Violations, Conditions, and Potential Hazards	Severity	Probability	RAC
Energized junction box is missing a cover. The box is within 8 feet of the floor and poses a potential electrocution hazard upon contact in a work area or frequently-used walkway or corridor.	I	C	2
Energized junction box is missing a cover. The box is within 8 feet of the floor and poses a potential electrocution hazard upon contact but is not located in a work area or frequently-used walkway or corridor.	I	D	3
Energized junction box is missing a cover. The box is more than 8 feet from the floor (relatively inaccessible) and has flammable materials near the location, and poses a limited fire hazard..	III	B	3
Fire extinguisher not inspected or maintained. It is not located in a sprinkler-protected area and a fire would pose a fire hazard with no protective measures.	III	B	3
Fire extinguisher not inspected or maintained. It is located in a sprinkler-protected area and a fire would pose a fire hazard with incomplete protective measures.	III	C	4
A confined space exists with a potential atmospheric hazard. The space is not labeled or marked as a permit required space; no entry program has been developed. No known entries have been made but the space is accessible and it could pose an inhalation hazard.	I	C	2
A confined space exists with a potential atmospheric hazard. The space is not labeled or marked as a permit-required space; no entry program has been developed. Entries have been made without protective measures, posing a likely inhalation hazard.	I	B	1
3 or 4 employees use methylene chloride (carcinogen) for more than 30 hours a week at levels above the PEL with poor ventilation, no respiratory protection, and no PPE to prevent potential skin exposure.	Table 3 = 9 Table 4 = 7 Total = 16 Severity I	Table 6 = 2 Table 7 = 8 Total = 10 Probable	1
5 or 6 employees use methylene chloride very infrequently at levels above the PEL with poor ventilation, no respiratory protection, and no PPE to prevent potential skin exposure.	Table 3 = 9 Table 4 = 7 Total = 16 Severity I	Table 6 = 3 Table 7 = 1 Total = 4 Unlikely	3