

Indoor Air Quality

Background

1. There were three test points -
 - a. 13 feet in front of the firing point at the 10 o'clock position
 - b. directly to the right of the firing point
 - c. less than 8 feet from the rear of the firing point at the 8 o'clock position
2. The two air deionizers were on for the first test and off for the second. Both were located on the floor, at 2 and 10 o'clock in front of the shooter about 2-4 feet from the shooting table.
3. One hundred 9mm and seventy-five 5.56 MMRs were discharged during each test.
4. Each test lasted about one hour. Simon and I attempted to realistically duplicate conditions found either in a demonstration scenario or a sighting and testing scenario, i.e., shoot, talk or measure, reload, shoot, talk, measure reload, clean, etc.

Test Results

1. The testing results for the 175 rounds discharged in a one-hour time period generated 5.1 micrograms of lead with a lead concentration of 0.043 mg/m^3 for the hour or 0.005 mg/m^3 as a time weighted average.
2. The permissible exposure limit for lead is 0.05 mg/m^3 averaged over an 8-hour shift. We were below the PEL (Permissible Exposure Limit) based on one hour, and well below the calculated 8-hour average (0.005 mg/m^3), which is the one that should be responded to. We are also well below the Threshold Limit Value - the allowed exposure at one time of 0.15 mg/m^3 .
3. By way of example, said another way, one way of reducing an employee's exposure over 8 hours, excluding ventilation or PPE is to procedurally restrict the amount of time an employee works in an area. So if we tested each hour and got 0.05 mg/m^3 on each test and we tested for 8 hours, the result would be the time weighted average of $.05 \text{ mg/m}^3$ times 8 divided by 8 or 0.05 mg/m^3 and would require protection. If we limited the exposure to only four hours, it would be 4 hours times 0.05 mg/m^3 divided by 8 hours or 0.025 mg/m^3 , which would not exceed the allowed time weighted average and not require protection.

Conclusion

1. So we could safely use the ammunition in our workspace at the rate fired in the test, constantly for 8 hours, and still be below - but close to the PEL. If we increased the number of rounds or amount of lead styphnate in the charge, that could change the results, but as of now, technically we need to do nothing, but using the filters helps reduce contaminants and odors.

2. Regarding the filters, when they were operating, the highest exposure to lead was measured by the unit 13 feet in front of the firing point (0.043 mg/m^3), none were recorded within the firing area.
3. With the filters off, a slightly less exposure (0.040 mg/m^3) was registered at the unit 13 feet in the front, but the closest unit at the firing point registered 0.038 mg/m^3 , which indicates that the contaminants flow forward from the discharge work and work their way back to the shooting area. Since no readings were picked up at the table while the units were in operation the filters seem to do their job and protect the participants where placed in the current location.
4. Since both units are silent and aesthetically neutral, we should plan to use them, particularly during demonstrations or extended testing.

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