

Issue Brief



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The Modular Building Institute . Government Advocacy . Current Analysis and Position

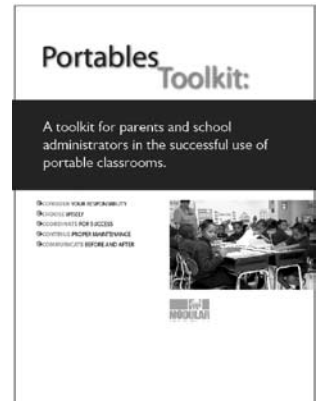
Indoor Air Quality in Relocatable Classrooms

All school buildings use similar construction and furnishing materials, so the types of chemicals present in the indoor air are not likely to vary greatly between relocatable and permanent classrooms.

The most comprehensive study conducted on indoor air quality in relocatable classrooms was a report by the California Air Resources Board and the California Department of Health Services in November 2004. This report, "Environmental Health Conditions in California's Portable Classrooms" analyzed various indoor air quality issues at 384 randomly selected schools. For each school, the facility manager and three teachers (two from portables and one from a traditional classroom) were asked to complete a detailed questionnaire about the aspects of the classroom. Additionally sampling tubes were sent to two thirds of those schools for deployment in the three classrooms.

The following excerpts are taken directly from the report¹:

- Both portable and traditional classrooms were found to have some environmental conditions that need improvement. However, the most serious problems occur only in a small percentage of classrooms.
- . . . improved operation and maintenance would go a long way to address many of the problems identified.
- State Relocatable Classrooms have always met or exceeded construction codes in effect at the time of approval. Additionally, they comply with ASHRAE standards for temperature control.
- 60% of teachers in portables indicated they turn off the ventilation system at times due to excess noise . . . Overall, the HVAC systems delivered adequate outdoor air and total airflows when operated properly, so design capacity did not appear to be a common problem in this study.
- Complaints of stuffy room air usually result from the HVAC not being operated properly.
- Formaldehyde and other aldehydes . . . were elevated above [California's Office of Environmental Health Hazard Assessment's] OEHHA's interim 8-hour REL for acute eye, nose, and lung irritation in about 4% of the classrooms.



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The Modular Building Institute has a free best practices resource available to school administrators, facility managers, and the public. Download the Portables Toolkit at modular.org.

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MBI's Portables Toolkit has been presented to school administrators at EPA's Indoor Air Quality Tools for Schools Annual Summit as well as the Association of School Business Officials (ASBO) annual meeting.

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EPA thanks you [MBI] for your involvement and participation in the “Indoor Air Quality Tools for Schools” Program. We appreciate your dedication to educating others on how to improve the health and safety of our nation’s schools.

*Michele Curreri
U.S. EPA’s Indoor Air Quality Tools for Schools Program*



- Levels in virtually all classrooms exceeded OEHHA's exposure level (1.3 parts per billion-ppb) for irritant effects and OEHHA's one-in-a-million excess lifetime cancer risk level (0.13 ppb) for formaldehyde. However, these levels of formaldehyde in homes and offices virtually always exceed these levels as well, and it is generally not feasible to achieve levels below these guideline levels, because outdoor levels near schools average about 3-5 parts per billion.
- Portables often are sited with their ventilation units and air intakes facing roadways and parking lots, which may account for the higher counts [of particulate matter] in some of the portables.

The Modular Building Institute has a free best practices resource available to school administrators, facility managers, and the public in general. Our “Portables Toolkit” can be downloaded from our homepage – www.modular.org.

Other public resources include:

From the U.S. Environmental Protection Agency’s Indoor Air Quality Reference Guide: <http://www.epa.gov/iaq/schools/tfs/guidej.html#Indoor%20Air%20Quality%20and%20Portable%20Classrooms>

Here are tips from the EPA when commissioning a portable classroom:

- Prior to occupancy of any new portable units, operate HVAC systems at their maximum outdoor air intake rate continuously for several days. Start the “flush out” as soon as the HVAC system is operational, and continue after furniture installation. During this period, do not re-circulate return air. In humid climates, avoid introducing significant amounts of moisture during the flush out.
- Measure the amount of outdoor air entering the outdoor air intake of the HVAC unit to ensure it meets or exceeds the amount specified or 15 cfm per person, whichever is greater.
- Do not “bake out” the unit. “Bake out” is defined as increasing temperatures up to 100°F in order to “artificially age” building materials. Effectiveness of this procedure has not been proven and it may in fact damage parts of the HVAC system or building components.

About MBI

Founded in 1983, the Modular Building Institute is the only, international, non-profit trade association serving non-residential modular construction. Our regular membership includes wholesale manufacturers, direct manufacturers, and dealers of commercial modular buildings, while our associate members are companies supplying building components, services, and financing to the industry. It is MBI’s mission to grow the industry and its capabilities by encouraging innovation, quality, and professionalism through communication, education, and recognition. MBI also administers an educational foundation. For more information, visit modular.org.

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¹ References taken from the Report to the California Legislature, *ENVIRONMENTAL HEALTH CONDITIONS IN CALIFORNIA'S, PORTABLE CLASSROOMS*, A joint report submitted by: California Air Resources Board, California Department of Health Services Pursuant to Health and Safety Code § 39619.6 (Assembly Bill 2872, Shelley, Statutes of 2000), November 2004, pp 8-13.