

## STATE BUILDING CODE INTERPRETATION NO. I-34-00

June 12, 2000

The following is offered in response to your May 30, 2000 request for a formal interpretation of the Indoor Air Quality requirements of the 1996 International Mechanical Code portion of the 1999 Connecticut Building Code.

**Question #1:** “Chapter 4 of the International Mechanical Code (adopted into Connecticut Code) lists Common Ambient Air Pollutants at specific levels matching those by which the EPA defines acceptable air.”

“Does this mean that whenever ambient air is polluted to levels above those listed, ambient air introduced for ventilation purposes must be cleaned to at least that tabulated hazardous content?”

**Answer #1:** Sections 403.2 and 403.3 of the above referenced code set forth the requirement that in mechanically ventilated buildings, unless allowed by exception, outdoor air shall be introduced at the rates established by Table 403.3. The assumption is that the outdoor air is of an acceptable quality. Section 403.4 states that “Where the concentration of common contaminants in the outdoor air exceeds the levels indicated in Table 403.4, air filtration, other means for the removal of contaminants, or a combination of air filtration and other means of removal of contaminants shall be employed to bring the outdoor air quality into compliance with this section.” It is fundamental that the outdoor air being utilized to ventilate indoor space must be less contaminated than the indoor air. If it is determined that the outdoor air contains contaminants in excess of the values in Table 403.4, the outdoor air must be filtered, cleaned, conditioned or otherwise decontaminated to comply with the maximum levels in Table 403.4.

**Question #2:** “Chapter 5, of the International Mechanical Code tells us that whenever air is contaminated to 1% of the STEL (short term exposure limit) for hazardous gases, that air must either be exhausted, or cleaned prior to recirculation. We read this in conjunction with the listed contaminants of Chapter 4, that should uncleaned air be admitted and concentrated by the recirculation action of an HVAC system, that air must be cleaned to an acceptable level prior to recirculation.”

“Have we correctly understood the Codes intent with respect to the recirculation of contaminated air?”

**Answer #2:** No. The section to which you refer, Section 510 – Hazardous Exhaust Systems, does not pertain to mechanical ventilation of occupiable space, but rather to the specific application of hazardous exhaust systems designed to remove flammable vapors, corrosive fumes, combustible dusts and similar hazardous materials. The air collected by such a system is to be conveyed to the outdoors per Section 510.1 of the code, which does not allow for recirculation of such air, whether cleaned or not. 510.4 of the referenced code contains the statement “Contaminated air shall not be recirculated to occupied areas unless contaminants have been removed”, which is in direct conflict with Section 510.1. In view of this, recirculation of contaminated air can only be approved in accordance with Section 105 of the code, with appropriate documentation.

**Question #3:** “Chapter 4, Includes an Exceptions Clause which allows reductions in the Tabulated Outside Air for Ventilation Rates for engineered systems which clean air. For HVAC systems which recirculate substantial quantities of air and effectively clean not only ambient air pollutants, but nuisance biological “people emissions” as well, we see only carbon dioxide content as the only restriction as to how much air can be recirculated and how much must be replaced with

outdoor air. Having no specific Code published carbon dioxide limitation, we default to ANSI/ASHRAE 62-1989 (the parent document for the IAQ relationships of the International Mechanical Code) for a value for an acceptable carbon dioxide limit.”

“ANSI/ASHRAE 62-1989 the Ventilation for Acceptable Indoor Air Quality Standard cites a FIRST GUIDELINE of 1/10 TLV as listed by the ACGIH. May this value be used in determining the outdoor air ventilation rates during a BROWN AIR episode when air cleaning must be applied within an engineered HVAC system?”

**Answer #3:** There is no direct reference to the standard you cite within the referenced code. The use of a standard not referenced by the code can only be by modification to the code approved by the State Building Inspector or his designee. While it may be permissible to utilize the stated value, it is not mandated by the code.

**Question #4:** “The above is applicable for new construction which post dates the May 1999 incorporation of the above mentioned IAQ provisions into Connecticut construction law. How does it impact “grandfathered” buildings when renovations to HVAC systems are made?”

**Answer #4:** Please see the answer to question #3.

**Question #5:** “The EPA furnishes records stating that last year there were only ten days where ozone levels exceeded the acceptable level within urban locations within the State. Other years had higher levels. New power sources, although built to EPA set emissions standards, will add to present pollution levels making future pollution forecasts different from present data.”

“Does this override the “rarely happens” argument used for “wink-crime” non-compliance with respect to the IAQ provisions of the Code?”

**Answer #5:** Section 403.4 of the referenced code must be complied with, and air filtration and/or other means for the removal of contaminants must be utilized when there is proof that the concentration of common contaminants in the outdoor air exceeds the levels indicated in Table 403.4.

**Question #6:** “Must air cleaning provisions be built into any central HVAC systems for buildings within the States urban regions?”

**Answer #6:** No. Such provisions are only required when there is proof that the concentration of common contaminants in the outdoor air exceeds the levels indicated in Table 403.4.

**Question #7:** “BROWN AIR (the description of air pollution conditions) episodes invariably coexist with thermal peak temperatures and air cleaning requirements can be applied, through the codes Exemptions Clause, to reduce air conditioning energy.

“Is the Exemptions Clause provided to help offset any increased costs in HVAC systems for air cleaning equipment?”

**Answer #7:** The intent of the exception to Section 403.2 is to allow the code official to approve an engineered ventilation system that will perform as well as that prescribed by Section 403.3. The emphasis is on equivalent performance and air quality, not on economy or reduction of energy.

## STATE BUILDING CODE INTERPRETATION NO. I-34-00 (Revisited)

August 24, 2000

The following is offered in response to your letter to me dated August 1, 2000, in which you rephrased a question previously asked as Question #2 in Interpretation I-34-00. My response is based on the 1996 International Mechanical Code portion of the 1999 State Building Code.

**Question:** “Whenever, indoor air contains contaminants at levels above the 1% of the STEL (short term exposure limit) for health hazard gases, must that air be either cleaned for recycling, or exhausted to preclude the recirculation of contaminated air?”

**Answer:** No. The 1996 International Mechanical Code portion of the 1999 State Building Code contains provisions for the prevention of contaminants entering the indoor air environment, but does not contain the language to which you allude in your question. The code requires either natural or mechanical means of ventilation of indoor spaces (in certain circumstances mechanical ventilation must be provided). When mechanical ventilation is provided, a certain portion of the ventilation supply must consist of outdoor ventilation air. The code, at Section 403.4, requires the removal of existing contaminants in outdoor air in excess of the limits set forth in Table 403.4 prior to its introduction into the indoor environment. In addition, the code states at Sections 401.9, 402.3 and 502.1, that where required, exhaust systems shall be provided to discharge air from local contaminant sources such as machines, equipment and processes to the outside of the building. The presumption is that the combination of required outdoor air (de-contaminated where required) and required exhaust systems at the source of contaminants will result in acceptable indoor air quality. The code does not, however, make the statement that whenever indoor air contains contaminants at levels above 1% of the STEL for health hazard gases, such air must be cleaned or exhausted.