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Project Summary

Air Infiltration Measurements Using Tracer Gases: A Literature Review

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The report gives results of a literature review of air infiltration measurements using tracer gases, including sulfur hexafluoride, hydrogen, carbon monoxide, carbon dioxide, nitrous oxide, and radioactive argon and krypton. Sulfur hexafluoride is the commonest tracer gas, primarily because its presence may be accurately measured in the parts per billion range, while most of the other gases used may be accurately measured in the parts per million range. The report describes a computer-controlled injection system.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

The use of tracer gases for the measurement of air infiltration into structures and interzonal flows within a structure is not new. This technique has been investigated over the past 15 years. Numerous tracer gases have been used, among which are sulfur hexafluoride, hydrogen, carbon monoxide, carbon dioxide, nitrous oxide, and radioactive argon and krypton. Sulfur hexafluoride is the most common tracer gas of choice—primarily because its presence may be accurately measured in the parts per billion range using electron capture/gas chromatography techniques. Most of the other gases used may be accurately measured in the parts per million range using infrared technology.

There are generally three types of methods used: tracer gas decay, constant concentration, and constant injection. Investigations comparing tracer gases have led to the following conclusions: (a) Even though sulfur hexafluoride is appreciably heavier than air, mixing is not a problem; and (b) The inherent uncontrollable variables present in tracer gas work limit the accuracy of determinations to ±5–10%. There is thus no reason why one tracer gas should be selected over another provided other criteria are met. In the case of hydrogen, diffusion of the gas through the surrounding walls can pose a problem.

Tracer gases may be used in air flow measurements in large buildings where the building may be treated as several coupled zones. In such a case, the decay technique can still be used by having the system repeat the injection at regular intervals. A computer-controlled injection system is described in the full report.

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***David C. Sanchez** is the EPA Project Officer (see below).*
The complete report, entitled "Air Infiltration Measurements Using Tracer Gases: A Literature Review," (Order No. PB95-173225; Cost: $17.50, subject to change) will be available only from
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5285 Port Royal Road
Springfield, VA 22161
Telephone: 703-487-4650
The EPA Project Officer can be contacted at
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