ANSI/ASHRAE Standard 105-1984 (RA 99)
(Reaffirmation of ANSI/ASHRAE 105-1984 with minor editorial changes)

ASHRAE® STANDARD

AN AMERICAN NATIONAL STANDARD

Standard Methods of Measuring and Expressing Building Energy Performance

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Standard Methods of Measuring and Expressing Building Energy Performance

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ANSI/ASHRAE 105-1984 (RA 99)
Standard Methods of Measuring and Expressing Building Energy Performance

(This foreword is not part of this standard but is included for information purposes only.)

FOREWORD

ANSI/ASHRAE/IESNA Standard 90.1-1989 *is now the minimum standard practice for the design of energy-efficient buildings and serves as the basis for energy codes in almost all states. Standard 90.1, in addition to the prescrip-tive path of compliance, is also a performance standard through the use of either Section 10 or 11. Use of the per-formance alternative requires, however, the prior specification of a building that complies with the prescriptive path. Some designers and organizations have expressed interest in a "pure" performance standard, expressed as some target level of energy consumption.*

ASHRAE believes that the most effective target level for a given building is that obtained by intelligent choice of building system components meeting the criteria of Standard 90.1. We also recognize, however, that there are few large bodies of data on building energy performance, and those that exist often express that performance in incompatible ways. Typical expressions of energy performance have been: site energy—without regard for energy form or state of conversion; "source"energy—without regard for type of energy resource; annual utility bills—without regard for local prices, etc. Each of these is often "normalized" by dividing by building floor areas, which may be gross or net rentable space, ignoring the significant differ-nces between large and small buildings.

ASHRAE Standard 105 is intended to provide a uniform basis for reporting energy use. Claiming compliance with this standard when reporting the energy performance of an existing or a proposed building requires the reporting of the "raw" normally measured data for each form of energy used as delivered to the building, regardless of its conversion state or degree of refinement. Compliance also requires the reporting of sufficient information about the building, its uses, the local climate, and the calculation or measurement process used so that those receiving the data can apply their own desired analysis or comparison. This standard is classified as an ASHRAE Standard Method of Measurement .

This standard requires energy performance reporting of each energy form separately in the conventional units of purchase. While it is possible to add different energy forms using one of several possible conversion bases (site energy, source energy, cost, social impact, etc), this standard does not address or acknowledge that there is an appropriate way to add different energy forms or different energy sources[1]. If the user of ASHRAE Standard 105 does not report each energy form separately, compliance cannot be claimed.

This standard does not establish an energy performance standard but does, in Section 7, address the establishment of a performance standard database. That procedure has been followed, for example, by the U.S. Department of Energy, using computer performance of "typical" buildings in various climatic zones. Section 7 of this standard establishes some minimum criteria for a building energy performance database. The underlying concerns are that any performance standard be derived from buildings similar in function, energy mix, climate, and energy form to those the standard is intended to cover and that the number of buildings in the database be a reasonably statistically significant quantity.

1 ASHRAE has established a technical committee to research energy resources but has not established any method to compare either site energy or source energy. It is not within the scope of this standard to anticipate these findings.

1. PURPOSE

1.1 The purpose of this standard is to provide a consistent method of measuring and expressing the energy performance of buildings and to provide minimum requirements for and aid in the formation of a building energy performance database.

This standard is intended to foster a commonality in reporting the energy performance of existing or proposed buildings to facilitate comparison, design and operation improvements, and development of building energy performance standards.

2. SCOPE

a. This standard requires (1) the measurement of energy use for existing buildings and (2) for proposed buildings, the reporting of only those data that could be measured in an existing building.

b. This standard specifies techniques for measuring and expressing the energy performance of buildings.

c. This standard defines minimum requirements of the database required for use in building energy performance standards.

d. This standard provides a consistent, uniform method of reporting predicted or measured energy used to determine energy performance.

e. This standard does not establish building energy goals, limits, or performance data.

f. This standard does not present a method for certification of prediction methodology, such as computer programs.

3. DEFINITIONS

conditioned: heated and/or cooled; provided with a positive heat supply to maintain air temperature of 50°F [10°C] or higher, or provided with a positive cooling supply to maintain air temperature of 86°F [30°C] or lower.

degree-day [kelvin-day]: a unit, based on temperature difference and time, used in estimating fuel consumption and specifying the nominal heating load of a building in winter. For any one day, when the mean temperature is less than 65°F [18°C], there are as many degree-days [kelvin-days] as there are degrees Fahrenheit [degrees Celsius] departure of the mean temperature for the day from 65°F [18°C].

energy: the capacity for doing work. Energy comes from many sources including:

(a) fuels used for their energy value, as in steam and electric generation, process heating and cooling,