

Automatic Pedestrian Doors and Energy Efficiency Codes

Introduction

Manufacturers of automatic swinging, sliding, and folding pedestrian doors are sometimes being asked to provide information about “thermal transmittance” and “air leakage” (sometimes referred to as “air infiltration”) performance. This information is usually requested as a result of energy efficiency requirements found in an adopted code document or job specification.

This AAADM Technical Bulletin will explain the subject including quantified code requirements. In particular, air leakage requirements for automatic swinging, sliding, and folding pedestrian doors have been clarified beginning with the 2018 International Energy Conservation Code (IECC) and the 2019 edition of ASHRAE 90.1.

Background

U-factor and air leakage are two of the primary energy efficiency attributes of many fenestration building products, including automatic pedestrian doors.

- *U*-factor is a measure of heat transmittance. The lower the *U*-factor value, the less the component transmits heat (i.e., the better it performs). A code official or a design professional may request a product's *U*-factor for prescriptive compliance or to help determine the *U*-factor for the entire building envelope. For automatic pedestrian doors, *U*-factor can be determined either through physical testing and simulation or a calculated area-weighted average (see AAADM Technical Bulletin #106) based on specific details about the door and glass construction.

- Air leakage is a measure of the total air flow in cubic feet per minute per square foot of door area. Compliance with air leakage requirements is mandatory. Automatic pedestrian doors, like other exterior building products, must be tested in order to determine air leakage rating.

Typically, automatic pedestrian doors are used in commercial applications. Where installed in the exterior building envelope, they may be subject to the provisions of either the IECC or ASHRAE 90.1 depending on which of these documents is being enforced or specified. In these documents, automatic pedestrian doors are classified as “fenestration” products, meaning that they contain greater than 50% glazing. The Climate Zone of the installation, which affects the *U*-factor requirement, is usually known by the code enforcer or specifier.

Automatic Pedestrian Doors and U-factor

In the 2018 edition of IECC, as in previous editions, the applicable *U*-factor requirements are found in Table C402.4. Automatic pedestrian doors are in the “entrance doors” category, thus the maximum *U*-factor requirement varies from 0.77 to 1.10 depending on Climate Zone.

In the 2019 edition of ASHRAE 90.1, as in previous editions, the applicable U-factor requirements are found in Tables 5.5-0 through 5.5-8 which are divided by Climate Zones. Automatic pedestrian doors are in the “entrance doors” category, thus the maximum U-factor requirement varies from 0.63 to 1.10 depending on not only Climate Zone but whether the building is fully conditioned or semi-heated.

For both documents, the higher maximum numbers with respect to fixed and operable fenestration are due to allowances involving ADA requirements and design for repetitive use.

Automatic doors and their unique configurations and means of operation were not considered when the energy conservation codes were developed. As a result, automatic doors are not listed in the codes, and the automatic door industry faces some challenges.

Automatic Pedestrian Doors and Air Leakage

In the 2018 IECC, the applicable air leakage requirements are found in Table C402.5.2. For the first time, commercial glazed swinging entrance doors, power-operated sliding doors, power-operated folding doors, and revolving doors are required to meet a maximum of 1.0 cubic feet per minute per square foot (CFM/SF) of door area. “Swinging doors” and “sliding doors” continue to be required to meet a maximum of 0.2 CFM/SF of door area, but this requirement has been meant in prior IECC editions to apply to manual operation for each of those door types.

In ASHRAE 90.1-2019, the applicable air leakage requirements are found in Table 5.8.3.2. Also for the first time, glazed swinging entrance doors, glazed power-operated sliding entrance doors, glazed power-operated folding doors, and revolving doors are required to meet a maximum of 1.0 CFM/SF of door area. This requirement is consistent with the 2018 IECC, and brings clarification to automatic pedestrian door requirements.

In both the IECC and ASHRAE 90.1, fenestration air leakage performance is based on testing to ASTM E283 at a pressure of 1.57 pound per square foot.