

doors & hardware

ADVANCING LIFE SAFETY & SECURITY SOLUTIONS

CODE CORNER: *Required Clearances—Not So Clear*

By Lorin Neyer, Fire Marshal, Office of Statewide Health, Planning and Development, State of California

Q: Can astragals and threshold sills be used to fill excessive gaps at meeting edges and undercuts?

A: Exceeding clearances required by the National Fire Protection Association's NFPA 80 Standard for Fire Doors and Fire Windows is probably the most common deficiency noted in the field for door installations. Unfortunately, this can be a difficult problem to overcome after floor finishes are installed. I'll address undercuts and Threshold plates or sills are considered in NFPA 80, Table 1-11.4, where the requirements for "Clearances Under the Bottom of Doors" can be found. Sills are not required where there are noncombustible floors (1-11.2); the maximum clearance under a swinging door with no sill is 3/4", as measured to the noncombustible floor. When a condition is found in the field where that maximum is exceeded, often the proposed "fix" is to add a sill. But the same door with a sill is required to have no more than 3/8" from the bottom of the door to the raised sill.

With those clearance requirements in mind, let's take, for example, a door with an undercut of 1" over a concrete floor. The contractor will inevitably ask, "Can I put in a sill to fill the gap?" Since the sills are limited to 1/2" in height to comply with the building codes and the Americans with Disabilities Act (ADA), adding a 1/2" sill will still leave a 1/2" gap at the bottom, which exceeds the 3/8" permitted by Table 1-11.4. Obviously, this is not the answer for this condition.

Will I really write up a door for being only 1/8" over what is allowed? Yes. Minimums are minimums for a reason. Someone smarter than me figured out what the minimum is; my job is only to verify that the installation complies with the code.

There is a product available that may help in this condition, commonly called a door shoe. The door shoe also has its limitations. Routinely accepted by the authority having jurisdiction (AHJ) where the undercut is between 1/4" and 1/2", the door shoe will still need to have the air space in the gap filled with the door material. The door manufacturer should be consulted on the limitations of door shoes on any given door, and you'll need to check with the AHJ as to acceptance of this product in lieu of meeting the code.

Have you ever seen a building inspector or fire inspector looking at a closed door and trying to stick two quarters around its edges? How about standing inside a room with the lights off looking for light around the edges that may be coming from the corridor? If you have, that may have been me! Those are the unofficial field tests for ensuring that door clearances around the edges are met. Two quarters face to face happens to be 1/8". As for the light test, the theory here is that if you can see light around a door, smoke will likely find its way around it as well. The next time you stay in a hotel, try this with your room door. The results may surprise you.

The other clearance requirement that seems to be a problem for many installations is the "meeting edges." NFPA 80, Section 2-3.1.7 provides that the "...meeting edges of doors swinging in pairs on the pull side shall be 1/8-inch \pm 1/16-inch for steel doors and shall not exceed 1/8-inch for wood doors." In a nutshell, this means the door needs to squarely fit in the frame.

For a myriad reasons, in new construction and in existing buildings, the frames get out of square. In new construction, I see the frames take a beating from construction carts, wheel barrels, material deliveries, and premature removal of the stabilizer bars. In older buildings, settling may have occurred, or there may be a new door going into an existing frame that just doesn't fit right.

Whatever the reason, the clearance requirements are pretty clear. It is the methods of repair that get interesting. For a single door, shims can be used to help square up the door. (Metal shims only for the fire doors, please! Save the plastic shims and matchbooks for the non-rated doors.) When the frame is actually twisted in the opening, the shims will sometimes accentuate the problem, preventing the door from closing or latching. The most popular request here lately for a fix for single doors with excessive gaps is the intumescent seals that are widely used for meeting the positive pressure requirements. This is not an approved fix. The door actually has to meet the clearance requirements regardless of the seals or gaskets that are added.

On pairs of doors, the 1/8" maximum gap between the doors is often a challenge to achieve while maintaining the required edges on the perimeter. This is another case where the contractor will inevitably ask, "Can I put an astragal in the center to fill the gap?" Again, sorry—no. I'll repeat here for clarity: the door actually has to meet the clearance requirements regardless of the seals or gaskets or astragals that are added. Very few doors require an astragal to meet code, but there are a few. When an astragal is provided, the meeting edge requirements still apply.

I hope this helps to clear up the clearance issues. Until everyone involved with the installation of doors understands these requirements, I'll be out there with my two quarters checking the clearances. And yes, I will write up 1/16" over the maximum!

Copyright© 2002 by The Door and Hardware Institute. All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by an information storage or retrieval system, without permission in writing from the Publisher.



The Door and Hardware Institute, 14150 Newbrook Drive, Suite 200, Chantilly, VA 20151-2232;
703/222.2010; Fax: 703/222.2410; www.dhi.org.

Lorin Neyer is a Fire Marshal for the Office of Statewide Health, Planning and Development in California, providing fire and life safety plan review and field inspection of health care facilities in a six-county area. She was previously Assistant Fire Marshal at the University of California, Santa Barbara. A Certified Fire Instructor II with the State of California, Ms. Neyer has been an instructor for the California and Colorado Fire Academies since 1990 and currently serves on the California Building Standards Commission "Code Partnership 2000" committee as a member of the Fire Code Sub-Committee. She is also a member and past Co-Chair of the Fire Service Education Committee for the California Fire Prevention Officers Association.

REPRINTED WITH PERMISSION from the June 2002 Issue of Doors and Hardware magazine.