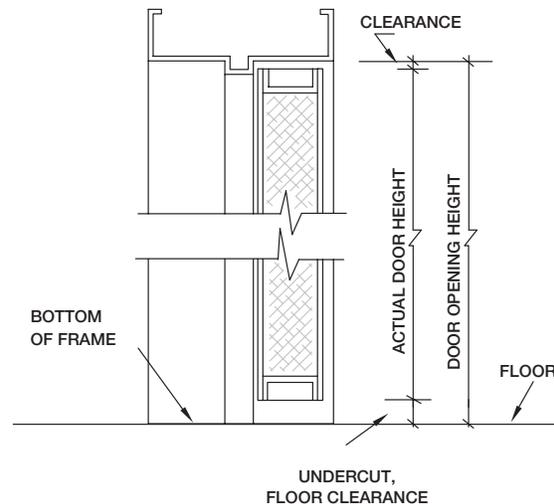


## Defining Undercuts

Review of established definitions.

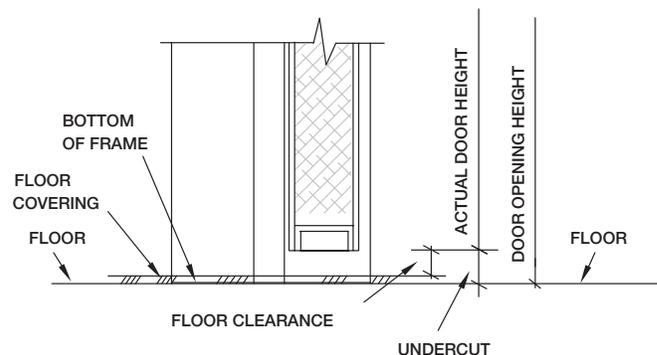
1. **“ACTUAL DOOR HEIGHT”** – The door opening height minus top clearance and undercut.
2. **“DOOR OPENING HEIGHT”** – The distance measured vertically between the frame head rabbet and top of floor or bottom of frame minus jamb extension.
3. **“FINISHED FLOOR”** – See “Floor”
4. **“FLOOR”** – The top of the concrete or structural slab.
5. **“FLOOR CLEARANCE”** – The distance between the bottom of the door and the top of the material directly below the door. This varies with application, such as concrete, any floor covering and/or a threshold.
6. **“FLOOR COVERING”** – Any material applied on top of the floor that extends under the door in its closed position or under the door as it swings to its fully open position.
7. **“UNDERCUT”** – The distance between the bottom of door and the bottom of frame. The formula in which to determine Undercut is derived by adding the total sum of the following (Floor Clearance + Floor Covering Thickness + Threshold Height (assuming the threshold is mounted on top of the floor covering) + Jamb Extensions Height).
8. **“JAMB EXTENSIONS”** – That portion of a jamb or mullion which extends below the level of the floor.

Typically frames are intended to be installed directly on the floor. When no floor coverings or thresholds are used, the dimension for “Undercut” is the same as for “Floor Clearance.” See Figure #1.



**Figure #1**

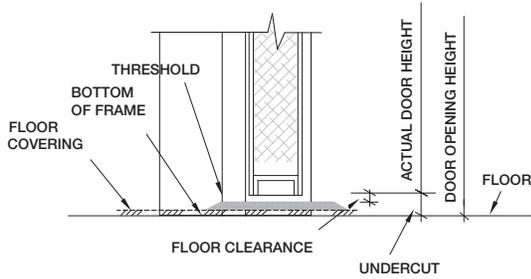
Floor coverings, such as carpet, resilient or ceramic tile, are typically installed on top of the floor, fitted around the frame, and under the door. In this situation, the formula for figuring Undercut is the total of the Floor Clearance + Floor Covering Thickness. See Figure #2.



**Figure #2**

When a threshold is used, it is installed on top of the floor or floor covering, fitted around the frame and under the door. Again the formula for figuring “Undercut” changes. Undercut is the total of the

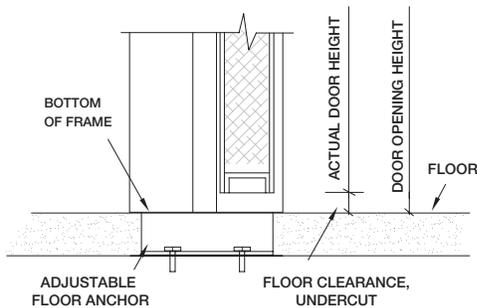
Floor Clearance + Threshold Height + Floor Covering Thickness. See Figure #3.



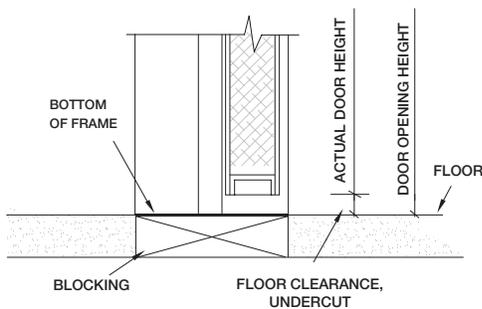
**Figure #3**

In situations with specialized floors such as thick ceramic tile or terrazzo, the frame is typically installed prior to the installation of the floor.

One method is to install the frame with adjustable floor anchors or for the frame to be installed on a block or shim. This allows the frame to be positioned, as required, to accommodate the floor height. See Figures #4A and #4B. Both illustrate a raised frame condition in which the bottom of frame is positioned to be directly on top of the floor after the floor is installed. In this situation, the dimension measured for Undercut is also the same as Floor Clearance.



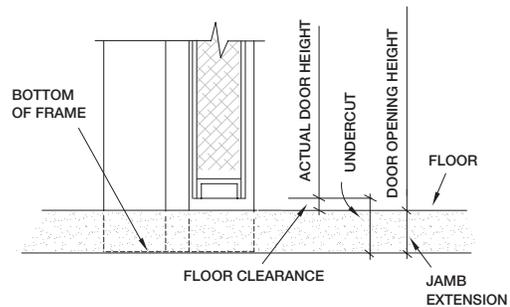
**Figure #4A**



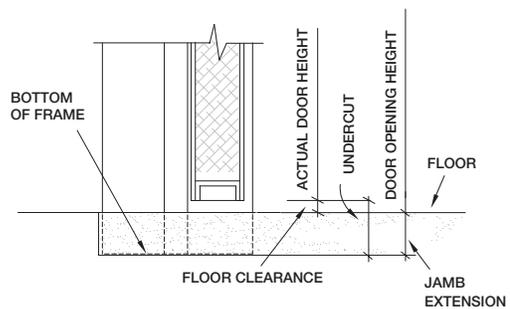
**Figure #4B**

Another method, called “below floor installation,” is to install the frame directly on the rough slab. After the frame is installed, the floor is then installed around the frame. That portion of the

frame that is covered by the floor is called jamb extensions. The formula for figuring “Undercut” is the total of the Floor Clearance + Jamb Extensions. See Figure #5A and #5B.



**Figure #5A**



**Figure #5B**

The Architect/Designer must be very specific within specifications and contract drawings, which should include detailed drawings illustrating conditions for each floor, including thicknesses and materials. These drawings should designate the height at which the hollow metal frame should be set. Thresholds and hardware items requiring specific floor clearances shall be listed in the hardware schedule, which allows the door and frame manufacturer to properly size each opening.

Within the door and frame industry, both the Hollow Metal Manufacturers Association (HMMA) a division of the National Association of Architectural Metal Manufacturers (NAAMM) and the Steel Door Institute (SDI), publish recommended clearances. In addition, the National Fire Protection Association (NFPA) Publication 80, “Standard for Fire Doors and Fire Windows,” regulates the installation and maintenance of labeled openings, and lists several different scenarios consisting of different floor material and the maximum clearance under the bottoms of doors.