

Entering the Commercial Market

by Glenn Mathewson

Building a deck on a restaurant or other commercial establishment can be a great way to expand your business, but if you are a contractor accustomed to residential work there are significant code differences to be aware of. The movement and expectations of people as they interact with buildings play a tremendous part in the planning and design of public places. It can be surprising how many variables exist that limit the overall design of a deck at locations such as a restaurant, a day care, or an apartment complex.

Most districts regulate residential construction with some version of the International Residential Code, whereas for other classes of construction, they use the International Building Code. Though the IRC is based on the IBC, many differences exist.

Buildings and structures are categorized by occupancy type: Assembly, residential, business, and educational are some examples. Throughout all building codes, requirements vary by occupancy. At a restaurant, which is an assembly occupancy, the basic

design of a deck will be regulated in a much more specific manner than it would be at a home.

One of the driving forces behind the more specific regulations for commercial establishments is the need to provide safe egress for all the expected occupants. In codes for single-family homes, there is little to no consideration made for the size of the building or the expected occupant load (the number of people that may be inside).

In a commercial establishment such as a restaurant, however, the nature of

Residential vs. Commercial Code				
Component	2006 IRC	IRC Section	2006 IBC	IBC Section
Maximum rise (straight stairs)	7.75"	R311.5.3.1	7"	1009.3
Minimum rise (straight stairs)	no minimum	n/a	4"	1009.3
Minimum run (straight stairs)	10" w/nosing, 11" w/o	R311.5.3.2	11"	1009.3
Solid riser	not required	R311.5.3.3	depends on use	1009.3.3
Minimum stair width	36"	R311.5.1	depends on occupancy	1009.1
Landing depth (direction of travel)	36"	R311.5.4	width of stairs, max 48"	1009.4
Landing width	width of stairs served	R311.5.4	at least stair width	1009.4
Minimum guard height	36"	R312.1	42"	1013.2
Guard opening limitations	0" to 36", 4" sphere	R312.2	0" to 34", 4" sphere 34" to 42", 8" sphere	1013.3
Handrail adjacent abrasive elements	permitted	n/a	not permitted	1012.6
Handrail extensions	not required	n/a	required	1012.5
Handrail interruptions at newel posts	interruption permitted	R311.5.6.2	interruption not permitted	1012.4
Stair handrail, when required	four or more riser stairs	R311.5.6	all stairs	1009.10
Stair handrail location	one side	R311.5.6	both sides, intermediate	1009.10
Step at doors	permitted	R311.4.3	depends on occupancy	1008.1.4
Live load on deck	40 psf	Table R301.5	depends of occupancy	Table 1607.1
Live load on stairway	40 psf	Table R301.5	100 psf	Table 1607.1
Exception to foundation frost depth	when self-supported	R403.1.4.1	no exception	1805.2.1
Elevation changes in walking surface	not regulated	n/a	regulated	1003.5

STRUCTURE

the building's occupancy is highly scrutinized. The size of the building dictates the maximum allowable occupant load, which then determines the minimum width of all the exit components. A restaurant deck may be part of the exit, the exit discharge, or the exit access; all three of these components have differing requirements.

In general, the basic design of a deck at any commercial establishment, including apartments, is most appropriately the job of a registered design professional, or at least needs the helpful review of the jurisdiction's plans examiner. Requirements can be difficult to determine, so don't take this article as anything more than a general overview.

Commercial Code Differences

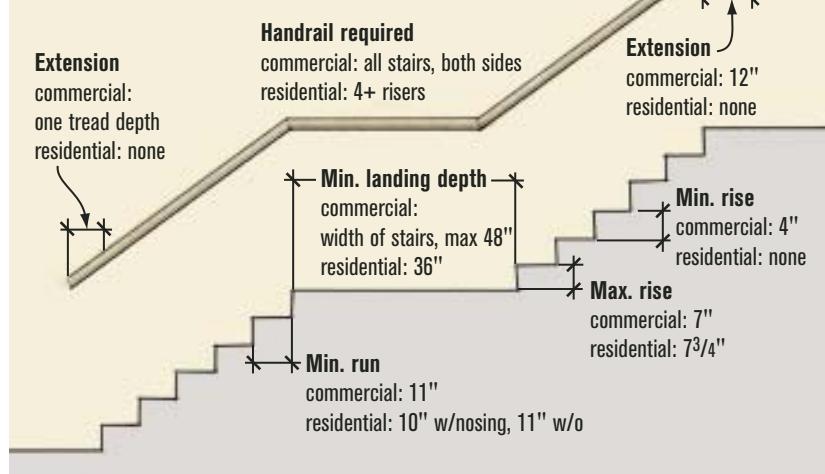
One aspect of deck construction that varies considerably is the geometrical limitations of stairs and stairways. When considering stairway requirements, keep in mind that a single change in elevation is considered a stair and requires a top and bottom landing; a stairway consists of all stairs and landings required to traverse from one floor level to another.

The general rule for commercial-use stair runs is a minimum 11-inch run, measured from tread nosing to tread nosing (see **illustration**). Width of a commercial stairway is based on total occupancy and whether the stairs are part of the accessible means of egress. Residentially, a simple 36-inch minimum width is required.

Landing depth is measured in the direction of travel, generally perpendicular to the last tread. In commercial applications the depth must be at least equal to the stairway width, but need not be greater than 48 inches.

Guards in commercial settings are required to be 42 inches high. The "4-inch-sphere rule" for the maximum size of an opening applies only up to

Commercial vs. Residential Stair Requirements



Many of the differences between residential and commercial codes surround stair geometry.

the height of 34 inches. For the top 8 inches of the guard, between 34 and 42 inches above the deck, the maximum size of an opening is larger — it can't allow passage of an 8-inch sphere.

If the stairway handrail is mounted on or adjacent to a brick or stucco exterior or any other "abrasive surface" it may be considered a violation of the IBC.

The IBC requires handrail extensions at the top and bottom of stairs when the handrail doesn't connect to the handrail of a lower or upper set of stairs. The top extension must extend horizontally for a minimum of 12 inches beyond the top rise and the bottom extension must extend sloped beyond the last tread for a horizontal distance equal to the tread depth.

In addition to the requirement for handrails on both sides of commercial stairways, there are times when an intermediate or center handrail may be required. Based on the minimum required width of a commercial stairway, as dictated by occupant load, no portion of that width can be more than 30 inches from a handrail. This means that if the minimum width for a stairway is 61 inches, an intermediate handrail is required.

Live loads that must be resisted by

structural elements can significantly affect the size of material selected for the project. For the deck, the minimum live load at commercial establishments depends on the type of occupancy the deck serves. In most commercial jobs, including restaurants, stairway minimum live loads are 100 pounds per square foot, more than 100 percent greater than the minimum load of 40 psf for residential decks.

For the foundation or piers supporting the deck, there is a convenient exception to depth below frost in the IRC: In residential applications, if the deck is not supported by the dwelling, such as with a ledger, then the foundation is not required to extend below the frost depth; this exception does not exist in the IBC.

Though changes in elevation on residential decks are not generally restricted, there can be many factors that restrict changes of elevation on commercial decks. While multi-level decks are attractive to homeowners, in public settings they may create safety hazards and limit occupant mobility. ♦

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