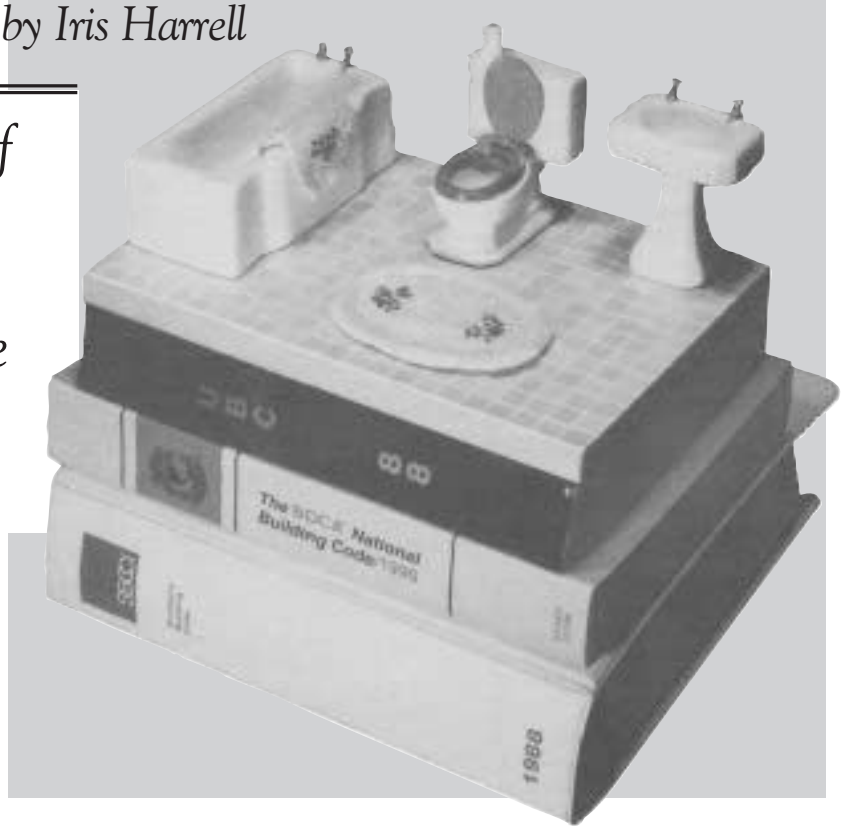
Bringing the Bathroom Up to Code

by Iris Harrell

A clear understanding of the rules will help you build safely and keep the inspectors happy



As a contractor in California, I have the dubious pleasure of conforming to some of the strictest code interpretations in the country. Builders and remodelers here comply with Title 24, a collection of recent model codes amended by various state agencies with current seismic, safety, energy, accessibility, and other requirements. The result is codes that are often more restrictive than what's published by the model code organizations. I also think it's just a matter of time before building codes become as strict in other states.

The 1992 version of Title 24, as it relates to bathrooms, is based on the Uniform Building Code (UBC), published by the International Conference of Building Officials. Plumbing requirements are adapted from the International Association of Plumbing and Mechanical Officials' Uniform Plumbing Code (UPC), which is a companion code to the UBC. Electrical references are from the National Fire Protection Association's National Electric Code (NEC). Generally speaking, the requirements of these codes are similar to, and often the same as, the other model codes.

In the following sections, I've provided some insight into bathroom codes as well as information on some of the lesser known requirements of Title 24. Not all of these will pertain to all parts of the country, so I've included references to other regional codes (see "Key to Code References," next page). I've also described some acceptable ways to meet these regulations. Finally, several of the items I've described are not required by code, but are essential to minimize callbacks and make the bathroom safer.

Review Plans With an Inspector

During the design phase of a bathroom remodel, I imagine myself building that bathroom with the most adamant inspector peering over my shoulder, and I design accordingly. It's not as much fun as letting fly with all your wildest ideas, but it's infinitely more practical.

All codes have gray areas subject to interpretation by the inspector. To guard against surprises, I check out anything that's unusual or questionable in my design with the strictest inspector in town. For example, I'm especially thorough about checking out any expensive custom parts and European products before I order them.

Answering questions is part of the inspector's job, and I've never found one who wasn't willing to help out. Sometimes I call with my questions, but in many cases I take the plans down in person and ask them to have a look. This not only ensures accurate information, it also means you avoid phone tag, endless busy signals, and all the other irritations that come when you're trying to catch busy inspectors. It also helps build a personal relationship with the inspector and gets them involved in the job before they come to see us for that first inspection.

I've found that the best time to talk with inspectors is early in the morning or late in the afternoon. Since most of them are overworked, I try to be brief and to the point. Working with inspectors this way involves some extra steps at the front end of the job, but it saves time and money in the end.

Many of the codes that pertain to bathrooms are logical and easy to find. But some items are little known or may be hidden in other parts of the code and require some detective work.

Shower Size

The UPC requires that you have a minimum of 1,024 square inches

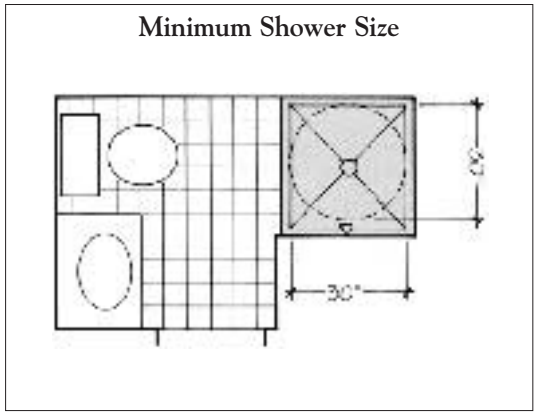


Figure 1. *The Uniform Plumbing Code requires a minimum of 1,024 square inches of shower area, and also that a 30-inch sphere can fit throughout the entire height of the shower.*

in the entire shower area and that you are able to fit a 30-inch-diameter sphere throughout the full height of the shower (see Figure 1). Both of these rules are true regardless of the shower's shape. This can be difficult to achieve when you are exchanging a tub for a shower since some of the old tubs measure 30 inches or less in width. If this is the case, depending upon how the tub is situated in the room, you'll probably need to fur out the walls at either end of the tub so there's enough room for the new curb.

Code References:

Shower Size
NPC-1216.4, 900 square inch minimum; UPC-909(d).

Shower Enclosures

Shower doors must open out. They may open in as well, but if someone falls in the shower, the door must open out so you can get to the person. Many architects and designers don't know this until their plans get red-marked by the building department.

By now, all of the model codes require that shower enclosures be made from safety glass. If that glass is tempered, the word "tempered" must be etched or otherwise permanently marked on each piece of glass. In the past, companies were printing up labels that said "tempered," and dishonest builders and glass contractors were sticking them to glass that really wasn't tempered. However, for laminated glass (a glass-plastic sandwich) a sticker is sufficient.

Shower walls must be impervious to water up to 70 inches above the drain. This usually isn't a problem, but we've gotten stuck in the past with wood windows. If you have one lower than 70 inches, you may have to pull it out. We have tried painting the trim with a marine-type paint, but this won't be approved by some inspectors.

Code References:

Shower Doors
UBC-5407

Glass Shower Enclosures
SBC-2703.2; NBC-2203.2; UBC-5406 (d).

Waterproof Shower Walls
SBC-2002.3; NPC-1216.4; UBC 510(b).

Water-Resistant Drywall

Code requires water-resistant gypsum board (often referred to as green board) in showers and tubs. All of the codes allow contractors to set tile on green board, but I think this will change soon. The material is not stiff enough to serve as a good substrate, and once water gets into it, water-resistant board will crumble. The Gypsum Association says proper maintenance of the tub area (regrouting any spots where the grout is missing, caulking around faucets and the tub lip, and so on) will prevent significant water entry. But I've seen too many tile walls fail that had a green-board substrate (see Figure 2).

A better choice is one of the cementitious backerboards, such as Wonderboard (Glascrete, 13001 Seal Beach Blvd., Seal Beach, CA 90740; 800/272-8786) or Durock (U.S. Gypsum Corp., 125 So. Franklin St., Chicago, IL 60606; 800/621-9622). A proper vapor barrier is a must with backerboard.

Figure 2. *A worker removes ceramic tile from a crumbling green-board substrate in a tiled whirlpool bath. The failed substrate will be replaced with cement backerboard.*

We used to hang leftover sheets of green board on the ceilings, but code now prohibits this. According to the Gypsum Association, the material sags unless it is attached to framing that's a maximum of 12 inches on-center. Because the material's core and face paper is treated for water repellency, it doesn't possess the same strength as standard gypsum board.

Water-resistant board also cannot be used over vapor retarders or in areas subject to continuous high humidity, such as saunas or steam rooms. When green board is used over a vapor barrier, moisture collects between the retarder and the board. Since that moisture has nowhere to go, it slowly soaks and degrades the water-resistant board.

Code References:

Water-Resistant Drywall
SBC-1803.4; UBC-4712.

Hand-Held Showerheads

These are popular with our clients, but some of the models don't pass code because they lack an antisiphon valve. Without this valve, dirty water can backflow into the pure water lines if the showerhead is allowed to dangle into a full tub. Manufacturers don't always supply the antisiphon valve as a standard feature because it brings up the price of the unit.

If you purchase a unit without an antisiphon valve, install the hand-held showerhead so that, fully extended, it falls at least one inch above the tub's overflow valve. Otherwise the inspector will ask that the plumber install an access panel and put an antisiphon valve in the lines — a small but annoying expense.

Code References:

Hand-Held Showers
SPC-1204.3.4; NPC-1223.1.2; UPC-1003(n).

Key to Code References

Code Body	Document Name	Abbreviation
International Conference of Building Officials (ICBO) (5360 So. Workman Mill Rd., Whittier, CA 90601)	Uniform Building Code Uniform Plumbing Code	(UBC) (UPC)
Building Officials and Code Administration International (BOCA) (4051 W. Flossmoor Rd., Country Club Hills, IL 60478)	National Building Code National Plumbing Code	(NBC) (NPC)
Southern Building Code Congress International (SBCCI) (900 Montclair Rd., Birmingham, AL 35213)	Standard Building Code Standard Plumbing Code	(SBC) (SPC)
National Fire Protection Association (NFPA) (Batterymarch Park, Quincy, MA 02269)	National Electric Code	(NEC)

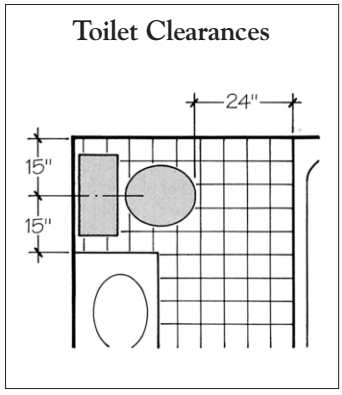


Figure 3. *California code requires a front clearance of 24 inches and 15 inches to each side (left). Where space is tight, the author uses this 1.5-gallon toilet made by Kohler (right).*

Whirlpool Tubs

These require an access panel so the motor and electrical parts can be serviced. It's important to remember this when you're still in the design stage. Since most of my clients don't want to see this panel, I often put the motor in a remote location, usually inside the vanity or closet.

But the inspectors have something to say about this, too. You cannot install any shelving in front of the access panel. The worry here is that people will pile all kinds of stuff on the shelves and the plumber or the electrician won't be able to find the access. There's also some concern that the items put on the shelves may be combustible.

Here is a good example of one of the gray areas in code enforcement: Some inspectors will permit shelving as long as it's removable. It may be worth having a delicate discussion with the inspector before you rule it out. Your customers will certainly be happier with more shelf space.

Code References:

Whirlpool Access Panels
SPC-923.1; NPC-1221.2; UPC-912.

Toilets and Bidets

If you could draw a line down the center of the toilet bowl, code requires you to have at least 15 inches of space to either side of that line (see Figure 3). When there's space, I allow at least 18 inches to either side. This is more comfortable, especially for those who are stocky. You also need 24 inches of space in front of the toilet. I use the same dimensions for a bidet.

California is one of several states that require ultra low-flush toilets in new construction and remodeling. You can apply for an exemption if your plumbing system is incompatible with low-flush toilets (usually due to low water-pressure).

There is a good deal of controversy about low-flush toilets. Some people argue that, because the waste isn't always fully evacuated on the first flush, some models require two flushes, negating the water savings. I've also heard plumbers complain about the lines getting clogged when there isn't sufficient water pressure and slope to pull the waste all the way through.

I've had good results with the Kohler Wellworth-Lite and the Kohler Rialto (Kohler Co., Kohler, WI 53044; 414/457-4441). Both of these are 1.5-gallon toilets. The Rialto is especially nice because it is not as large as other varieties and fits into small spaces where we're pushing to meet that 24-inch code limit.

Code References:

Toilet Clearances
SPC-903.5, no frontal minimum; NPC-1204.2 requires 18 inches to the front; UBC-511(a) or UPC-907.

Bathroom Lighting

While Title 24 requires light switches to be at least 5 feet from

Watch Your Step: Stairs in the Bathroom

Stairs leading up to a tub or whirlpool can be very dramatic — and very unsafe as well. We don't build them often, but on those occasions when stairs are part of the design, we do all we can to make them as safe as possible.

The model codes have little to say about bathroom stairs. Some inspectors apply the same rules as those used to design stairways leading from one floor level to another. But most consider bathroom stairs decorative, so few rules apply.

Bathers Beware

After a long soak in a tub full of hot water, many people feel light headed or may even black out as they exit the tub. This condition, known as hypotension, is an abrupt lowering of blood pressure that occurs as you move from a prone position to standing. The hot water exacerbates the problem so that the reeling sensation strikes just as people are about to take that first step down the tub stairs.

While there's nothing we can do to prevent hypotension, we can help bathers steady themselves by providing grab bars, nonslip flooring, and other safety items.

Railings. According to California's Title 24, if there are more than three risers, you need a handrail. But this is one of those gray areas. Inspectors have different ideas about what constitutes three steps and what

constitutes two steps and a landing. So play it safe and include at least a grab bar anytime you have fewer than three steps.

The vertical distance from the nose of the steps to the center of the handrail must fall between 30 and 34 inches, according to Title 24. The rail should be 1 1/2 inches away from the wall to allow room to grasp it, and the rail should not be smaller than 1 1/4 inches or larger than 2 inches in diameter. This is especially important since there are some beautiful handrails that don't meet code. If you have any questions about what your client selects, take a sample to the inspectors for their advice.

There are a few grab bars available that don't look like they belong in a hospital. Check with local bath showrooms for the best selections. Some of the manufacturers have grab bars that match their faucets. I've also used the clear plastic variety, although one inspector wouldn't pass it for fear it would shatter like glass.

As for the best place to put the grab bar, there are different opinions. Some people position one at an angle along the stairs as a substitute for a handrail. But the critical area is the point where you enter and exit the tub (that's when you're on one foot). So I put the grab bar at the end of the tub where the bathers get in and out. If you want to really be safe, install both a grab bar and a handrail or two grab bars, one at the tub and one along the stairs.

Risers and treads. Based on California code, risers can be a maximum of 8 inches and treads can be a minimum of 9 inches. I've found it's safer to use lower risers, usually only 4 to 7 inches, and treads should be at least 11 inches. You can make them even wider so they double as a seat surrounding the fixture.

The steps should be of uniform size. Code does not permit a size variation of more than 3/8 inch in the riser or the tread. If you've ever climbed steps with a greater variation, you know it's an easy way to hurt yourself.

We often use a different tile color on the risers so that the elevation change is clear (see photo). You can even install low-voltage lighting under the nosing to further emphasize the location of the steps.

Flooring. Almost any kind of flooring will be slippery when it gets wet and soapy. This is especially true of tile. As a rule, the glossier the tile, the more slippery it will be. Some manufacturers, including Dal-Tile (7834 Hawn Fwy., Dallas, TX 75217; 214/398-1411), make abrasive tile with grit embedded in the surface. Another option is to use unglazed ceramic mosaic tiles (which are hard to keep clean and have no water resistance) or to install nonslip strips, available at most hardware stores.

— I. H.

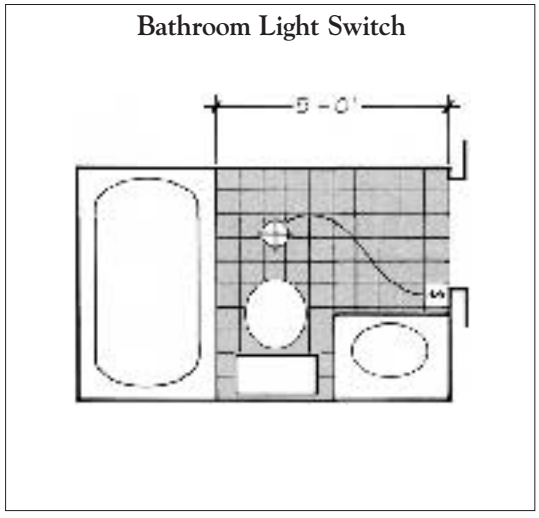


Figure 4. *California's Title 24 requires light switches to be located at least 5 feet from a whirlpool or shower.*

the whirlpool or shower (see Figure 4), different inspectors have found different interpretations. We have put light switches much closer than 5 feet, as long as they were connected to a ground-fault circuit interrupter. We've also found discrepancies in the way that 5 feet is measured: Some inspectors include the distance around the shower door while others measure straight from the edge of the shower stall. What they're trying to prevent is people standing in 3 inches of water and operating the light switch. It's best to find out how the inspector will rule before you start wiring.

Certain parts of the bath may be designated as either "damp" or "wet." Again, this is subject to some interpretation, but it affects the type of lighting you can use in that area. For instance, a tub and shower combination is considered a wet location. (An example of a damp location is a tub with no shower.) So recessed lights over a tub/shower combo must include a vapor-proof lens cover. The goal here is to keep water from splashing inside the fixture. Also, homeowners have been known to change the light bulb while standing in the shower.

There is a sticker on the light or packaging that says whether the fixture is approved for a damp or wet location. As a rule, lighting that's approved for wet locations can go in damp locations, but usually not vice versa.

One of the newer energy-oriented amendments to Title 24 requires a fluorescent light in each new bathroom. That fluorescent fixture must be the main light, and it must be operated by the first switch inside the door. The idea is to save energy, but many designers are not excited about working this into their plans. Even though there are many different colors and fixtures available, fluorescent lighting has a bad reputation. I've had good luck with full spectrum and daylight fluorescent tubes. Both of these create a bright, natural light. I normally put the fixture over the vanity area.

Code References:

Wet Location Lighting
NEC-410

Ventilation

There's just no substitute for fresh air. That may be part of the philosophy behind the fact that code does not require a fan in bathrooms with at least one window or skylight. But since people don't always open that window, especially in the dead of winter, I recommend putting a fan in anyway. Doing so is a good way to avoid callbacks for things like mildewed grout and wallpaper.

If you use a fan that doesn't sound like a Volkswagen coming through the bathroom and put it on a timer, your customers will be more apt to use it (see Figure 5). I like NuTone's QT-80 and QT-9093 (NuTone Inc., Madison and Red Bank Roads, Cincinnati, Ohio 45227; 513/527-5100). The latter is a combination fan, heat source, light, and night light. Both of these have low sone ratings: The QT-80 is 1.5 and the QT-9093 is 2.5 sones. (See "Choosing Kitchen and Bath Exhaust Fans," *Kitchen & Bath*, 2/92.)

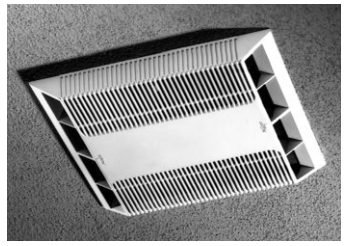


Figure 5. *Clients will be more likely to use the bathroom exhaust fan if you install a quiet one, like this model from Nutone.*

Plumbing Vent

The vent pipes must be at least 10 feet from the nearest operable window or skylight. This is, of course, to keep odors and sewer gases, which are potentially dangerous, from being sucked back into the house. But you can't put that vent 10 feet away from an operable skylight when the bath is only 5x8 feet. You can raise the vents 3 feet higher on the roof, but most people don't want to see it, especially at the front of the house. The other, more costly, alternative is to dogleg the vent through the attic and out.

Code References:

Bathroom Plumbing Vents
SPC-1404.4, must be 10 feet away or 2 feet above the roof; NPC-904.2, same as SPC; UPC 506(b).

Grab Bars and Antiscald Valves

These two items are not mandatory in bathrooms, but, budget permitting, I try to include them anyway. As a designer, it's my responsibility to make the bathroom safe as well as attractive. As a builder, I know there are plenty of lawyers out there trying to make a living off people who are injured due to negligent building practices.

Grab bars. These are not mandatory unless there are steps up to the tub (see "Watch Your Step: Stairs in the Bathroom," previous page). But the National Kitchen and Bath Association (NKBA), in its recent publication, *27 Rules of Bathroom Design*, recommends installing a grab bar in the tub and shower to facilitate entry and exit (see Figure 6).

Antiscald valves. The NKBA also suggests that all showerheads be protected with some type of antiscald device. I would expand this to include bath faucets as well, since children can easily reach the levers, turn on the water, and burn themselves. ■

Figure 6. *Though not required by code, the National Kitchen and Bath Association recommends installing grab bars in tubs and showers to help prevent falls.*

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