Installing Trench Drains in Curbless Showers

Many consumers and professionals in the design and building industries are aware of the advantages of curbless showers. Each year, more and more curbless showers are being requested in residential settings. Despite the recognized advantages, many architects, builders and homeowners are reluctant to install a shower without a center drain and a 2- to 4-inch dam or threshold.

Several misperceptions may be at the root of this reluctance. One is that water cannot be contained in the shower and may leak out into the room or saturate the subfloor. A second misperception is that curbless showers are primarily an institutional option.

What is a Trench Drain? A long narrow trough that runs along the open side of a curbless shower. Water flows across the shower floor into the “gutter” (or trench) and into a standard drain. The trench is covered with a metal or plastic grate, flush with the shower and room floor. This Tech Sheet shows suggested installation details in two different construction types: wood frame and structural concrete slab.

Advantages of Trench Drains. Since trench drains are an effective method of controlling water, especially if waterproof membranes are used and correctly installed, designers and builders can be more confident that unwanted water infiltration will not occur.

A shower floor with multiple compound slopes to a center drain is difficult and unsafe for many people, e.g., a person unsteady on his or her feet or someone using a freestanding shower chair or a shower wheelchair. When curbless showers are constructed with a trench style drain, compound slopes in the shower floor can be eliminated and a stepless entry provided. A floor with a single slope is safer for most users and makes it possible to install the same tile size throughout the bathroom and shower.

Tech Sheet

Growing Acceptance. In the US, curbless showers with trench drains have been installed for years in some special use occupancies. Internationally, they are a commonly accepted and aesthetically integrated residential option. More attractive examples of curbless showers using quality finishes are being built and publicized, contributing to a growing appreciation for this bathing option.

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Trench Drain
Wood Frame Construction

Suggested Detail: Wood Frame

- gravel over weep holes to protect from mortar
- L-shaped ¼" x 3" x 3" continuous clips lag bolted at 24" o.c.
- ¾" exterior grade plywood
- membrane clamping collar w/ weep holes
- PVC drain body
- coupling w/ stainless steel clamps (Fernco or similar)
- bushing, solvent weld
- PVC pipe
- membrane clamped into drain body
- male adaptor
- drain line (connected to drain waste and vent system)
- ceramic tile
- full mortar bed (shower floor)
- waterproof membrane
- stainless steel grate
- high density polyethylene trench drain (Zurn Z884 perma-trench or similar) 4-¾" shallow drain system
- slope tile 1/4"-1/8":12" max
- flush threshold from room into shower
- conventional horizontal tile joints
- cut 2nd row of tile to accommodate slope of full base cove
- critical: minimum 1" mortar bed thickness at this point
- thinset system in dry area (room floor)
- there may be some deviation from this illustration based on the architect or builder's designed joist location
- shower and trench may be isolated within structural floor system to allow varied drain locations
- waterproof membrane--extend several feet under room floor
- Recommended: extend membrane under entire bathroom floor and turn up 4" at all walls. Consider adding an upturned sleeve at toilet drain.

Remember:
- Suggested Detail: Wood Frame
- use membrane clamping collar w/ weep holes
- check with architect or builder for designed joist location
- gravel over weep holes to protect from mortar
- try to keep slope to 1/4"-1/8":12" max
- flush threshold from room into shower
- conventional horizontal tile joints
- cut 2nd row of tile to accommodate slope of full base cove
- critical: minimum 1" mortar bed thickness at this point
- thinset system in dry area (room floor)
- there may be some deviation from this illustration based on the architect or builder's designed joist location
- shower and trench may be isolated within structural floor system to allow varied drain locations
- waterproof membrane--extend several feet under room floor
- Recommended: extend membrane under entire bathroom floor and turn up 4" at all walls. Consider adding an upturned sleeve at toilet drain.

Refer to the detailed illustration for visual representation.
Trench Drain
Structural Concrete Slab

Critical: minimum 1" mortar bed thickness at this point. Create "trench box" deep enough to accommodate fittings required to transition from outlet to drain. Thinset system in dry area (room floor). Waterproof membrane—extend several feet under room floor. Recommended: extend membrane under entire bathroom floor and turn up 4" at all walls. Consider adding an upturned sleeve at toilet drain.

Suggested Detail: Concrete Slab

Quality materials and careful installation must be used to ensure a leak and maintenance free shower. Curbless showers must include waterproof membranes, non-slip floor materials, and no abrupt change of level greater than $\frac{1}{4}$ inch.

The drain assembly, excluding the trench and grate, can be fabricated using common plumbing parts for less than $75$.

Membrane should be clamped into the drain body.

Shower floor slope should not exceed $\frac{1}{8} - \frac{1}{4}$ inch per running foot.

As with all shower installations, caulk should never be used as a primary leak prevention method.

Cast or molded trenches are best. A sampling of sources includes: Strongwell, Zurn, and ACO Polymer Products, Inc.

Common materials for grates include stainless steel, fiberglass, and plastic. Grates should be light enough to remove easily for cleaning.

Prefabricated curbless shower units with built-in trench drains are not as durable as custom-built designs. It is strongly recommended that a waterproof membrane be used even when installing a prefabricated unit. See *Curbless Showers: An Installation Guide* (available at [www.centerforuniversaldesign.org](http://www.centerforuniversaldesign.org)).

A sampling of sources for prefabricated shower units includes: Comfort Design Bathware (design development underway) and Watermark Solid Surface.

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Sample Bathroom Plan with Curbless Shower and Trench Drain

Meets the requirements of both the NC Accessibility Code for Type A Units and the NC Housing Finance Agency’s Qualified Allocation Plan (QAP). Smaller bathroom designs are possible when full accessibility is not needed. See the QAP Bathroom Tech Sheet on the CUD website for other options.

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