

TRENCH DRAIN

High Time for a Primer on Lowly Trench Drains

New technology gets its comeuppance.

BY RACHEL RUHL

Ah, the lowly trench drain. It's one of the very last considerations yet the first to go in and the foundation for all to follow.

Every building foundation begins with one absolute certainty — drainage is needed to control or reduce water runoff, as well as the intentional elimination of fluids generated within the structure.

Drains come in many shapes, designs and sizes, all based on use and intent — both indoors and out. One of the most effective means of assuring proper drainage, especially when higher volumes of fluids are involved, is the trench drain.

There are two primary reasons to specify trench drains:

- **Faster removal of surface water.** In courtyards, amphitheaters, sports complexes and other high-traffic areas, rainwater needs to drain quickly to avoid ponding, which can be a nuisance and a safety hazard.
- **Reduce travel distance to the drainage point.** For indoor applications, such as auto dealerships, sanitary manufacturing plants, breweries, distribution facilities and other businesses that wash floors daily, this is an important consideration. Directing daily wash-downs to a line of trench drain is an efficient way to keep floors sanitary and safe.

A History of Drainage

Let's start at the beginning, shall we? The trench drain made its debut

with poured keyways. In these applications, concrete is formed into a channel with a ledge (hence, "keyway") to support the grating. But formed-concrete channels deteriorate over time. Heavy traffic causes the ledge supporting the grating to chip, making the grates unstable.

Next came polymer concrete trench drains. The manufactured channels eliminate the need for field-forming and have a high compressive strength, making them extremely durable. But the material is heavy and difficult to work with. Aligning, leveling and stabilizing is time-consuming and expensive.

Composite plastic trench drains came next. Early versions offered some advantages as they were lightweight and easier to handle than polymer concrete. But because plastic lacks compressive strength and structural stability, heavy traffic causes stress in the plastic. This means that channels deform and can separate from the surrounding concrete.

However, they've come a long way since their introduction.

Today, composite plastic trench drains come in many sizes, shapes and designs. They can be used outdoors for surface drainage — from drainage systems designed for residential driveways to large, rugged

systems intended to solve water run-off problems at the world's busiest airports.

Even indoor applications as microbrewery managers have learned that trench drains are an ideal companion to large, interior containers requiring regular washing.

Trench drains may be a single foot in length to thousands of feet long. They may drain to a single point or at many connected points along the length of an extended drainage system.

"There's little question that the technology has since come a long way," says Roy Hetzler, product specialist at Watts. "Our engineers have married the compressive strength and long-term performance of polymer concrete trench drains with the ease of handling and installing plastic trench drains."

Drain Specifics

Standard commercial-grade trench drain systems are pre-sloped, typically at a grade of 0.7 percent. A sloped system is occasionally required to increase flow velocity but the slope primarily assists with flushing. A sloped system helps carry debris and keeps the channel clean. It is a critical design feature in areas where organic debris can accumulate and create health hazards, such as animal shelters, food manufacturing facilities and pool decks.

Common trench drain systems have a nominal width of either 6 in. or 12 in., although other widths are available.

For indoor applications, a 6-in.-wide trench drain is typically sufficient, such as where drains are primarily used for floor washing.

Outdoor installations receiving rainwater run-off may require a wider trench drain. Those positioned at the bottom of loading ramps and similar sloped areas also will receive large flows.

Trench drain gratings are chosen to

accommodate anticipated traffic. Heavy vehicles with small wheels (forklifts and construction equipment) and those traveling at high rates of speed (airplanes and roadway traffic) create the heaviest traffic loads on a trench drain.

A SLOPED SYSTEM HELPS CARRY DEBRIS AND KEEPS THE CHANNEL CLEAN.

In areas with pedestrian traffic, designers often specify grating that complies with the Americans with Disabilities Act (a maximum of 1/2-in.-wide slots perpendicular to the traffic flow) or heel proof (a maximum of 5/16 in. grate openings).

Material Matters

Unfinished areas with heavy traffic (such as warehouses and vehicle service facilities) commonly use cast- or ductile-iron grating. Iron grating shows rust after time but it is purely cosmetic and doesn't impact the grating's strength or durability.

Stainless-steel grates prevent bacteria growth, so they are often used for sanitary purposes, in facilities such as food manufacturing or service facilities.

Polypropylene grating is non-metallic, which makes it the best choice for animal shelters, pet-care facilities and barefoot traffic around swimming pools.

Composite plastic trench drain is lightweight and easier to handle than polymer concrete. Polypropylene and high-density polyethylene plastics are most commonly used and have interchangeable properties for the majority of applications.

Plastic lacks compressive strength, so channel design is important. Heavy traffic can stress plastic channels, causing them to misalign and eventually separate from the surrounding concrete. Adding protective frames will not eliminate load stress.

Applications Tell the Story

Toronto, Ontario-based Thorncrest Ford built a new service garage to assist its rapidly growing business better. The 3,000-sq.-ft. customer reception center is a double-bay garage that accommodates up to eight vehicles and has all the bells and whistles — including Watts Dead Level trench drains, which



Installers review the plan for a Dead Level trench drain at a FedEx facility in Virginia. Photo credit: Watts Water Technologies

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combine the compressive strength and long-term performance of polymer concrete models with plastic trench drains' ease of handling.

The plumbing and mechanical contractor said he appreciated the Dead Level systems' design around the structural frame — not around a plastic channel — so that when the trench system is loaded, the load is transferred into the concrete, where it's supposed to go.

The service garage can accommodate any size vehicle without worry of the drains breaking under the weight. The drains easily keep up with all the snow and slush coming in on vehicles.

Another type of trench drain — made of stainless steel, with a wide variety of functional and decorative grates — is designed specifically for use in the food and beverage industry, where hygiene is critical.

USE AND FUNCTION ARE AMONG THE FIRST CONSIDERATIONS WHEN SELECTING A TRENCH DRAIN.

Lacking corners or inside cavities to harbor bacterial growth and with resistance to a wide range of cleaning chemicals, these drain systems are unaffected by high-temperature cleaning or steam disinfection.

MadTree Brewery in Cincinnati

chose to install Blücher HygienicPro trench drains in its new 50,000-sq.-ft. brewhouse. While the old brewhouse trench drains required 25 gal. of water to clear in four minutes, the new HygienicPro trench drains use only 1 gal. of water to clear in 17 seconds.

"The design and engineering of the drains made them stand out," notes Mike Stuart, MadTree director of people and social strategies. "They proved to easily evacuate any waste going down the drain and used way less water in doing so."

Different Needs

Contemporary trench drains must meet a lot of different needs, notes Bushra Ghaly, engineering manager for drainage products at Watts. Use and function are among the first considerations when selecting a trench drain.

"But it's important to note that a wide variety of trade professionals can influence selection," he explains. "Specifying engineers are sure to scrutinize trench drain structural stability and long-term performance. On the other hand, installing contractors require functionality and fast, uneventful installations."

And business or building owners typically are concerned that the finished product is appealing, durable and easy to maintain, he adds.

Another part of the equation: wholesale distributors. When it comes to trench drains, they're looking for the simplicity of ordering and stocking, as well as competitive pricing. Of course, lightweight products have an advantage but they also must be durable, easy to install and exceed the functional expectations of both installers and building owners/managers.

Hetzler says that, for the most part, the material cost for trench drains of different manufacturers is very similar.

"Where building owners save money is in installation time and labor cost," he explains. "Labor charges can be triple the material cost, which is why ease of installation can be the make-or-break point after a contractor bids the job. And that depends on the products specified and the engineering that goes into them." ●

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An inspection team examines a Blücher stainless-steel drain system at a large commercial facility.
Photo credit: Watts Water Technologies



Dead Level trench drains are set in place before the concrete pour at an athletic facility in Texas.
Photo credit: Watts Water Technologies

