

## FLOOR DRAINS

Floor drains remove waste water and accumulated debris from floor areas and direct it to waste lines for discharge into the sewer system.

Floor drains are designed to quickly discharge clear waste liquids into sewers; to accumulate and hold debris where necessary and direct it to proper interceptors; to provide adequate drainage regardless of traffic loads; to provide drainage in locations where aesthetic considerations must be satisfied; to provide drainage facilities in floor construction of complex design or structural limitations.

The selection of proper floor drains for small buildings where floors are not subject to heavy or specialized traffic is relatively simple. There are however, numerous types of buildings which have unusual drainage problems and require special analysis to select proper drainage equipment:

In **hospitals** the floors and utility areas must be kept scrupulously clean, requiring study of number and type of drains. Floor drains must have attractive metal tops and finishes to blend into the architectural design, yet be strong enough to support cart loads in corridors, therapy areas, kitchen and serving sections, and other specialized rooms. Drain interiors with acid resisting enamel finish are recommended for added sanitation. Mental hospitals require additional specialized drainage equipment. Drains must be made tamper-proof, and in some cases, equipped with integral flushing arrangements.

In **animal treatment and research laboratories and zoological gardens**, specialized drainage must be provided.

In **schools**, adequate drainage must be provided in shower and toilet rooms, corridors, equipment rooms, and areas subject to emergency

sprinkler discharge, and in boiler rooms, shop and yard areas.

In **manufacturing plants, bottling and canning plants** having above normal water consumption, proper waste interception and disposal is essential.

In **food, processing and meat packing plants** where large volumes of water are used in the varied operations, inside traffic loads are heavy, and where special or unusual floor construction is part of the structural design, intensive study is required to insure the installation of adequate drainage equipment.

In **parking garages, car repair shops and service stations**, where oily debris from melting snow and ice causes potential fire hazards, special drains must be provided. Volatile wastes should not be permitted to drain directly to the sewer because of the danger of explosion. Such wastes should be directed into floor drains feeding into interceptors which separate the volatile liquids from the waste water and remove the hazardous fumes through vent connections to the atmosphere.

There are many other building categories requiring plumbing engineering research to insure the best and most functional drainage equipment. There is no universal floor drain. All floor drains are not alike, nor do all floor drains perform the same functions in the same manner. Wade, for over one hundred years has been a pioneer in the functional design of drainage equipment. The selection of type, size and capacity of floor drains for a specific project must be given as much time and thought as other types of mechanical equipment in the building design. A careful study of the functions of the drainage units in the floor drain section will be of value to the engineer in selecting the most suitable products.

## FLOOR DRAIN SIZING

To select the number and size of the drains to be used, one should determine the maximum amount of liquid that might have to be drained from the area involved.

Consideration must be given to abnormal sources such as overflow of fixtures, automatic sprinkler heads and similar items.

### FLOW RATING

The flow rating or capacity of a floor drain is determined by several factors.

#### 1. Size of Waste line

A horizontal branch waste line with normal pitch or slope is capable of discharging only so much liquid from the floor drain to the main sewer line. For example, a 2" horizontal line with a deep seal trap at the drain outlet is capable of conveying from 10 to 25 GPM and the capacity of a 4" line will range from 50 GPM to 150 GPM depending upon the depth of the sump in the floor drain body.

#### 2. Depth of Floor Drain

The deeper the sump of the floor drain, the greater the head of water that may be built up in this sump. This head of water will provide additional pressure to force a greater flow of water through the P-trap and the horizontal branch line. This is the reason for a range of flow rates for a given line size.

#### 3. Grate Free Area

Outlet size and depth of the floor drain body are important in determining the flow rating of a drain. However, if the free drainage area of the grate opening is small, water will build up on the floor. At some point, the head buildup above floor level will produce a flow through the drain that will equal the maximum flow capacity of the horizontal drain line.