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Vertical Dams and Trapdoor Tanks for Dairy Flushing

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Several types of water release devices are used for flushing dairies. These include tower/pipeline valve systems, tip tanks, siphon tanks and vertical dams and trapdoor tanks. This publication will discuss the use of vertical dams and trapdoor tanks for flushing dairies.

Vertical dams

Vertical dams, sometimes called rising dams, are devices placed in the side of a flush tank to release the contained water. The vertical dam is made of plate steel and is raised by a lever and appropriate linkage so that water flows under the dam and out of the tank when the dam is raised (see Figure 1).

Figure 1. Schematic of a vertical dam flush device.

Typically, vertical dams are 8 to 10 feet wide and 3 to 4 feet high. Usually, tanks associated with vertical dams are poured concrete with the frame for the vertical dam cast in place with the wall of the flush tank.

The lever and linkage arrangement on vertical dams provides a 4- to 6-inch opening at the bottom of the dam when the dam is raised. Depending on the width of the gate and the depth of the tank, discharge rates with vertical dams can be as high as 10,000 gallons per minute. Such rates make vertical dams suitable for flushing wide (16- to 18-foot) alleys.

Vertical dams are slightly wedge-shaped so that they seal tightly in the closed position. When closed, the "over-center" configuration of the linkage maintains pressure against a rubber seal around the perimeter of the dam.

Commercially available vertical dams can be configured for manual operation with a hand lever or pneumatic operation using air cylinders. A disadvantage of vertical dams is that they are usually placed at the upper end of the gutter or area being flushed. Although this placement effectively blocks any traffic in or out of the upper end of the gutter, generally, the rubber seal around the edge of the vertical dam requires periodic maintenance or

replacement from repeated opening and closing.

Trapdoor tanks

Usually, trapdoor flush tanks for dairies are used for flushing relatively narrow alleys such as milk parlors or return alleys. These tanks are constructed of steel in a rectangular or box-like configuration. So, the volumes may be practically limited to 1,000 gallons or less.

Usually, trapdoor tanks are made of 10- to 12-gage steel and coated with a primer and paint to resist corrosion. Usually, tank sizes are 400 to 1,000 gallons. Dimensions may be 2- to 3-feet wide by 4- to 10-feet long by 4- to 8-feet high. Since trapdoor tanks are often placed in existing facilities, one tank dimension must fit through existing doorways or trafficways.

Although trapdoor tanks are simple devices, the mechanical linkages that operate the trapdoor and the seal around the trapdoor are subject to a harsh environment and deterioration. Buy tanks from manufacturers who have experience in the design and construction of trapdoor tanks (see Figure 2).

Figure 2. Schematic of a commercially available trapdoor tank.

Trapdoor tanks may be operated manually with a lever/linkage mechanism to open the trapdoor, or a pneumatic mechanism may be used to open the trapdoor. The pneumatic, compressed-air operated type is generally preferred for dairy flushing. Trapdoor tanks are especially applicable to flushing inside dairy parlors, where Missouri regulations require the use of fresh water for flushing. However, recycled lagoon water can also be used in trapdoor tanks where regulations permit.

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