



# Dairy Effluent: Yard Flood Washing Systems

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***Flood washing systems are the ultimate high volume/low pressure cleaning system. A large volume of stored water from either the plate cooler, fresh water supply or from the 2nd or 3rd storage pond may be used.***

Flow rates for flood washing range on average from 5000 to 20 000 litres per milking. A range of 500 - 1500 litres per metre width of yard is recommended. For effective dislodgment of manure a 50mm minimum depth of flow with a minimum flow velocity of 1 metre per second is required.

There are 2 types of flood washing systems, surface flood washing and pipe & riser flood washing.

## Surface flood washing

There are a number of different ways to surface flood wash yards. These include:

### *A large water tank in the yard*

The tank is filled between milkings. Three to four large outlets and/or hoses (200 to 300 mm diameter) are placed at the bottom of the tank and these are opened together to flood the yard.

If the tank is raised above the yard, the increased head will make the volume of water used in the flood washing system more effective. A drain valve should be fitted for maintenance. As only the top half of the tank is used each flush, a pressure relief valve may be required to prevent pipe damage/water hammer upon valve closure.

### *200 litre flushing drums*

These drums automatically fill and then tip over on a pivot system to wash. They effectively keep the yard wet, but their volume and velocity is not adequate for effective flood washing. Many types of storage tanks can be used and their location can be varied to suit the yard design. A head of at least 2 metres is desirable. These can be installed on existing yards provided that the fall and layout of the yard are suited to flood washing (See Specifications for slope/width/catchment/nibs/drainage.)

## Pipe and riser flood washing

This system needs to be installed at the time of construction. A large supply pipe (300mm diameter or

greater) is laid under the concrete yard and approximately 1 metre down slope from the top of the yard. Riser pipes (100mm to 150 mm diameter) are placed at regular intervals to bring the water from the main up onto the yard. The risers can be spaced according to where manure is expected to accumulate, for example, there may be more risers in the area of entry and exit lanes on the yard.

The water supply to operate the system can be provided by either locating a gravity storage tank beside the yard for large yards to ensure adequate flow.

Alternatively, the main supply pipe can be connected directly to a large pump that draws from a nearby water supply. Pumps should be high volume and low pressure. Axial or mixed flow pumps are recommended.

The advantage of this form of flood washing system is that the flood wash water can be more evenly distributed across the yard, particularly for wider yards.

The disadvantage of this form of flood washing system is that the use of treated effluent can cause problems such as blocking and corrosion of pipes.

## Holding yard design

Yard falls for good drainage and cleaning should be in the range of 1:30 to 1:50. The best fall for flood cleaning of yards is 1:30. Cross yard slope should be only 25mm at the top of the yard and increasing to a greater slope at the bottom to direct the large volume of effluent to the outlet.

Kerb walls of a minimum of 200mm height are needed around the holding yards to contain the yard washing. The sides of the wall should be vertical. Reinforced concrete or two rows of bricks are ideal. The kerb wall should be in line with the inside of the fence posts to make yard cleaning easier. Rounded corners at the end of the yard may also help to contain effluent.

The sump receiving flood washing water must be large enough to hold the volume of water discharged in one operation of the tank. If the sump is to also act as a solids trap it should also be able to hold enough solids to ensure it only needs to be cleaned out every month or six weeks, that is to hold both the water and solid volumes. A contingency plan is required in the case of a pump breakdown.

### Pre-wetting

Pre-wetting the yard during milking helps to prevent manure becoming dried and caked on and enables more effective flood washing. Jetters may be fitted into the yard surface or pipes with holes in it may be placed around the bottom of the yard fence.

Sprays can be used to pre-wet the yard and also to cool the cows in summer. Where sprays are installed they should spray towards the shed entry so cows are not sprayed in their face. A hose should be available for periodic cleaning of the yard if needed.

### Design criteria

Design criteria for setting up flood washing systems are provided in Table 1. The shallower the slope the greater the flow rate needed to maintain an acceptable velocity. The normal slope of dairy yards is 1:30, this is an adequate slope for flood washing, but the slope across the yard should be virtually nil.

The example given in the table below is for a yard slope of 1:200, therefore if the volumes of water from this example are used in conjunction with a yard of 1:30 slope the requirements for water velocity will be easily met for an effective yard cleaning system.

Table 1. Flood washing design criteria

Yard Width (m)	Slope (%)	Velocity (M/Sec)	Flood Volume
10	0.5	2	5000
15	0.5	2	7500
10	0.5	1.5	5000
15	0.5	1.5	7500
10	0.5	1	5000
15	0.5	1	7500

Existing dairy yards which undergo expansion may not be suitable for floodwashing due to inconsistent slopes and

positioning onto the existing yard and therefore may be better adapted to hydrant or hose wash-down systems.

### Cattle considerations

Floodwash tanks are usually positioned at the top of the yard at the entries to the platform particularly in herringbone shed. It is important to take into consideration cattle flow ensuring protruding outlets do not impede cattle flow through the shed.

It is also recommended all outlets and rudders be guarded as cattle injury may occur with cattle bullying and jostling in the yard.

### Acknowledgment

The original note on yard flood washing systems was written by Andrew Crocos 2000

### Further information

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