

Storm Drainage Test Results

American Society of Plumbing Engineers

Research Foundation



**Manufacturer: Froet Industries, LLC**

# Storm Drainage Test Results

## 1.0 Introduction

This document summarizes the results of roof drain testing project performed by the ASPE Research Foundation. The purpose of this report is to communicate the preliminary results to each drain manufacturer. The names of the manufacturers will not appear in the final ASPE report. All drains will be identified blindly.

## 2.0 Test Setup

The drains were tested in the stack and alternate configuration with clear PVC pipes, except for the 5" drain test wherein regular PVC pipes were used. The stack test consisted of a 10 ft straight drop pipe. The stack tests were carried out without drain (pipe only) and with drain configurations as shown in Figure 1.

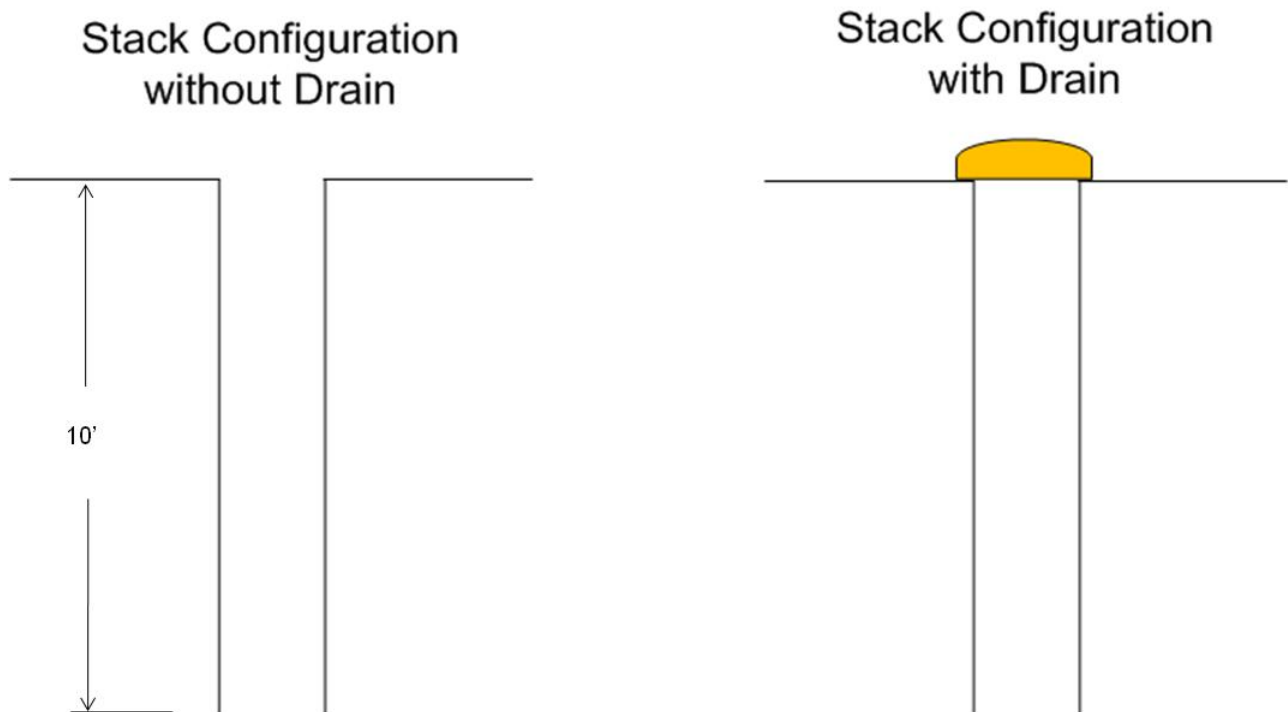
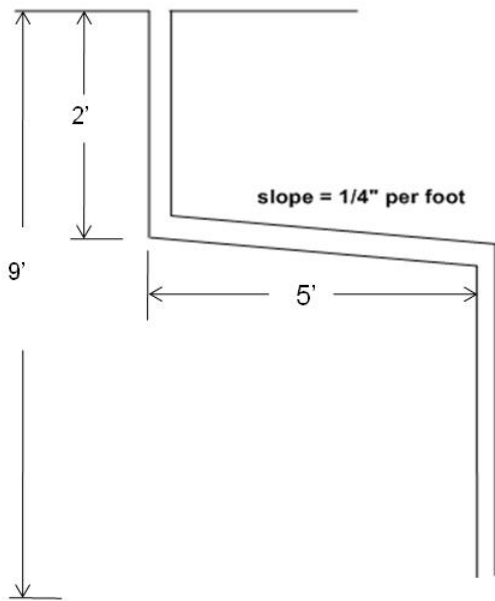


Figure 1. Stack test configuration. Two tests were carried out in the stack configuration, i.e., Pipe only and drain with pipe. First the pipe was tested and then the drain was placed. Flow rate, velocity and pressure readings were taken under steady state conditions.

The alternate configuration consisted of a 2 ft vertical drop, with a 90 degree bend followed by a 5 ft horizontal run and then finally a 4 ft vertical drop. The alternate tests were carried out without drain (pipe only) and with drain configurations as shown in Figure 2.

Alternate Configuration  
without Drain



Alternate Configuration  
with Drain

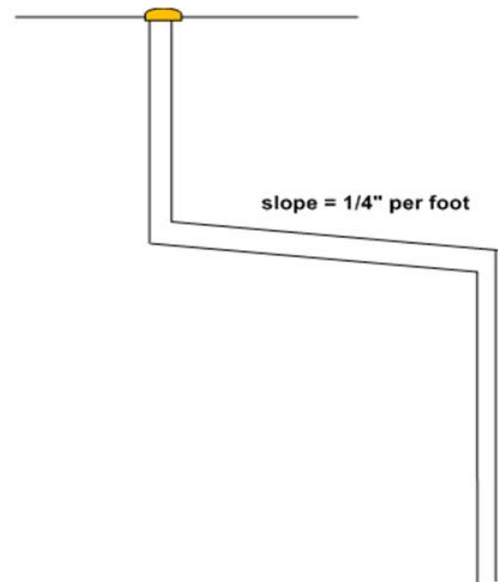


Figure 2. Alternate test configuration. Two tests were carried out in the alternate configuration, i.e., Pipe only and drain with pipe. First the pipe was tested and then the drain was placed. Flow rate, velocity and pressure readings were taken under steady state conditions.

### 3.0 Froet Drain Tested

Froet standard drain 200C4 (4in) was tested. The drain with the flange is shown in Figure 3.



	model	sump diameter	sump height	dome height	profile (dome ht.)	drain	dome
Froet (4" )	200C4	8"	~5"	5"	low profile	cast iron	cast iron

Figure 3. Froet 200C4 (4") standard drain test set up. This drain has a sump diameter of 8" and a depth of ~5". It has a low profile cast iron dome with a height of 5".

### 4.0 Summary of Results

The results of the tests are shown in Tables 1 and 2. Flow rate is shown from head heights 1 in through 8 in.

Table 1. Stack Configuration Test Results: Flow capacity (gpm) as a function of head height and drain size

	Head Height (inch)													
	1"	2"	2.5"	3"	3.5"	4"	4.5"	5"	5.5"	6"	6.5"	7"	7.5"	8"
Drain size: 4"														
Froet 200C4		164	241	345	438	560	646	742	771	791	850	886	878	885

Table 2. Alternate Configuration Test Results: Flow capacity (gpm) as a function of head height and drain size

	Head Height (inch)													
	1"	2"	2.5"	3"	3.5"	4"	4.5"	5"	5.5"	6"	6.5"	7"	7.5"	8"
Drain size: 4"														
Froet 200C4		118	203	361	398	583	609	635	640	637	621	629	630	735



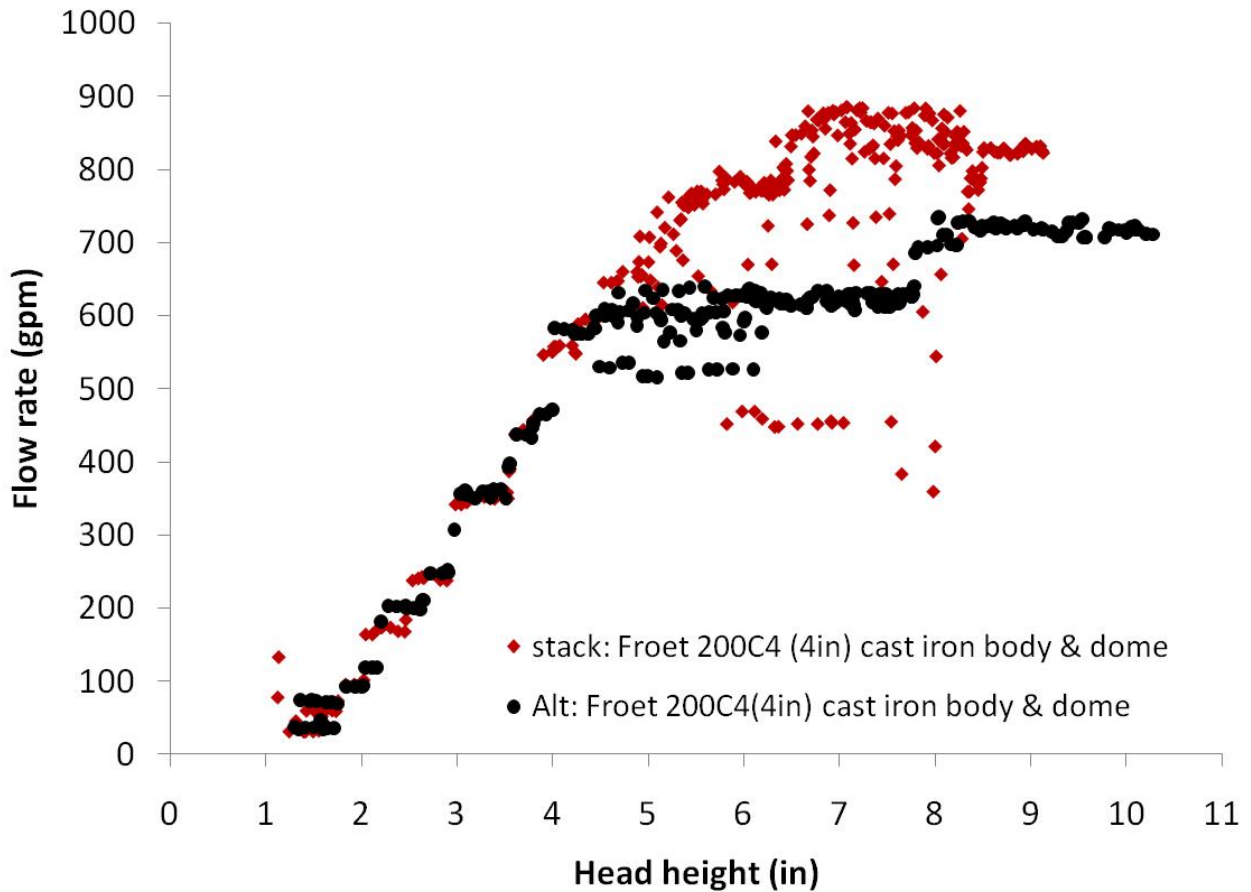


Figure 4. Flow rate as a function of head height for Froet 200C4, 4" storm drain. The drain showed fluctuation in the flow rates after 4" head height. The average stack capacity of this drain is ~750 gpm and the corresponding flow rate in the alternate configuration is ~600gpm.

## 5.0 Summary of Results

1. Flow rate depends on the piping configuration. Stack configuration showed higher flow rate compared to the alternate configuration.
2. Flow rate increases with increase in head height before reaching maximum flow rate. Maximum flow rate is attained when head height is between 4 in to 5 in. Head height at which maximum flow rate is attained depends on the drain size and drain model, i.e., the sump diameter, depth and dome height.