EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

SCHOOL DRINKING WATER PROGRAM

FLUSHING SCHOOL PLUMBING (HIGH VELOCITY METHOD)

INTRODUCTION

Flushing of school facility plumbing reduces exposure to contaminants associated with sediment and water age such as bacteria, lead, and copper. Flushing is a method intended to systematically remove both aged water and particulates from the system. This method is based on maintaining a flushing water velocity of at least 3 feet per second (ft/sec) in the building's service line once to twice per year. Flushing should occur after school dismisses for summer break (June)) and before the start of the next school year (August). By following the procedure outlined in this document, the school facility administrator can reduce the risk of elevated drinking water pollutants associated with stagnant water conditions, which are created during periods of inactivity such as weekends and summer or winter breaks.

This guidance is for school facilities having typical water fixtures such as sink faucets, toilets, urinals, and water fountains.

PROCEDURE

1. Flushing of school plumbing should be a planned event. Notify anyone with access to the building of the flushing plans well ahead of time. It is encouraged to place signs alerting people of the flushing plans.
2. Have a school layout drawing to help identify the anticipated flushing zones and the required flushing order based on their proximity to the service line entering the building (see the *EGLE Pre-Flushing Event Guidance for School Plumbing – How to Determine Flushing Zones* document).
3. Make sure you have coordinated enough people to participate in operating and monitoring flushing activities simultaneously, keeping in mind those fixtures that require constant activation during flushing like toilets, urinals, or sensor operated devices (see pre-flushing event guidance).
4. Based on the flushing plan, make sure to have access to all areas of the building.
5. Determine the size of the service line entering the building. Use Table 1 (below) to locate the minimum flow required to achieve an average water velocity of at least 3 ft/sec during flushing.
6. Do not use filtered bottle fill drinking fountain units as a flushing point for this process. After all zones are flushed, refresh these units by running water for 30 seconds to a minute and then change out the filter cartridge if required per the manufacturer's recommendations. Do not remove filters when running the water through these units.

TABLE 1: Minimum required water flows by size of service line entering the building for achieving desired water velocity.

Copper Pipe Size	Flow Rate (ft^3/min)[1] cubic feet per minute (cf/min) [1]	Flow Rate gallons per minute (gal/min) [1]
2	3.766	28
2 ½	5.818	44
3	8.292	62
3 ½	11.243	84
4	14.598	109
5	22.655	169
6	32.341	242

[1] Based on a water velocity of 3 ft/sec.

7. Have maintenance personnel start flushing through the hot water tanks at the utility room before beginning to open the fixtures in Zone 1 as indicated in Step 7 below. Flushing of the tanks is done by emptying the hot water tanks while the influent water valve to the water heater(s) and tanks remains open. You are basically emptying and filling the tanks all at once. These tanks should be flushed until the water coming out of the bottom of the tanks is cold. Shut off non-boiler heaters until flushing activities are completed.
8. While flushing the hot water tanks, begin zone flushing by instructing crew members to open all cold-water fixtures (except filtered drinking fountain units) and begin systematically flushing all toilets in the first zone.
9. Use the readings from the water meter to estimate the water flow through the meter. Follow the procedure below using Figures 1-a and 1-b (see bottom of Page 2):
   a. Record initial reading at the meter. (Refer to Figure 1-a.)
   b. Time one minute and record a second reading. (Refer to Figure 1-b.)
   c. Subtract the second reading from the first reading to estimate the actual flow per minute. Below is a sample calculation using the readings in Figure 1.

$$Flow\ rate = \frac{(final\ reading - initial\ Reading)cf}{1\ minute} = \text{cf/min}$$

$$\text{Ex. Fig1: } Flow\ rate = \frac{(10.13 - 0.13)cf}{1\ minute} = 10\ \text{cf/min}$$

10. Check the calculated flow rate with Table 1.
    a. If the calculated flow rate equals the corresponding number in Table 1, then go to Step 10.
    b. If the calculated flow rate is less than the corresponding number in Table 1, then expand your flushing zone to include more fixtures.
    c. If the calculated flow rate is greater than the corresponding number in Table 1, then decrease your flushing zone.
11. Start a timer. Keep fixtures open and flushing for at least 15 minutes. Be sure to make frequent rounds to monitor the water levels in the sinks and toilets during the 15-minute flushing period to ensure they are not overflowing.
12. Repeat Step 9 at least three times during the flushing of each zone. Make sure that the flow during flushing remains at or slightly above the corresponding flow rate in **Table 1**.
13. After flushing the zone for at least 15 minutes, close all fixtures and move to the next zone.
14. Repeat Steps 7 through 12 for additional zones (no need to flush hot water tank again).
15. Keep a record of the calculated flow rates obtained during the flushing process for each zone, the time of zone flushing, any problems noted with individual fixtures (i.e. low pressure, leaks, etc.) or problematic drains that back up.

FIGURE 1. Initial and timed water meter readings to demonstrate how to calculate flow per minute.

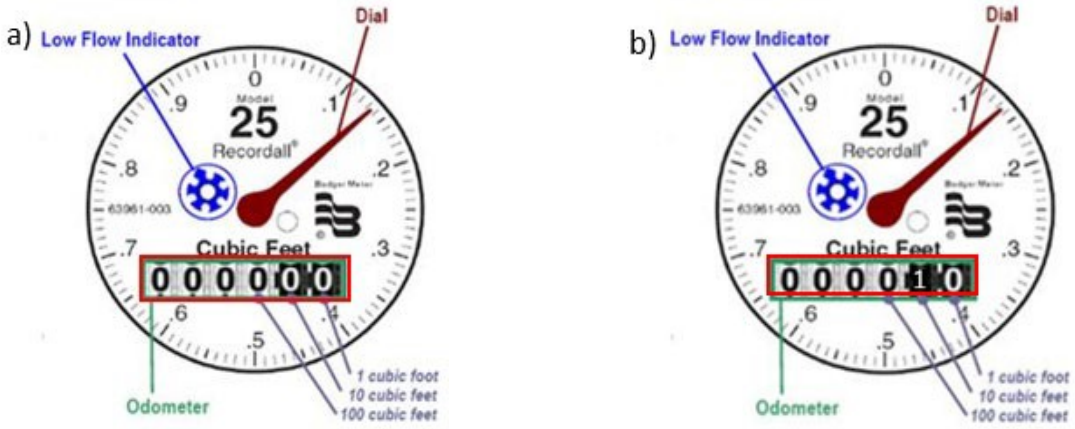

Figure 1 shows common water meter with readings in cubic feet at the odometer and 10th of a cubic foot at the dial. Typically, water meters include a rotating piece (blue wheel) to indicate low flow associated with leaks. This figure also includes two reading displays a) meter displaying an initial reading of 0.13 cf, and b) meter displaying a reading of 10.13 cf.