BILL NO. 1 -2005 ORDINANCE NO. 29

# AN ORDINANCE AMENDING THE **FIRE PREVENTION CODE** OF THE **EUREKA FIRE PROTECTION DISTRICT** OF **ST. LOUIS and JEFFERSON COUNTY, MISSOURI**

BE IT ORDAINED by the board of directors of the Eureka Fire Protection District of St. Louis and Jefferson County, Missouri, as follows:

An **ordinance** governing the design, construction, installation alteration, enlargement, equipment repair, demolition, removal, conservation, use and maintenance of all **dry hydrants and water supply areas**, prescribing minimum requirements and conditions to safeguard life, property and public welfare from the hazard of fire and explosion, adopting basic fire control measures and regulations which could impede or interfere with emergency duties, **known as regulating the fire prevention code**, providing penalties for the violation thereof; declaring and establishing fire limits; repealing existing and conflicting ordinances of the **EUREKA FIRE PROTECTION DISTRICT** of St. Louis and Jefferson County, Missouri and providing for the effective date of the ordinance.

**SECTION 1. Dry Hydrants and Water Supply**

**100.0 Dry Hydrants and Water Supply Areas:**

Dry hydrants and water supply areas may be permitted in areas being developed if the owner / developer can show that water mains and hydrants are inadequate or unavailable. All permitted dry hydrants and water supply areas shall be installed in the following developments: all multi-family residential developments, all residential subdivisions which contain five or more single-family proposed building lots and said lots are comprised of are less than three acres, all residential

subdivisions which contain ten or more single-family proposed building lots and said lots are comprised of three acres or more, all commercial developments which have a projected square foot building area of 12,000sqft or greater, and /or for any proposed building project which would require a fire suppression system to be designed by NFPA 13, 13R,or 13D. All dry hydrants and water supply areas shall be a minimum of 30,000 gallons of useable water in a thirty-year drought frequency. The minimum requirements of this section shall be deemed to the mandatory minimum requirements necessary to safeguard life, property and public welfare from the hazard of fire and explosion, however, the EUREKA FIRE PROTECTION DISTRICT shall have authority to require additional dry hydrants and water supply areas upon the special circumstances of each development, including, but not limited to, the lineal road distance of developmental roads, the topography of the development, and/or the proposed density or size of the development. The location(s) of any additional said water supply areas required shall be determined by the Fire Marshal's Office of the EUREKA FIRE PROTECTION DISTRICT. Dry hydrants shall be connected to approved lakes, approved ponds, approved retention areas, or to approved, above or below grade, storage tanks. Dry hydrants shall be installed, inspected, and operational prior to the issuing of any occupancy permits in the proposed developed land. All dry hydrants shall be inspected and approved by a member of the EUREKA FIRE PROTECTION DISTRICT. Nothing contained herein shall limit the authority of the Board of Directors to issue a variance from the above ordinance requirements based upon the unique nature of any specific development.

**100.1 Locations:**

All proposed dry hydrant and water supply area locations shall be submitted to the EUREKA FIRE PROTECTION DISTRICT for review and approval. All locations shall be presented on a plot plan showing the proposed location of the dry hydrant(s), water supply area(s), and topographical elevation levels. The first (1st) dry hydrant and water supply shall be located within the first 1,000 feet from the main entrance of the proposed development, unless otherwise approved by the EUREKA FIRE PROTECTION DISTRICT in writing. All dry hydrants and water supply areas shall be constructed or installed on common ground areas or private parcels, or lots, as long as the proper easement for access, operation, and maintenance are approved in writing by the EUREKA FIRE PROTECTION DISTRICT and recorded as a matter of public record. All dry hydrants and water supply areas shall have an approved all-weather fire service access road [minimum **75,000** GVW(gross vehicle weight)], and located within the proposed development plot plan. Dry hydrant connections shall not be less than five feet (5) or more than fifteen feet (15') from the edge of the fire service access road.

**100.2 Dry Hydrant Visibility and Protection:**

All dry hydrants shall be designated by an approved visible sign which reads, "DRY HYDRANT LOCATION, Fire Department Use Only." All dry hydrant connection areas shall be protected from impact hazards with a minimum of three steel bollards filled with concrete. The bollards shall be a minimum of five feet in length with not less than three feet (3ft) exposed above grade. The bollards shall be placed in a triangular position, approved by the EUREKA FIRE PROTECTION DISTRICT, around the dry hydrant location area.

**100.3 Design and Installation:**

NFPA 1142 (1999 edition) Appendix B, may be referenced to assist with design and installation requirements as a general guideline, but the rules and regulations of the EUREKA FIRE PROTECTION DISTRICT shall not be superceded by NFPA 1142 (1999 edition) Appendix B. Each dry hydrant shall be connected to its own individual approved water supply source set forth in section 100.0. There shall not be more that ten feet (10ft) of head lift to the discharge end of each dry hydrant.

**Exception:** More than one dry hydrant can be connected to an approved water supply source location, where the water supply ratio meets the 30,000 gallons to 1 dry hydrant, but the dry hydrants can not be tied together and shall have separate designs.

**100.3.1 Design:**

All dry hydrants and water supply areas shall be designed by a Licensed Professional Engineer and submitted for approval to the EUREKA FIRE PROTECTION DISTRICT before installation. All necessary calculations for the design of the dry hydrant and water supply areas shall be submitted with the dry hydrant design that is being submitted for approval. Prior to final approval by the EUREKA FIRE PROTECTION DISTRICT, the Licensed Professional Engineer who signed and sealed the plans for the proposed dry hydrant, and or water supply area, shall submit to the EUREKA FIRE PROTECTION DISTRICT a completion certificate that certifies that the dry hydrant was installed in accordance with his/her design and is in good working order based upon his own personal knowledge.

**100.3.1.1 Dry Hydrant Piping and Connections**

All dry hydrants shall be of schedule 40 PVC pipe, six inches (6") in diameter. All fire department

connections shall have six inch (6") National Hose (NH), [a.k.a. National Standard Thread (NST)], male thread. All inlet supply pipes, that are not connected to an approved above or below grade storage tank, shall be set on a concrete block and secured with copper wire at a minimum of twenty four inches (24") above and below the top and bottom surfaces of the water supply.

**100.3.1.2 Storage Tanks:**

All storage tanks designed for water supply shall be designed and equipped with an independent power source and independent water well to re-supply that storage tank within 72 hours with the minimum required amount of usable water supply for fire suppression as set forth in section 100.0. All storage tanks shall be designed and equipped with a water level indicator that will activate a visual and audible alarm, located near the storage tank area, which will indicate that the water level of the tank is below 50% of its capacity. All storage tanks shall be equipped with a sign or label, which indicates the maximum amount water that the storage tank is capable of storing.

**100.3 Maintenance and Inspection:**

All dry hydrant connection locations shall be maintained and obstruction free for a minimum of ten feet (10') in all directions. All vegetation shall be maintained at a height no greater than six inches (6") in all directions around the dry hydrant connection and maintained thusly for a minimum of ten feet (10') in all directions. In the event that the dry hydrant and or water supply area has become inadequate for the use of fire suppression operations due to drought, low water, leakage, or other substantial defect, as deemed inadequate by the EUREKA FIRE PROTECTION DISTRICT and or a Licensed Professional Engineer, the dry hydrant and or water supply area shall be immediately repaired and placed back in working order at the owner(s) expense, with in 60 days. All repairs, such as broken pipes and/or fittings, shall be repaired within ten (10) days. Upon completion of any repairs, the dry hydrant and or water supply area shall be inspected, operated and certified by a Licensed Professional Engineer who is knowledgeable and qualified to perform such inspection. All building and occupancy permits issued for structures serviced by a dry hydrant system shall be subject to immediate revocation in the event that the dry hydrant and or water supply area has become inadequate for the use of fire

suppression operations and attempts to repair any inadequate dry hydrants and water supply areas or not made. All repair, maintenance, and certified documentation shall be submitted to, and approved by, the EUREKA FIRE PROTECTION DISTRICT on completion of any repair work.

**100.3.1 Fire Department Responsibility**
The EUREKA FIRE PROTECTION DISTRICT shall not be held responsible for any damage that may occur to equipment, pumps, or roads that are related to dry hydrants or water supply areas. The EUREKA FIRE PROTECTION DISTRICT shall not be held responsible to fill, maintain, repair or otherwise improve any dry hydrant or water supply areas.

**SECTION 2. EMERGENCY ENACTMENT.**

It being deemed that the situation intended to be met by such ordinance constitutes an emergency directly affecting the lives, safety, and health of the inhabitants of the areas encompassed by this ordinance, and the protection of property within those areas, this **ordinance shall take effect and be in full force and effect immediately from and after the enactment of same**. This ordinance having been duly considered and voted upon by the board of directors of the EUREKA FIRE PROTECTION DISTRICT of St. Louis and Jefferson County, Missouri, the ordinance is enacted as an ordinance of the EUREKA FIRE PROTECTION DISTRICT of this 8 day of March, 2005.

FRANCIS B. OBERKRAMER, CHAIRMAN
BOARD OF DIRECTORS

ATTEST:

CHARLES E. KUHN, Secretary
BOARD OF DIRECTORS

(SEAL)

# Design Worksheet and Charts for PVC Dry Fire Hydrant Installations.

The following worksheet and charts can be used to assist in the design of a dry fire hydrant installation. These charts will help determine the size of pipe and fittings that will be needed to flow at the capacity of the pumps being used at the hydrant site. The charts are for PVC pipe. Charts are available for other types of pipe material. Some factors to consider when designing the dry fire hydrant are:

(a) Static lift should not exceed 10 ft to 12 ft (3.1 m to 3.7 m), if possible. This is dead lift and cannot be overcome by enlarging the pipe size. Keep the static lift as low as possible.

(b) Total head loss should not exceed 20 ft (6.1 m), or the pump might not supply its rated gpm (L/min). If using portable pumps on the dry fire hydrant, keep total head loss as low as possible.

How to use the charts:

(a) Add the total length of straight pipe to be used at the site (screen + lateral run + riser = STRAIGHT PIPE). Write this down on the design worksheet at step 1.

(b) Using Figure 2, add up the number of feet of straight pipe equivalent for all fittings used to make up the hydrant (elbows + hydrant adapter + any reducers = STRAIGHT PIPE EQUIVALENT FOR FITTINGS). Write this down on the design worksheet at step 2.

(c) Add the numbers from step 1 and step 2 together to obtain the TOTAL STRAIGHT PIPE EQUIVALENT of the hydrant. Write this figure down on the design worksheet at step three.

(d) Determine the desired maximum gpm (L/min) hydrant flow. Usually this would be the pumping capacity of the pump or pumper used at this hydrant. Write this figure down on the design worksheet at step 4.

(e) Using Figure 3, determine the head loss due to friction per 100 ft (30.5 m) of pipe (number from step 3) based on the gpm (L/min) from step 4. If there is over or under 100 ft (30.5 m) of pipe equivalent (from step 3), adjust head loss from the chart. Example: TOTAL STRAIGHT PIPE EQUIVALENT is 75 ft (22.9 m) and the desired volume is 1950 gpm (7441 L/min) - head loss from the chart is 20 ft/100 ft (6.1 m/30.5 m) of pipe. For this run, there would be a head loss of 15 ft (4.6 m) [20 ft (6.1 m) × 75 ft/100 ft (22.9 m/30.5 m) = 15 ft (4.6 m)]. Write this figure down as HEAD LOSS FOR PIPE AND FITTINGS on the design worksheet at step 5.

(f) From Figure 4, figure the head loss due to friction in the suction hose to be used on the hydrant. Write down on the design worksheet as SUCTION HOSE HEAD LOSS at step 6.

(g) Next, determine static lift. This is the vertical distance from the water's surface in the hydrant pipe (use the lowest water level as it will represent the maximum lift needed) at the pump or pumper intake. Write this figure down on the design worksheet as STATIC LIFT at step 7. Try not to exceed 8 ft to 10 ft (2.4 m to 3.1 m) if possible. Remember - this is a vertical measurement and represents "dead" lift.

(h) Next determine the head loss through the strainer as shown by Figure 5 and 6,7 or 8 as appropriate.

(i) Add the answers from steps 5, 6, 7 and 8 together on the design worksheet at step 9. This is the TOTAL HEAD LOSS. Do not exceed 20 ft to 25 ft (6.1 m to 7.6 m) of total head loss at the pump intake; otherwise, all the pump capacity will be used for suction (or lift), and the pump might not flow its rated capacity.

# Design Worksheet

FIRE DEPARTMENT _____

DRY FIRE HYDRANT LOCATION _____

Step 1

Strainer length _____

Lateral run length _____

Riser height _____

Straight Pipe = _____

Step 2

Use figure 2 to fill in the following values:

Hydrant adapter _____ Reducer _____

Elbow _____ Elbow _____

Elbow _____ Elbow _____

Straight Pipe Equivalent for Fittings = _____

Step 3

Straight Pipe + Straight Pipe Equivalent for Fittings = _____ + _____ = Total Straight Pipe Equivalent

Step 4

Desired GPM flow = _____ (Rated pump capacity)

Step 5

Using answers from step 3 and 4, use Figure 3 to determine Head Loss for Pipe and Fittings.

Head Loss for Pipe and Fittings = _____ per 100 foot X $\frac{\text{_____}}{100}$ feet = _____ feet

Step 6

Using Figure 4, determine suction hose head loss for length of suction hose used to connect the pump to the hydrant. Suction Hose Head Loss = _____ foot for _____ foot long suction hose.

Step 7

Static Lift = _____

Step 8

Strainer Loss = _____

Step 9

Add the answers from Steps 5, 6, 7 and 8 together to get total head loss.

#5 _____ + #6 _____ + #7 _____ + #8 _____ = Total Head Loss

If Total Head Loss is greater than 20 to 25 ft, the pump might not be able to flow its rated GPM.

**Figure 1 Design Worksheet**

| PVC Pipe Diameter | 2.5" | 3.0" | 4.0" | 5.0" | 6.0" | 8.0" | 10.0" |
|---|---|---|---|---|---|---|---|
| 90° Elbow, Standard | 6.5 | 8.5 | 11.0 | 14.0 | 16.0 | 22.0 | 27.0 |
| 90° Elbow, Medium Sweep | 5.5 | 7.0 | 9.5 | 12.0 | 14.0 | 18.0 | 22.0 |
| 90° Elbow, Long Sweep | 4.5 | 5.5 | 7.0 | 9.0 | 11.0 | 14.0 | 18.0 |
| 45° Elbow | 3.0 | 4.5 | 5.0 | 6.5 | 7.5 | 10.0 | 13.0 |
| Hydrant Connection (6" x 4.5") | | | | | 2.5 | 2.5 | 2.5 |
| Reducer (8" x 6") or (10" x 6") | | | | | | 3.5 | 8.0 |

**Figure 2, Straight Pipe Equivalent for Fittings (in feet)**

| Pipe Size | 3" | 4" | 5" | 6" | 7" | 8" | 10" |
|---|---|---|---|---|---|---|---|
| GPM | | | | | | | |
| 100 | 2.4 | 0.6 | 0.2 | 0.1 | | | |
| 200 | 8.6 | 2.1 | 0.7 | 0.3 | 0.1 | 0.1 | |
| 250 | 13.0 | 3.2 | 1.1 | 0.5 | 0.1 | 0.1 | |
| 300 | 18.2 | 4.5 | 1.5 | 0.6 | 0.2 | 0.2 | 0.1 |
| 350 | 24.2 | 6.0 | 2.0 | 0.8 | 0.3 | 0.2 | 0.1 |
| 400 | 30.9 | 7.6 | 2.6 | 1.1 | 0.4 | 0.3 | 0.1 |
| 500 | 46.8 | 11.5 | 3.9 | 1.6 | 0.8 | 0.4 | 0.1 |
| 600 | 65.6 | 16.2 | 5.5 | 2.2 | 1.1 | 0.6 | 0.2 |
| 700 | 87.2 | 21.5 | 7.3 | 3.0 | 1.4 | 0.7 | 0.2 |
| 750 | 99.1 | 24.4 | 8.3 | 3.4 | 1.6 | 0.8 | 0.3 |
| 800 | 111.7 | 27.5 | 9.3 | 3.8 | 1.8 | 0.9 | 0.3 |
| 900 | 138.9 | 34.3 | 11.6 | 4.8 | 2.3 | 1.2 | 0.4 |
| 1000 | 168.8 | 41.6 | 14.1 | 5.8 | 2.7 | 1.4 | 0.5 |
| 1100 | 201.4 | 49.7 | 16.8 | 6.9 | 3.3 | 1.7 | 0.6 |
| 1200 | 236.7 | 58.4 | 19.7 | 8.1 | 3.8 | 2.0 | 0.7 |
| 1300 | 274.5 | 67.7 | 22.9 | 9.4 | 4.4 | 2.3 | 0.8 |
| 1400 | 314.9 | 77.7 | 26.2 | 10.8 | 5.1 | 2.7 | 0.9 |
| 1500 | 357.7 | 88.5 | 29.8 | 12.3 | 5.8 | 3.0 | 1.0 |
| 1600 | 403.2 | 99.5 | 33.6 | 13.8 | 6.5 | 3.4 | 1.2 |
| 1700 | 451.1 | 111.3 | 37.6 | 15.5 | 7.3 | 3.8 | 1.3 |
| 1800 | 501.5 | 123.7 | 41.8 | 17.2 | 8.1 | 4.2 | 1.4 |
| 1900 | 554.3 | 136.7 | 46.1 | 19.0 | 9.0 | 4.7 | 1.6 |
| 2000 | 609.5 | 150.4 | 50.8 | 20.9 | 9.9 | 5.2 | 1.7 |
| 2100 | 667.2 | 164.6 | 55.6 | 22.9 | 10.8 | 5.6 | 1.9 |
| 2200 | 727.2 | 179.4 | 60.6 | 24.9 | 11.8 | 6.2 | 2.1 |
| 2300 | 789.6 | 194.8 | 65.8 | 27.1 | 12.8 | 6.7 | 2.3 |
| 2400 | 854.4 | 210.7 | 71.2 | 29.3 | 13.8 | 7.2 | 2.4 |
| 2500 | 921.4 | 227.3 | 76.7 | 31.6 | 14.9 | 7.8 | 2.6 |
| 2600 | 990.9 | 244.4 | 82.5 | 34.0 | 16.1 | 8.4 | 2.8 |
| 2700 | 1062.6 | 262.1 | 88.5 | 36.5 | 17.2 | 9.0 | 3.0 |
| 2800 | 1136.6 | 280.4 | 94.7 | 39.0 | 18.4 | 9.6 | 3.2 |
| 2900 | 1213 | 299.2 | 101.0 | 41.6 | 19.7 | 10.3 | 3.5 |
| 3000 | 1291.6 | 318.6 | 107.6 | 44.3 | 21.0 | 10.9 | 3.7 |

Based on Hazen-Williams Formula

**Figure 3, Head Loss (ft per 100 ft of PVC pipe)**

The Charts are for PVC schedule 40 pipe. Other types of pipe material have similar charts that should be consulted when other pipe is used.

| Hose Size | 1 1/2" | 2 1/2" | 4" | 4 1/4" | 5" | 6" |
|---|---|---|---|---|---|---|
| GPM | | | | | | |
| 100 | 84.1 | 7.0 | 0.7 | 0.4 | 0.2 | 0.1 |
| 200 | 303.6 | 25.3 | 2.6 | 1.4 | 0.9 | 0.4 |
| 250 | 459.0 | 38.2 | 3.9 | 2.2 | 1.3 | 0.5 |
| 300 | 643.3 | 53.6 | 5.4 | 3.1 | 1.8 | 0.8 |
| 350 | 855.9 | 71.3 | 7.2 | 4.1 | 2.4 | 1.0 |
| 400 | 1096.0 | 91.3 | 9.3 | 5.2 | 3.1 | 1.3 |
| 500 | 1656.9 | 138.0 | 14.0 | 7.9 | 4.7 | 1.9 |
| 600 | 2322.4 | 193.4 | 19.7 | 11.1 | 6.6 | 2.7 |
| 700 | 3089.7 | 257.3 | 26.1 | 14.7 | 8.8 | 3.6 |
| 800 | 3956.6 | 329.5 | 33.5 | 18.9 | 11.3 | 4.7 |
| 900 | 4921.0 | 409.9 | 41.6 | 23.5 | 14.1 | 5.8 |
| 1000 | 5981.4 | 498.2 | 50.6 | 28.5 | 17.1 | 7.0 |
| 1100 | 7136.1 | 594.4 | 60.4 | 34.0 | 20.4 | 8.4 |
| 1200 | 8383.8 | 698.3 | 71.0 | 40.0 | 24.0 | 9.9 |
| 1300 | 9723.5 | 809.9 | 82.3 | 46.4 | 27.8 | 11.4 |
| 1400 | 11153.9 | 929.0 | 94.4 | 53.2 | 31.9 | 13.1 |
| 1500 | 12674.2 | 1055.6 | 107.2 | 60.5 | 36.2 | 14.9 |
| 1600 | 14283.3 | 1189.6 | 120.9 | 68.1 | 40.9 | 16.8 |
| 1700 | 15980.5 | 1331.0 | 135.2 | 76.2 | 45.7 | 18.8 |
| 1800 | 17765.0 | 1479.6 | 150.3 | 84.7 | 50.8 | 20.9 |
| 1900 | 19635.9 | 1635.5 | 166.2 | 93.7 | 56.1 | 23.1 |
| 2000 | 21592.7 | 1798.8 | 182.7 | 103.0 | 61.7 | 25.4 |
| 2100 | 23643.7 | 1968.5 | 200.0 | 112.8 | 67.5 | 27.8 |
| 2200 | 25761.2 | 2145.7 | 218.0 | 122.9 | 73.6 | 30.3 |
| 2300 | 27971.7 | 2329.8 | 236.7 | 133.4 | 80.0 | 32.9 |
| 2400 | 30265.7 | 2520.8 | 256.1 | 144.4 | 86.5 | 35.6 |
| 2500 | 32642.5 | 2718.8 | 276.2 | 155.7 | 93.3 | 38.4 |
| 2600 | 35101.9 | 2923.7 | 297.0 | 167.5 | 100.3 | 41.3 |
| 2700 | 37643.1 | 3135.3 | 318.5 | 179.6 | 107.6 | 44.3 |
| 2800 | 40265.8 | 3353.8 | 340.7 | 192.1 | 115.0 | 47.4 |
| 2900 | 42969.6 | 3579.0 | 363.6 | 205.0 | 122.8 | 50.6 |
| 3000 | 45753.9 | 3810.9 | 387.1 | 218.3 | 130.7 | 53.8 |

For SI units: 1 GPM = 0.0631 L/sec.

**Figure 4, Head Loss (ft per 100 ft of hard rubber suction hose)**

## Head Loss Through Strainer

Open Area = 4 times Pipe area = $4 \times \frac{\pi}{4} (D)^2 = \pi D^2$

D = Nominal Pipe Size and is considered inside diameter for these computations.

| Pipe Size (Inches) | Open Area (Square Inches) | Number of 3/8" holes | Number of 1/2" holes |
|---|---|---|---|
| 6" | 113.1 | 1026 | --- |
| 8" | 201.1 | 1821 | 1026 |
| 10" | 314.2 | — | 1600 |

**Figure 5, Strainer Open Area**

Q = Desired flow rate in gpm.

d = hole diameter (inches)

$$q = \frac{Q}{\text{number of holes}} = \left(\frac{gpm}{hole}\right)$$

$$\text{Head Loss of Strainer} = \left[\frac{\frac{q}{60 \times 7.5}}{0.6 \times 8.02 \times \frac{\pi}{4}\left(\frac{d}{12}\right)^2}\right]^2$$

| Desired Flow Rate | Number of 3/8" holes | Head Loss |
|---|---|---|
| 250 | 1026 | 0.02 |
| 500 | 1026 | 0.09 |
| 750 | 1026 | 0.19 |

**Figure 6, Head Loss for Six inch Pipe Strainer 5 feet long**

| Desired Flow Rate | Number of 3/8" holes | Head Loss | Number of 1/2" holes | Head Loss |
|---|---|---|---|---|
| 250 | 1821 | 0.01 | --- | |
| 500 | 1821 | 0.03 | --- | |
| 750 | 1821 | 0.06 | 1026 | 0.06 |
| 1000 | 1821 | 0.11 | 1026 | 0.11 |
| 1250 | 1821 | 0.18 | 1026 | 0.17 |
| 1500 | 1821 | 0.25 | 1026 | 0.25 |

**Figure 7, Head Loss for Eight inch Pipe Strainer 5 feet long**

| Desired Flow Rate | Number of 1/2" holes | Head Loss |
|---|---|---|
| 250 | 1600 | 0.01 |
| 500 | 1600 | 0.01 |
| 750 | 1600 | 0.03 |
| 1000 | 1600 | 0.05 |
| 1250 | 1600 | 0.07 |
| 1500 | 1600 | 0.10 |

**Figure 8, Head Loss for Ten inch Pipe Strainer 5 feet long**

# Installation Procedure for Dry Fire Hydrant.

(a) Check for any underground or overhead utilities before digging. Contact the appropriate authorities, e.g., water, power, telephone, cable, gas, etc.

(b) Using a backhoe or excavator, dig in the trench starting at the point where the suction screen will be placed in the water.

(c) Maintain a uniform level trench cut all the way from the screen location to the point where the riser begins.

(d) Assemble the horizontal run and vertical riser portion of the hydrant (screen, lateral run, and riser) and place into the trench and water source as one piece.

(e) Sink the screen end and allow the assembly to sink into the bottom of the trench. **IT IS CRITICAL THAT AT NO TIME SHOULD ANYONE BE ALLOWED INTO OR CLOSE TO THE TRENCH. IT IS NOT NECESSARY.**

(f) When certain the suction screen is placed correctly, start backfilling the trench at the riser (keeping the riser pipe vertical) and backfill out into the water, being careful not to cover the suction screen.

(g) Mound and tamp the dirt slightly, as settling will occur over time. Mounding the dirt will also help keep frost away from the water in the pipe.

(h) Place a cement block or use a commercial or manufactured strainer support under the suction screen to support the screen off the bottom. If the installation is in a fast-moving waterway, several blocks or supports might have to be attached to the screen to prevent the current from moving the screen. The pipe and screen will also have to have special protection from any debris washing down the stream and hitting the pipe or screen.

(i) Cut off the vertical riser and attach the hydrant connection, making sure that the top of the hydrant connection is below the bottom of the pump intake. It is important that the pump intake remain slightly above the hydrant connection to prevent an air lock in the suction line.

(j) Set up guards and hose supports. Level, seed, and mulch the area to prevent erosion.

(k) Test pump the hydrant.