

**... Fire Protection by Computer Design**

EASTERN FIRE PROTECTION  
170 KITTYHAWK AVE  
P.O. BOX 1390  
AUBURN MAINE, 04210  
207-784-1507

Job Name : 5564 CROSSROADS  
Building : WOOD CONSTRUCTION  
Location : 735 WASHINGTON STREET, PORTLAND MAINE  
System : WET  
Contract : 5564  
Data File : 5564 cross roads third floor.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - 5564 CROSSROADS Date - 12/12/2016  
Location - 735 WASHINGTON STREET, PORTLAND MAINE  
Building - WOOD CONSTRUCTION System No. - WET  
Contractor - EASTERN FIRE PROTECTION Contract No. - 5564  
Calculated By - JML Drawing No. - 1  
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height VARIES  
OCCUPANCY - RESIDENTIAL

S Type of Calculation: ( )NFPA 13 Residential ( )NFPA 13R (X)NFPA 13D  
Y Number of Sprinklers Flowing: ( )1 (X)2 ( )4 ( )  
S ( )Other  
T ( )Specific Ruling Made by Date  
E  
M Listed Flow at Start Point - 16 Gpm System Type  
Listed Pres. at Start Point - 10.66Psi (X) Wet ( ) Dry  
D MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction  
E Domestic Flow Added - 0 Gpm Sprinkler or Nozzle  
S Additional Flow Added - 0 Gpm Make VIKING Model FREEDOM UP  
I Elevation at Highest Outlet - 132.12Feet Size 1/2" K-Factor 4.9  
G Note: Temperature Rating 175  
N

Calculation Gpm Required 32.708 Psi Required 50.013 At Test  
Summary C-Factor Used: Overhead 120 Underground 120

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - Rated Cap. 20 Cap. MIN. 1120 GALLONS  
T Time of Test - @ Psi 54.13 Elev.  
E Static (Psi) - Elev. 100'-0"  
R Residual (Psi) - Other Well  
Flow (Gpm) - Proof Flow Gpm  
S Elevation -

P Location: PUMP LOCATED IN BASEMENT  
P  
L Source of Information: PUMP MANUFACTURER'S TECH DATA  
Y

# Water Supply Curve C

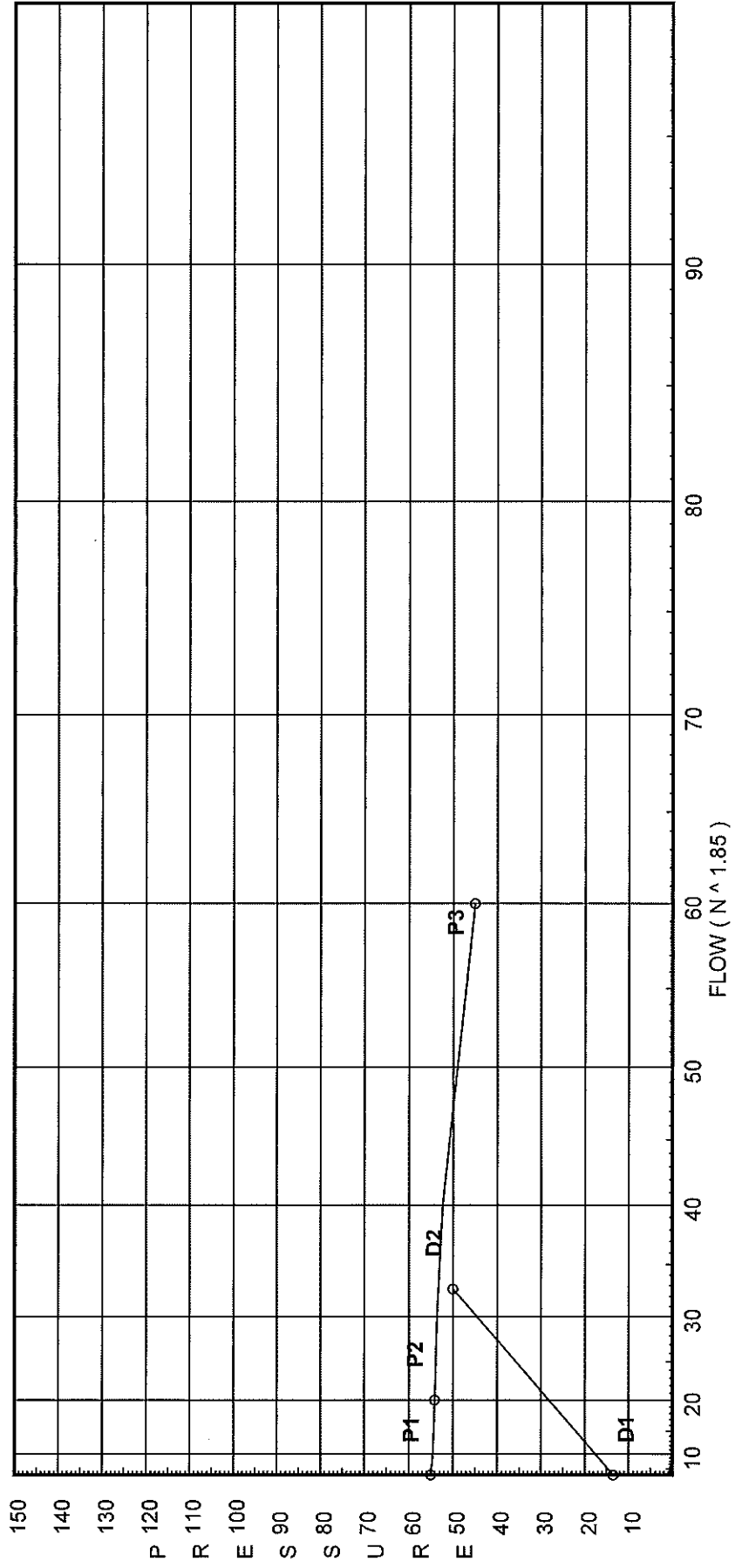
EASTERN FIRE PROTECTION  
5564 CROSSROADS

### Pump Data:

P1 - Pump Churn Pressure : 54.99  
 P2 - Pump Rated Pressure : 54.13  
 P2 - Pump Rated Flow : 20  
 P3 - Pump Pressure @ Max Flow : 45.03  
 P3 - Pump Max Flow : 60

### Demand:

D1 - Elevation : 13.480  
 D2 - System Flow : 32.708  
 D2 - System Pressure : 50.013  
 Hose ( Demand ) : 32.708  
 D3 - System Demand : 32.708  
 Safety Margin : 3.334



# Fittings Used Summary

EASTERN FIRE PROTECTION  
5564 CROSSROADS

Page 3  
Date 12/12/2016

| Fitting Legend Abbrev. Name  | 1/2  | 3/4 | 1 | 1 1/4 | 1 1/2 | 2  | 2 1/2 | 3  | 3 1/2 | 4  | 5  | 6  | 8  | 10 | 12 | 14 | 16 | 18 | 20  | 24  |
|------------------------------|--|-----|---|-------|-------|----|-------|----|-------|----|----|----|----|----|----|----|----|----|-----|-----|
| E NFPA 13 90' Standard Elbow | 1  | 2   | 2 | 3     | 4     | 5  | 6     | 7  | 8     | 10 | 12 | 14 | 18 | 22 | 27 | 35 | 40 | 45 | 50  | 61  |
| Fsp Flow Switch Potter VSR   | Fitting generates a Fixed Loss Based on Flow |     |   |       |       |    |       |    |       |    |    |    |    |    |    |    |    |    |     |     |
| S NFPA 13 Swing Check        | 0  | 0   | 5 | 7     | 9     | 11 | 14    | 16 | 19    | 22 | 27 | 32 | 45 | 55 | 65 |    |    |    |     |     |
| T NFPA 13 90' Flow thru Tee  | 3  | 4   | 5 | 6     | 8     | 10 | 12    | 15 | 17    | 20 | 25 | 30 | 35 | 50 | 60 | 71 | 81 | 91 | 101 | 121 |

## Units Summary

Diameter Units Inches  
 Length Units Feet  
 Flow Units US Gallons per Minute  
 Pressure Units Pounds per Square Inch

Note: Fitting Legend provides equivalent pipe lengths for fittings types of various diameters. Equivalent lengths shown are standard for actual diameters of Sched 40 pipe and CFactors of 120 except as noted with \*. The fittings marked with a \* show equivalent lengths values supplied by manufacturers based on specific pipe diameters and CFactors and they require no adjustment. All values for fittings not marked with a \* will be adjusted in the calculation for CFactors of other than 120 and diameters other than Sched 40 per NFPA.

# Pressure / Flow Summary - STANDARD

EASTERN FIRE PROTECTION  
5564 CROSSROADS

Page 4  
Date 12/12/2016

| Node No. | Elevation | K-Fact | Pt Actual | Pn | Flow Actual | Density | Area | Press Req. |
|----------|-----------|--------|-----------|----|-------------|---------|------|------------|
| 1        | 132.125   | 4.9    | 10.66     | na | 16.0        | 0.1     | 1    | 10.66      |
| 2        | 132.125   | 4.9    | 11.63     | na | 16.71       | 0.1     | 1    | 10.66      |
| 3        | 132.125   |        | 19.0      | na |             |         |      |            |
| 4        | 132.125   |        | 20.42     | na |             |         |      |            |
| 5        | 132.125   |        | 22.75     | na |             |         |      |            |
| 6        | 125.96    |        | 26.35     | na |             |         |      |            |
| 7        | 125.96    |        | 27.62     | na |             |         |      |            |
| 8        | 116.46    |        | 32.8      | na |             |         |      |            |
| 9        | 106.25    |        | 39.25     | na |             |         |      |            |
| 10       | 106.25    |        | 41.71     | na |             |         |      |            |
| 11       | 106.25    |        | 43.5      | na |             |         |      |            |
| TOR      | 106.25    |        | 44.14     | na |             |         |      |            |
| PUMP     | 101.0     |        | 50.01     | na |             |         |      |            |

The maximum velocity is 12.14 and it occurs in the pipe between nodes 2 and 3

# Final Calculations - Hazen-Williams

EASTERN FIRE PROTECTION  
5564 CROSSROADS

Page 5  
Date 12/12/2016

| Hyd.<br>Ref.<br>Point | Qa<br>Qt | Dia.<br>"C"<br>Pf/Ft | Fitting<br>or<br>Eqv. | Ln. | Pipe<br>Ftng's<br>Total | Pt<br>Pe<br>Pf | Pt<br>Pv<br>Pn | ***** | Notes             | ***** |
|-----------------------|----------|----------------------|-----------------------|-----|-------------------------|----------------|----------------|-------|-------------------|-------|
| 1                     | 16.00    | 1.049                | E                     | 2.0 | 9.250                   | 10.660         |                |       | K Factor = 4.90   |       |
| to                    |          | 120.0                |                       | 0.0 | 2.000                   | 0.0            |                |       |                   |       |
| 2                     | 16.0     | 0.0861               |                       | 0.0 | 11.250                  | 0.969          |                |       | Vel = 5.94        |       |
| 2                     | 16.71    | 1.049                | E                     | 2.0 | 20.790                  | 11.629         |                |       | K Factor = 4.90   |       |
| to                    |          | 120.0                |                       | 0.0 | 2.000                   | 0.0            |                |       |                   |       |
| 3                     | 32.71    | 0.3233               |                       | 0.0 | 22.790                  | 7.367          |                |       | Vel = 12.14       |       |
| 3                     | 0.0      | 1.38                 | E                     | 3.0 | 13.790                  | 18.996         |                |       |                   |       |
| to                    |          | 120.0                |                       | 0.0 | 3.000                   | 0.0            |                |       |                   |       |
| 4                     | 32.71    | 0.0851               |                       | 0.0 | 16.790                  | 1.428          |                |       | Vel = 7.02        |       |
| 4                     | 0.0      | 1.38                 | 2E                    | 6.0 | 15.335                  | 20.424         |                |       |                   |       |
| to                    |          | 120.0                | T                     | 6.0 | 12.000                  | 0.0            |                |       |                   |       |
| 5                     | 32.71    | 0.0850               |                       | 0.0 | 27.335                  | 2.324          |                |       | Vel = 7.02        |       |
| 5                     | 0.0      | 1.38                 | E                     | 3.0 | 1.920                   | 22.748         |                |       |                   |       |
| to                    |          | 120.0                | T                     | 6.0 | 9.000                   | 2.670          |                |       |                   |       |
| 6                     | 32.71    | 0.0850               |                       | 0.0 | 10.920                  | 0.928          |                |       | Vel = 7.02        |       |
| 6                     | 0.0      | 1.38                 | 2E                    | 6.0 | 3.000                   | 26.346         |                |       |                   |       |
| to                    |          | 120.0                | T                     | 6.0 | 12.000                  | 0.0            |                |       |                   |       |
| 7                     | 32.71    | 0.0851               |                       | 0.0 | 15.000                  | 1.276          |                |       | Vel = 7.02        |       |
| 7                     | 0.0      | 1.38                 | E                     | 3.0 | 9.500                   | 27.622         |                |       |                   |       |
| to                    |          | 120.0                |                       | 0.0 | 3.000                   | 4.114          |                |       |                   |       |
| 8                     | 32.71    | 0.0850               |                       | 0.0 | 12.500                  | 1.063          |                |       | Vel = 7.02        |       |
| 8                     | 0.0      | 1.38                 | T                     | 6.0 | 17.875                  | 32.799         |                |       |                   |       |
| to                    |          | 120.0                |                       | 0.0 | 6.000                   | 4.422          |                |       |                   |       |
| 9                     | 32.71    | 0.0850               |                       | 0.0 | 23.875                  | 2.030          |                |       | Vel = 7.02        |       |
| 9                     | 0.0      | 1.38                 | 2E                    | 6.0 | 16.950                  | 39.251         |                |       |                   |       |
| to                    |          | 120.0                | T                     | 6.0 | 12.000                  | 0.0            |                |       |                   |       |
| 10                    | 32.71    | 0.0850               |                       | 0.0 | 28.950                  | 2.461          |                |       | Vel = 7.02        |       |
| 10                    | 0.0      | 1.38                 | E                     | 3.0 | 12.000                  | 41.712         |                |       |                   |       |
| to                    |          | 120.0                | T                     | 6.0 | 9.000                   | 0.0            |                |       |                   |       |
| 11                    | 32.71    | 0.0850               |                       | 0.0 | 21.000                  | 1.786          |                |       | Vel = 7.02        |       |
| 11                    | 0.0      | 1.61                 | 2E                    | 8.0 | 7.920                   | 43.498         |                |       |                   |       |
| to                    |          | 120.0                |                       | 0.0 | 8.000                   | 0.0            |                |       |                   |       |
| TOR                   | 32.71    | 0.0401               |                       | 0.0 | 15.920                  | 0.639          |                |       | Vel = 5.15        |       |
| TOR                   | 0.0      | 1.61                 | S                     | 9.0 | 6.000                   | 44.137         |                |       |                   |       |
| to                    |          | 120.0                | Fsp                   | 0.0 | 9.000                   | 5.274          |                |       | ** Fixed Loss = 3 |       |
| PUMP                  | 32.71    | 0.0401               |                       | 0.0 | 15.000                  | 0.602          |                |       | Vel = 5.15        |       |
|                       | 0.0      |                      |                       |     |                         |                |                |       |                   |       |
|                       | 32.71    |                      |                       |     |                         | 50.013         |                |       | K Factor = 4.63   |       |