

Hydraulic Design Information Sheet

Name - Portland Public Schools Kitchen Renovation Date - 5-21-13  
 Location - Kitchen prep area  
 Building - System No. - 1 of 1  
 Contractor - Residential Fire Protection Contract No. - C13012  
 Calculated By - JAL Drawing No. - 1 of 1  
 Construction: ( ) Combustible (X) Non-Combustible Ceiling Height - 10'-0"  
 Occupancy - Kitchen/Food Prep

S (X) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.  
 Y ( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve

S Other

T Specific Ruling Made By Date

Specific Ruling	Made By	Date
M Area of Sprinkler Operation - 900	System Type	Sprinkler/Nozzle
Density - .15	( ) Wet	Make Viking
D Area Per Sprinkler - 144	( ) Dry	Model VK302
E Elevation at Highest Outlet - 10'	( ) Deluge	Size 1/2"
S Hose Allowance - Inside -	( ) Preaction	K-Factor 5.6
I Rack Sprinkler Allowance -	( ) Other	Temp.Rat.155
G Hose Allowance - Outside - 100		

N Note Safety Margin: 48.259

Calculation Flow Required - 283.095 Press Required - 34.586  
 Summary C-Factor Used: 120 Overhead 140 Underground

Water Flow Test:	Pump Data:	Tank or Reservoir:
A Date of Test - 9-12-11	Rated Cap.-	Cap. -
T Time of Test -	@ Press -	Elev.-
E Static Press - 83	Elev. -	Well
R Residual Press - 80		Proof Flow
Flow - 1403		
S Elevation - 0		

U Location -

P  
 L Source of Information -  
 Y

Commodity	Class	Location
Storage Ht.	Area	Aisle W.
M Storage Method: Solid Piled	% Palletized	% Rack
( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage
( ) Double Row	( ) Slave Pallet	( ) Encap.
( ) Mult. Row	( ) Solid Shelf	( ) Non
	( ) Open Shelf	

R K Flue Spacing Clearance:Storage to Ceiling  
 A Longitudinal Transverse

G  
 E Horizontal Barriers Provided:

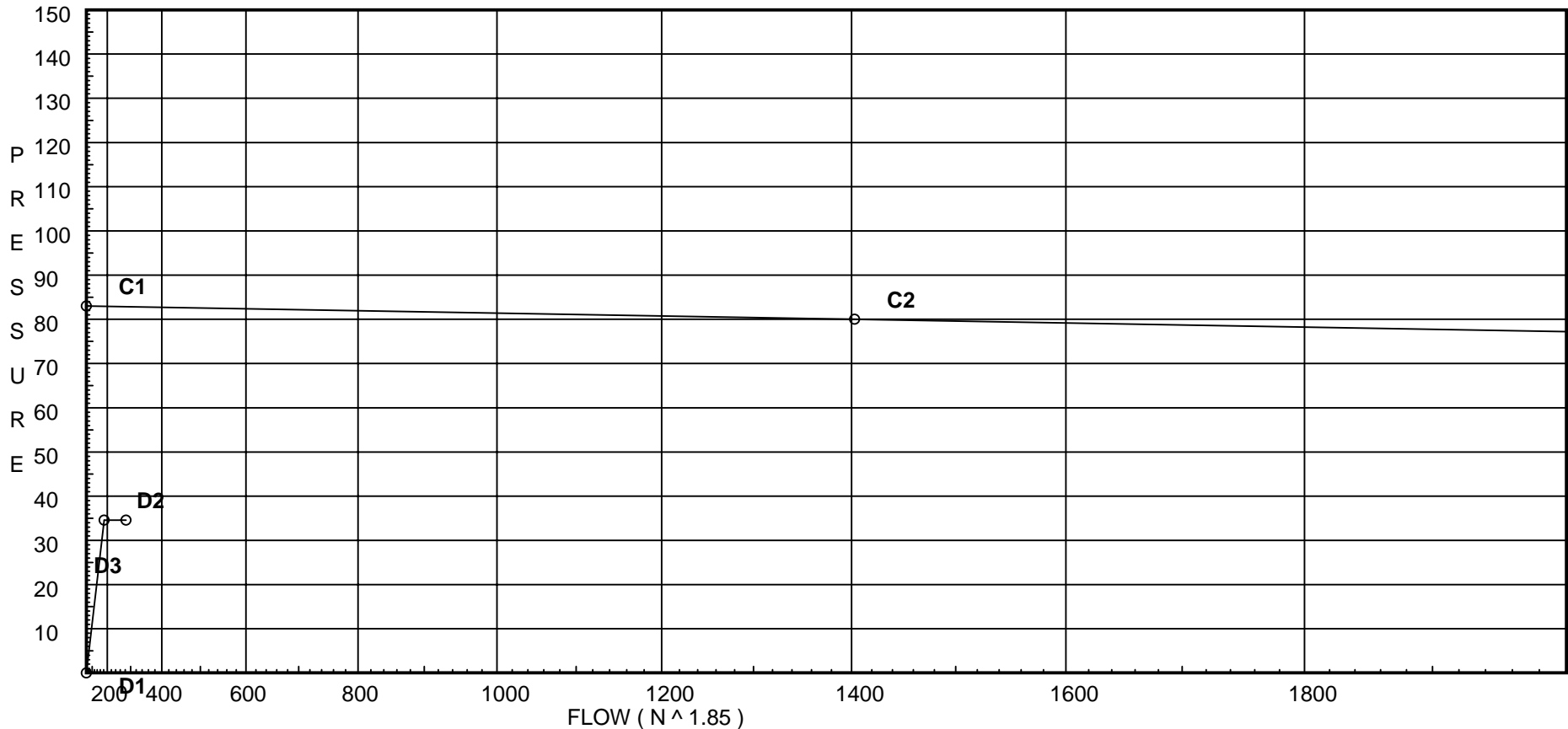
# Water Supply Curve (C)

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City Water Supply:  
C1 - Static Pressure : 83  
C2 - Residual Pressure: 80  
C2 - Residual Flow : 1403

Demand:  
D1 - Elevation : \_\_\_\_\_  
D2 - System Flow : 183.095  
D2 - System Pressure : 34.586  
Hose ( Adj City ) : \_\_\_\_\_  
Hose ( Demand ) : 100  
D3 - System Demand : 283.095  
Safety Margin : 48.259



# Fittings Used Summary

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Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24	
A	Generic Alarm Valve	0	0	0	0	0	0	7.7	21.5	0	17	17	27	29	0	0	0	0	0	0	0	0
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61	
G	Generic Gate Valve	0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13	
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121	

# Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HD1	10.0	5.6	14.88	na	21.6	0.15	144	7.0
HD2	10.0	5.6	14.88	na	21.6	0.15	144	7.0
1	13.4	K = K @ DRP1	14.23	na	21.6			
2	13.4	K = K @ DRP2	15.43	na	22.15			
3	13.4	K = K @ DRP2	22.07	na	26.49			
4	13.4	K = K @ DRP2	26.27	na	28.89			
5	13.4	K = K @ DRP2	21.31	na	26.03			
6	13.4	K = K @ DRP2	25.13	na	28.26			
7	13.4	K = K @ DRP2	27.73	na	29.69			
10	13.4		31.34	na				
11	13.4		31.46	na				
12	13.4		33.12	na				
TR	13.4		33.98	na				
BR	13.4		34.27	na	100.0			
UG1	13.4		34.53	na				
TEST	13.4		34.59	na				

The maximum velocity is 21.26 and it occurs in the pipe between nodes 4 and 10

# Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftg's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
HD1 to DRP1	21.60 21.6	1.049 120 0.1500	1E	2.0 0.0 0.0	3.500 2.000 5.500	14.878 -1.473 0.825			K Factor = 5.60 Vel = 8.02	
	0.0 21.60					14.230			K Factor = 5.73	
HD2 to DRP2	21.60 21.6	1.049 120 0.1500	1T	5.0 0.0 0.0	3.500 5.000 8.500	14.878 -1.473 1.275			K Factor = 5.60 Vel = 8.02	
	0.0 21.60					14.680			K Factor = 5.64	
1 to 2	21.60 21.6	1.049 120 0.1501		0.0 0.0 0.0	8.000 0.0 8.000	14.230 0.0 1.201			K Factor @ node DRP1 Vel = 8.02	
2 to 3	22.14 43.74	1.049 120 0.5536		0.0 0.0 0.0	12.000 0.0 12.000	15.431 0.0 6.643			K Factor @ node DRP2 Vel = 16.24	
3 to 4	26.49 70.23	1.38 120 0.3495		0.0 0.0 0.0	12.000 0.0 12.000	22.074 0.0 4.194			K Factor @ node DRP2 Vel = 15.06	
4 to 10	28.90 99.13	1.38 120 0.6613	1T	6.0 0.0 0.0	1.670 6.000 7.670	26.268 0.0 5.072			K Factor @ node DRP2 Vel = 21.26	
	0.0 99.13					31.340			K Factor = 17.71	
5 to 6	26.03 26.03	1.049 120 0.2118	2E	4.0 0.0 0.0	14.000 4.000 18.000	21.312 0.0 3.813			K Factor @ node DRP2 Vel = 9.66	
6 to 7	28.25 54.28	1.38 120 0.2171		0.0 0.0 0.0	12.000 0.0 12.000	25.125 0.0 2.605			K Factor @ node DRP2 Vel = 11.64	
7 to 11	29.69 83.97	1.38 120 0.4864	1T	6.0 0.0 0.0	1.670 6.000 7.670	27.730 0.0 3.731			K Factor @ node DRP2 Vel = 18.01	
	0.0 83.97					31.461			K Factor = 14.97	
10 to 11	99.13 99.13	3.26 120 0.0101		0.0 0.0 0.0	12.000 0.0 12.000	31.340 0.0 0.121			Vel = 3.81	
11 to 12	83.97 183.1	3.26 120 0.0313		0.0 0.0 0.0	53.000 0.0 53.000	31.461 0.0 1.658			Vel = 7.04	
12 to TR	0.0 183.1	4.26 120 0.0085	3E 1T	39.501 26.334 0.0	35.750 65.835 101.585	33.119 0.0 0.863			Vel = 4.12	
TR to BR	0.0 183.1	4.26 120 0.0085	1A 1G	22.384 2.633 0.0	8.600 25.017 33.617	33.982 0.0 0.286			Vel = 4.12	
BR to UG1	100.00 283.1	8.27 140 0.0006	1G 1T	6.326 55.354 0.0	400.000 61.680 461.680	34.268 0.0 0.261			Qa = 100 Vel = 1.69	

# Final Calculations - Standard

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Hyd. Ref. Point	Qa  Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
UG1	0.0	12.34	1G 9.377	600.000	34.529				
to		140	1T 93.767	103.144	0.0				
TEST	283.1	0.0001	0.0	703.144	0.057		Vel = 0.76		
	0.0								
	283.10				34.586		K Factor = 48.14		