(3-161457-RS 2

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Bureau of Development Services

OCT 18 2013

Reviewed for Code Compliance with the
NFPA 13D Standard
for Residential Sprinkler Systems

. . . Fire Protection by Computer Design

City of Portland
REVIEWED FOR CODE
COMPLIANCE

NOV 27 2013

Permit Number

Vanport Fire Sprinklers, Inc.
6101 NE 127th Ave.
Suite 200
Vancouver, WA. 98682
(360) 256-9838

Job Name	:	DEFFO HOUSE BEDROOM 5
Building	:	FP-1
Location	:	2320 SE 153RD AVE., PORTLAND OR 97233
System	:	REMOTE AREA #2
Contract	:	13RP-008
Data File	:	DEFFO HOUSE BEDROOM 5.WXF

HYDRAULIC CALCULATIONS
for

Project name: DEFFO HOUSE
Location: 2320 SE 153RD AVE., PORTLAND OR 97233
Drawing no: FP-1
Date: 10/10/2013

Design

Remote area number: REMOTE AREA #2
Remote area location: BEDROOM 5
Occupancy classification: LIGHT HAZARD
Density: .05 - Gpm/SqFt
Area of application: 145 - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: RESIDENTIAL, 4.9K, RECESSED PENDENT, 155F
No. of sprinklers calculated: 1
In-rack demand: - GPM
Hose streams: 0 - GPM
Total water required (including hose streams): 12.9642 - GPM @ 24.5502 - Psi
Type of system: WET SPRINKLER SYSTEM
Volume of dry or preaction system: - Gal

Water supply information

Date: 9/25/2013
Location: 2320 SE 153RD AVE.
Source: PORTALND WATER BUREAU

Name of contractor: Vanport Fire Sprinklers, Inc.
Address: 6101 NE 127th Ave. / Suite 200 / Vancouver, WA. 98682
Phone number: (360) 256-98
Name of designer: CRISTIAN G.
Authority having jurisdiction: CITY OF PORTLAND
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve (C)

Vanport Fire Sprinklers, Inc.
DEFFO HOUSE BEDROOM 5

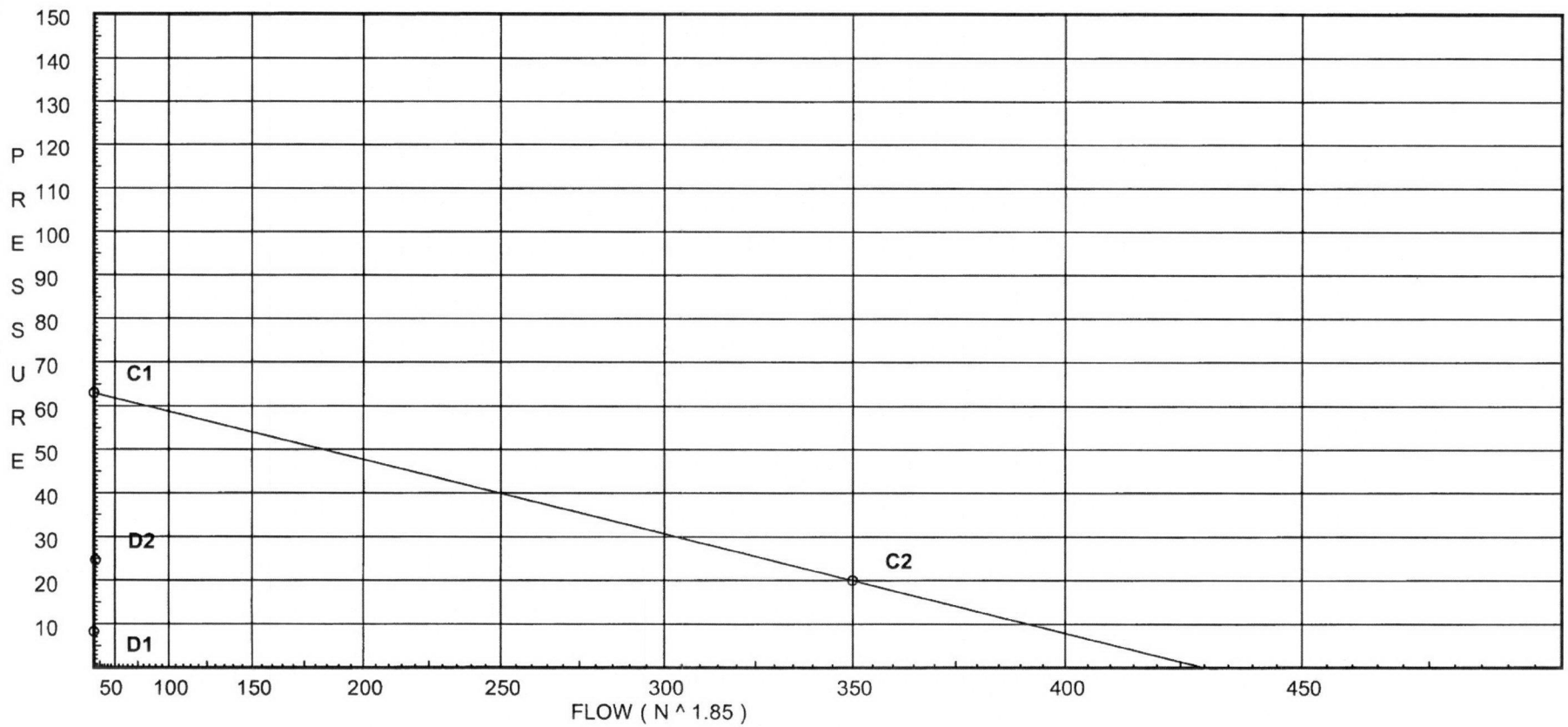
Date 10/10/2013

City Water Supply:

C1 - Static Pressure	:	63
C2 - Residual Pressure:		20
C2 - Residual Flow	:	350

Demand:

D1 - Elevation	:	8.229
D2 - System Flow	:	12.964
D2 - System Pressure	:	24.550
Hose (Demand)	:	_____
D3 - System Demand	:	12.964
Safety Margin	:	38.353



```
    13
D2 → 200
↑
|   13
|
TOR
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Fittings Used Summary

Vanport Fire Sprinklers, Inc.
DEFFO HOUSE BEDROOM 5

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	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
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
Zaa	Ames 2000B	Fitting generates a Fixed Loss Based on Flow																			

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

Vanport Fire Sprinklers, Inc.
DEFFO HOUSE BEDROOM 5

Date 10/10/2013

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HEADS	0.0		15.23	na				
200	19.0	4.9	7.0	na	12.96	0.05	256	7.0
LINES	0.0		15.23	na				
D2	0.0		17.57	na				
RISER	0.0		15.23	na				
TOR	0.0		20.08	na				
BOR	0.0		24.5	na				
TEST	0.0		24.55	na				

The maximum velocity is 4.37 and it occurs in the pipe between nodes 200 and D2

Final Calculations - Hazen-Williams

Vanport Fire Sprinklers, Inc.
DEFFO HOUSE BEDROOM 5

Date 10/10/2013

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt / Pe / Pf	Pt / Pv / Pn	******* Notes ******
200	12.96	1.101	3O	15.0	57.750	7.000		K Factor = 4.90
to		150.0	1E	3.825	18.825	8.229		
D2	12.96	0.0305		0.0	76.575	2.336		Vel = 4.37
	0.0							
	12.96					17.565		K Factor = 3.09
D2	12.96	1.101	5E	19.125	43.250	17.565		
to		150.0	4O	20.0	39.126	0.0		
TOR	12.96	0.0305		0.0	82.376	2.513		Vel = 4.37
	0.0							
	12.96					20.078		K Factor = 2.89
TOR	12.96	1.598	1Zaa	0.0	8.500	20.078		
to		150.0	1S	13.113	13.113	4.315		* Fixed loss = 4.315
BOR	12.96	0.0050		0.0	21.613	0.107		Vel = 2.07
BOR	0.0	1.598		0.0	10.000	24.500		
to		150.0		0.0	0.0	0.0		
TEST	12.96	0.0050		0.0	10.000	0.050		Vel = 2.07
	0.0							
	12.96					24.550		K Factor = 2.62

2

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Permit Number

Vanport Fire Sprinklers, Inc.
6101 NE 127th Ave.
Suite 200
Vancouver, WA. 98682
(360) 256-9838

Job Name	:	DEFFO HOUSE 1ST LEVEL
Building	:	FP-1
Location	:	2320 SE 153RD AVE., PORTLAND OR 97233
System	:	REMOTE AREA #1
Contract	:	13RP-008
Data File	:	DEFFO HOUSE 1ST LEVEL.WXF

HYDRAULIC CALCULATIONS
for

Project name: DEFFO HOUSE
Location: 2320 SE 153RD AVE., PORTLAND OR 97233
Drawing no: FP-1
Date: 10/10/2013

Design

Remote area number: REMOTE AREA #1
Remote area location: 1ST LEVEL CORRIDOR
Occupancy classification: LIGHT HAZARD
Density: .05 - Gpm/SqFt
Area of application: 256 - SqFt
Coverage per sprinkler: 256 - SqFt
Type of sprinklers calculated: RESIDENTIAL, 4.9K, RECESSED PENDENT, 155F
No. of sprinklers calculated: 2
In-rack demand: - GPM
Hose streams: 0 - GPM
Total water required (including hose streams): 26.2975 - GPM @ 35.337 - Psi
Type of system: WET SPRINKLER SYSTEM
Volume of dry or preaction system: - Gal

Water supply information

Date: 9/25/2013
Location: 2320 SE 153RD AVE.
Source: PORTALND WATER BUREAU

Name of contractor: Vanport Fire Sprinklers, Inc.
Address: 6101 NE 127th Ave. / Suite 200 / Vancouver, WA. 98682
Phone number: (360) 256-98
Name of designer: CRISTIAN G.
Authority having jurisdiction: CITY OF PORTLAND
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve (C)

Vanport Fire Sprinklers, Inc.
DEFFO HOUSE 1ST LEVEL

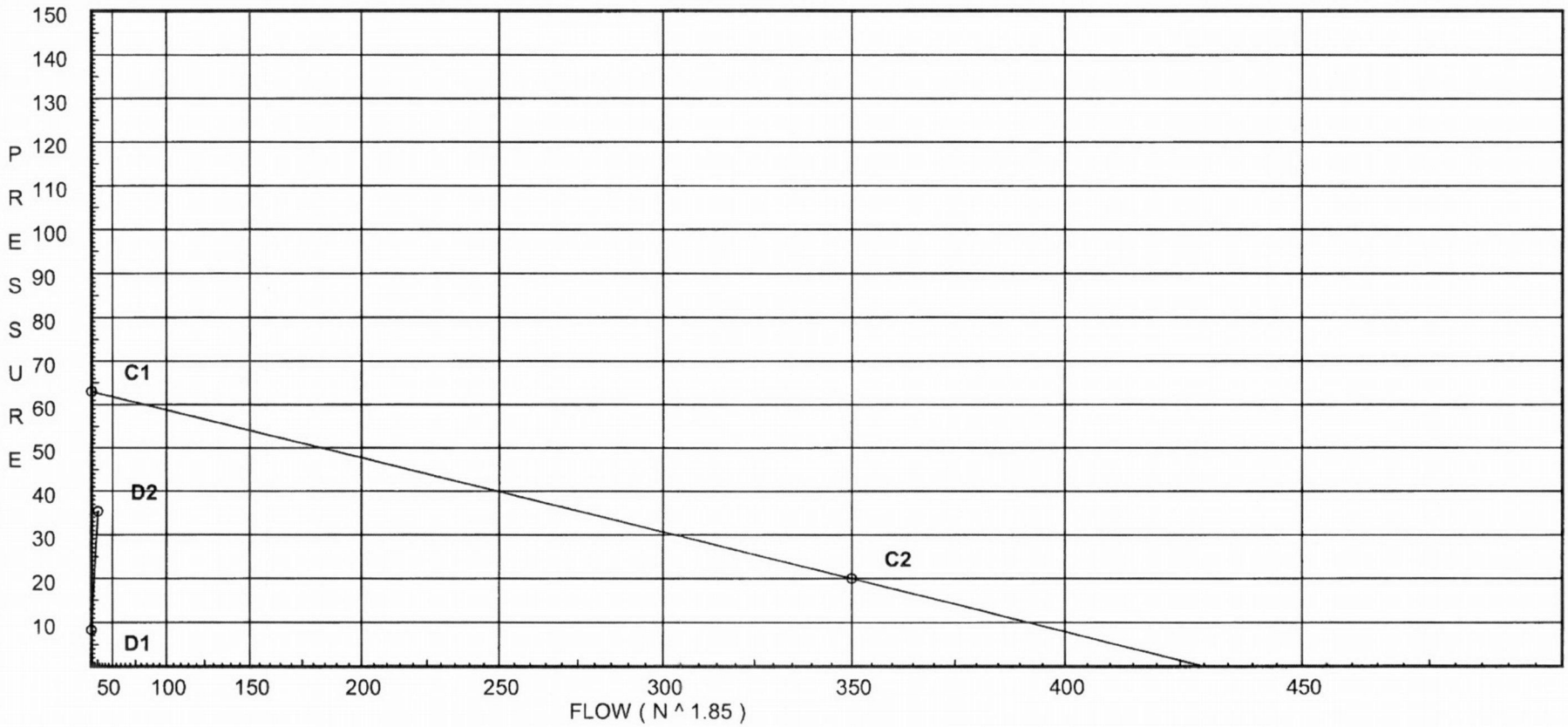
Date 10/10/2013

City Water Supply:

C1 - Static Pressure	:	63
C2 - Residual Pressure:		20
C2 - Residual Flow	:	350

Demand:

D1 - Elevation	:	8.229
D2 - System Flow	:	26.298
D2 - System Pressure	:	35.337
Hose (Demand)	:	_____
D3 - System Demand	:	26.298
Safety Margin	:	27.305



```
    26.3
D1 → 101 → 100
↑          13
|   26.3
|
TOR
```

Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	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
O *	CPVC Tee - Branch	3	3	5	6	8	10	12	15	0	0	0	0	0	0	0	0	0	0	0	0
S	NFPA 13 Swing Check	0	0	5	7	9	11	14	16	19	22	27	32	45	55	65					
Zaa	Ames 2000B	Fitting generates a Fixed Loss Based on Flow																			

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

Vanport Fire Sprinklers, Inc.
DEFFO HOUSE 1ST LEVEL

Date 10/10/2013

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HEADS	0.0		15.23	na				
100	19.0	4.9	7.0	na	12.96	0.05	256	7.0
101	19.0	4.9	7.4	na	13.33	0.05	256	7.0
LINES	0.0		15.23	na				
D1	0.0		23.54	na				
RISER	0.0		15.23	na				
TOR	0.0		30.25	na				
BOR	0.0		35.15	na				
TEST	0.0		35.34	na				

The maximum velocity is 8.86 and it occurs in the pipe between nodes 101 and D1

Final Calculations - Hazen-Williams

Vanport Fire Sprinklers, Inc.
DEFFO HOUSE 1ST LEVEL

Date 10/10/2013

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt / Pe / Pf	Pt / Pv / Pn	******* Notes ******
100	12.96	1.101		0.0	13.250	7.000		K Factor = 4.90
to		150.0		0.0	0.0	0.0		
101	12.96	0.0305		0.0	13.250	0.404		Vel = 4.37
101	13.34	1.101	4O	20.0	50.000	7.404		K Factor = 4.90
to		150.0		0.0	20.000	8.229		
D1	26.3	0.1129		0.0	70.000	7.903		Vel = 8.86
	0.0							
	26.30					23.536		K Factor = 5.42
D1	26.30	1.101	3O	15.0	33.000	23.536		
to		150.0	3E	11.475	26.475	0.0		
TOR	26.3	0.1129		0.0	59.475	6.715		Vel = 8.86
	0.0							
	26.30					30.251		K Factor = 4.78
TOR	26.30	1.598	1Zaa	0.0	8.500	30.251		
to		150.0	1S	13.113	13.113	4.504		* Fixed loss = 4.504
BOR	26.3	0.0184		0.0	21.613	0.398		Vel = 4.21
BOR	0.0	1.598		0.0	10.000	35.153		
to		150.0		0.0	0.0	0.0		
TEST	26.3	0.0184		0.0	10.000	0.184		Vel = 4.21
	0.0							
	26.30					35.337		K Factor = 4.42