DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK

CITY OF PORTLAND

BUILDING PERMIT

This is to certify that
RESIDENTIAL FIRE PROTECTION LLC
64 DAGGETT HILL RD
GREENE, ME 04236

For installation at
23 BEDFORD ST
USM MAINTENANCE BUILDING

Job ID: 2012-04-3694-ALTCOMM

CBL: 114A- G-009-001

has permission to install NFPA 13 automatic sprinkler system
provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.	A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

58

Fire Prevention Officer **Code Enforcement Officer / Plan Reviewer**

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
PENALTY FOR REMOVING THIS CARD

PORTLAND MAINE

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Director of Planning and Urban Development
Penny St. Louis

Job ID: 2012-04-3694-ALTCOMM install NFPA 13 automatic sprinkler system

For installation at: 23 BEDFORD ST USM MAINTENANCE BUILDING

CBL: 114A- G-009-001

Conditions of Approval:

Fire

Installation shall be in accordance with NFPA 13. A signed compliance letter will be required.

A separate sprinkler permit is required from the State Fire Marshal's Office.

If the building has a fire alarm system, sprinkler supervision shall be provided in accordance with NFPA 101, *Life Safety Code*, and NFPA 72, *National Fire Alarm and Signaling Code*.

Sprinkler protection shall be maintained. Where the system is to be shut down for maintenance or repair, the system shall be checked at the end of each day to insure the system has been placed back in service.

The Fire Department will require Knox locking caps on all Fire Department Connections on the exterior of the building.

System acceptance and commissioning must be coordinated with alarm and suppression system contractors and the Fire Department. Call 874-8703 to schedule.

A Knox Box is required.

Private fire mains and fire hydrants shall be maintained, tested and painted in accordance with City Code Chapter 10, Art IV and Chapter 2 of the Fire Department Rules and Regulations.

City of Portland, Maine - Building or Use Permit Application
389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No:	Date Applied:	CBL:	
2012-04-3694-ALTCOMM **2012-44731 FAFS**	**6/7/2012**	**114A- G-009-001**	
Location of Construction: **23 BEDFORD ST**	Owner Name: **UNIVERSITY OF MAINE**	Owner Address: **107 MAINE AVE** **BANGOR, ME 04401**	Phone:
Business Name: **USM maintenance Bldg**	Contractor Name: **RESIDENTIAL FIRE PROTECTION**	Contractor Address: **64 DAGGETT HILL ROAD, GREENE, ME 04236**	Phone: **(207) -946-3473**
Lessee/Buyer's Name:	Phone:	Permit Type: **FAFS**	Zone: **B-2 & USM OVERLAY**
Past Use: **USM Maintenance Bldg**	Proposed Use: **Same: USM Maintenance Bldg – to install fire suppression system**	Cost of Work: **$24,000.00** Fire Dept: 6/14/12 ✓ Approved w/ conditions ___ Denied ___ N/A Signature: BJ Walsh. (58)	CEO District: Inspection: Use Group: Type: Signature:
Proposed Project Description: **install fire suppression system**		Pedestrian Activities District (P.A.D.)	
Permit Taken By: Brad			

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building Permits do not include plumbing, septic or electrial work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.

Zoning Approval

Special Zone or Reviews	Zoning Appeal	Historic Preservation
___ Shoreland	___ Variance	✓ Not in Dist or Landmark
___ Wetlands	___ Miscellaneous	___ Does not Require Review
___ Flood Zone	___ Conditional Use	___ Requires Review
___ Subdivision	___ Interpretation	___ Approved
___ Site Plan	___ Approved	___ Approved w/Conditions
___ Maj ___ Min ___ MM	___ Denied	___ Denied
Date: OK 6/8/12	Date:	Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT ADDRESS DATE PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE DATE PHONE

Water-Based Fire Suppression System Permit

If you or the property owner owes real estate or property taxes or user charges on any property within the city, payment arrangements must be made before permits of any kind are accepted.

Parent #: 2012-04-3694 - ALTCOMM

Installation address: ~~25~~ 23 Bedford St. 2012-04731 CBL: 11N A 6009

Exact location: (within structure) Entire Building

Type of occupancy(s) (NFPA & ICC): Offices/Maintenance shop USM overlay B-2

Building owner: USM

Managing Supervisor (RMS): Stan Camic License No: 80

Supervisor phone: 207-713-5912 E-mail: scamic@rfpllc.net

Installing contractor: Residential Fire Protection License No: 511

Contractor phone: 207-946-3473 E-mail: scamic@rfpllc.net

The suppression work to be done will be: New: (●) Renovation: ( ) Addition to existing system: ( )

This is an amendment to an existing permit: Yes: ( ) NO ( ) Permit no: _____

NFPA Standard this system is designed to: 13 Edition: 3010

*Non-NFPA systems are not approved for use within the City of Portland.

Download a new copy of this document from www.portlandmaine.gov/fire for every submittal. Attach all working documents and complete approved submittals as may be required by the State Fire Marshal's Office on electronic PDF's in addition to full sized plans.

Contractor shall verify location and type of all FDCs shall be approved in writing by the Fire Prevention Bureau.

COST OF WORK: 23,230.00

PERMIT FEE: 260.00

($10 PER $1,000 + $30 FOR THE FIRST $1,000)

RECEIVED

JUN 07 2012

Dept. of Building Inspections
City of Portland Maine

Submit all information to the Building Inspections Department, 389 Congress Street, Room 315, Portland, Maine 04101.

Prior to acceptance of any fire protection system, a complete commissioning and acceptance test must be coordinated with all fire system contractors and the Fire Department, and proper documentation of such test(s) provided.

All installation(s) must comply with NFPA and the Fire Department Technical Standard(s).

Applicant signature: _____ Date: 6-5-12

PORTLAND MAINE

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Receipts Details:

Tender Information: Check , Check Number: 3549
Tender Amount: 260.00

Receipt Header:

Cashier Id: bsaucier
Receipt Date: 6/7/2012
Receipt Number: 44732

Receipt Details:

Referance ID:	6807	Fee Type:	BP-FIRE
Receipt Number:	0	Payment Date:	
Transaction Amount:	260.00	Charge Amount:	260.00
Job ID: Job ID: 2012-04-3694-ALTCOMM - Interior Renovations/ Floor plan reconfiguration			
Additional Comments: 23 (25) Bedford			

Thank You for your Payment!

State of Maine
Department of Public Safety
Fire Sprinkler System Permit

10039

USM 25 Bedford St. Renovation

Located at: 25 Bedford St.
In the Town of: Portland
Occupancy/Use: Office/Maintenance facility
Type of System: NFPA 13

Permission is hereby given to:

Residential Fire Protection LLC
64 Daggett Hill Road
Greene, ME 04236
Contractor License # **511**

to begin installation according to plans submittal approved by the Office of State Fire Marshal.
The submittal is filed under log # **2121238** , and no departure from the application submittal shall be made without prior approval in writing. This permit is issued under the provisions of Title 32, Chapter 20, Section 12004-I. Nothing herein shall excuse the holder of this permit from failure to comply with local ordinances, zoning laws, o other pertinent legal restrictions. This permit shall be displayed at the construction site or be made readily available.

This permit was issued on **6/7/2012** for a fee paid of **$177.00**

This permit will expire at midnight on ***Tuesday, December 04, 2012***

The expiration date applies only if the installation has not begun by that date and no permission has been granted to extend the date. Once installation begins, then the permit is valid for however long it takes to complete the installation, assuming that the work is fairly continuous.

John E Morris

John E. Morris
Commissioner

The type of Fire Department Connection and its location is to be according to the Local Fire Department

Within 30 days of the completion of a new fire sprinkler system or an addition to an existing fire sprinkler system, a fire sprinkler system contractor shall provide to the Office of State Fire Marshal a copy of this permit signed and dated by the certified Responsible Managing Supervisor representing that the fire sprinkler system has been installed according to specifications of the approved plan to the best of the supervisor's knowledge, information, and belief. This requirement is part of the sprinkler law, and neglect of this duty is grounds to not renew the contractor's license to do work in the State of Maine. All renewed sprinkler licenses are good for two years and expire on a June 30th.

Job completed, tested and verified by date of _____

RMS for this job: Camic Stan

RMS Signature:_____

Hydraulic Design Information Sheet

Name - USM 25 Bedford St. Date - 6-1-12
Location - Above ceiling
Building - System No. - 1 of 1
Contractor - Residential Fire Protection Contract No. - C12017
Calculated By - JAL Drawing No. - 1 of 1
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - 12'-9"
Occupancy - Unoccupied concealed space

SYSTEM DESIGN

(X) NFPA 13 (X) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.
( ) NFPA 231 ( ) NFPA 231C ( ) Figure Curve
Other
Specific Ruling Made By Date

Area of Sprinkler Operation - 1500	System Type	Sprinkler/Nozzle
Density - .1	(X) Wet	Make Victaulic
Area Per Sprinkler - 130	( ) Dry	Model V2704
Elevation at Highest Outlet - 19.75	( ) Deluge	Size 1/2"
Hose Allowance - Inside -	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance -	( ) Other	Temp.Rat.200
Hose Allowance - Outside - 100		

Note Safety Margin: 63.373

Calculation Summary: Flow Required - 307.163 Press Required - 39.060
C-Factor Used: 120 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - 8-23-07		Cap. -
Time of Test -	Rated Cap.-	Elev.-
Static Press - 104	@ Press -	
Residual Press - 20	Elev. -	Well
Flow - 2642		Proof Flow
Elevation - 0		

Location -

Source of Information -

STORAGE

Commodity Class Location
Storage Ht. Area Aisle W.
Storage Method: Solid Piled % Palletized % Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non
( ) Mult. Row		( ) Open Shelf	

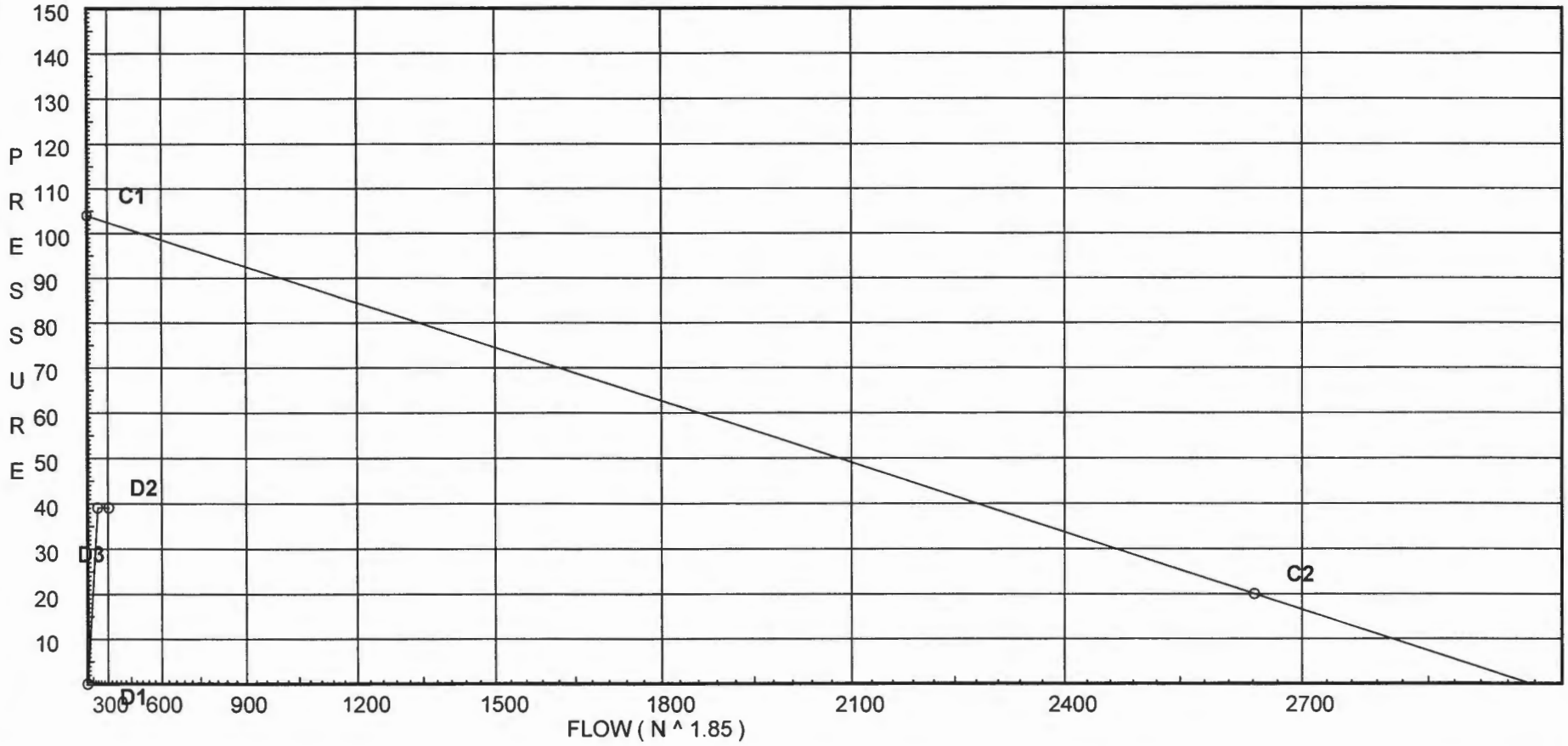
Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

City Water Supply:
- C1 - Static Pressure : 104
- C2 - Residual Pressure: 20
- C2 - Residual Flow : 2642

Demand:

D1 - Elevation	:	
D2 - System Flow	:	207.163
D2 - System Pressure	:	39.060
Hose (Adj City)	:	
Hose (Demand)	:	100
D3 - System Demand	:	307.163
Safety Margin	:	63.372



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	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
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			

Pressure / Flow Summary - STANDARD

RESIDENTIAL FIRE PROTECTION
USM 25 Bedford St. Renovation

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HD1	19.75	5.6	7.0	na	14.82	0.1	130	7.0
1	0.0	K = K @ SPG1	16.08	na	14.82			
2	0.0	K = K @ SPG1	16.82	na	15.16			
3	0.0	K = K @ SPG1	19.3	na	16.23			
4	0.0	K = K @ SPG1	24.81	na	18.41			
5	0.0	K = K @ SPG1	27.31	na	19.31			
6	0.0	K = K @ SPG1	16.13	na	14.84			
7	0.0	K = K @ SPG1	16.88	na	15.18			
8	0.0	K = K @ SPG1	19.37	na	16.26			
9	0.0	K = K @ SPG1	24.9	na	18.44			
10	0.0	K = K @ SPG1	27.4	na	19.34			
11	0.0	K = K @ SPG1	28.45	na	19.71			
12	0.0	K = K @ SPG1	27.74	na	19.46			
20	0.0		28.41	na				
21	0.0		28.5	na				
22	0.0		28.85	na				
23	6.5		30.2	na				
TR	0.0		35.08	na				
BR	0.0		37.92	na	100.0			
TEST	0.0		39.06	na				

The maximum velocity is 17.18 and it occurs in the pipe between nodes 8 and 9

Final Calculations - Hazen-Williams

RESIDENTIAL FIRE PROTECTION
USM 25 Bedford St. Renovation

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
HD1	14.82	1.049	1T	5.0	2.000	7.000		K Factor = 5.60
to		120		0.0	5.000	8.554		
SPG1	14.82	0.0747		0.0	7.000	0.523		Vel = 5.50
	0.0							
	14.82					16.077		K Factor = 3.70
1	14.82	1.049		0.0	10.000	16.077		K Factor @ node SPG1
to		120		0.0	0.0	0.0		
2	14.82	0.0747		0.0	10.000	0.747		Vel = 5.50
2	15.15	1.049		0.0	9.000	16.824		K Factor @ node SPG1
to		120		0.0	0.0	0.0		
3	29.97	0.2750		0.0	9.000	2.475		Vel = 11.13
3	16.24	1.049		0.0	9.000	19.299		K Factor @ node SPG1
to		120		0.0	0.0	0.0		
4	46.21	0.6126		0.0	9.000	5.513		Vel = 17.15
4	18.40	1.38	1T	6.0	6.000	24.812		K Factor @ node SPG1
to		120		0.0	6.000	0.0		
20	64.61	0.2997		0.0	12.000	3.596		Vel = 13.86
	0.0							
	64.61					28.408		K Factor = 12.12
5	19.31	1.049	1T	5.0	4.000	27.310		K Factor @ node SPG1
to		120		0.0	5.000	0.0		
20	19.31	0.1220		0.0	9.000	1.098		Vel = 7.17
	0.0							
	19.31					28.408		K Factor = 3.62
6	14.84	1.049		0.0	10.000	16.133		K Factor @ node SPG1
to		120		0.0	0.0	0.0		
7	14.84	0.0749		0.0	10.000	0.749		Vel = 5.51
7	15.19	1.049		0.0	9.000	16.882		K Factor @ node SPG1
to		120		0.0	0.0	0.0		
8	30.03	0.2760		0.0	9.000	2.484		Vel = 11.15
8	16.26	1.049		0.0	9.000	19.366		K Factor @ node SPG1
to		120		0.0	0.0	0.0		
9	46.29	0.6146		0.0	9.000	5.531		Vel = 17.18
9	18.43	1.38	1T	6.0	6.000	24.897		K Factor @ node SPG1
to		120		0.0	6.000	0.0		
21	64.72	0.3006		0.0	12.000	3.607		Vel = 13.88
	0.0							
	64.72					28.504		K Factor = 12.12
10	19.34	1.049	1T	5.0	4.000	27.403		K Factor @ node SPG1
to		120		0.0	5.000	0.0		
21	19.34	0.1223		0.0	9.000	1.101		Vel = 7.18
	0.0							
	19.34					28.504		K Factor = 3.62
11	19.71	1.38	1T	6.0	6.000	28.451		K Factor @ node SPG1
to		120		0.0	6.000	0.0		
22	19.71	0.0332		0.0	12.000	0.399		Vel = 4.23
	0.0							
	19.71					28.850		K Factor = 3.67

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
12	19.46	1.049	1T	5.0	4.000	27.737		K Factor @ node SPG1
to		120		0.0	5.000	0.0		
22	19.46	0.1237		0.0	9.000	1.113		Vel = 7.22
	0.0							
	19.46					28.850		K Factor = 3.62
20	83.92	3.26		0.0	13.000	28.408		
to		120		0.0	0.0	0.0		
21	83.92	0.0074		0.0	13.000	0.096		Vel = 3.23
21	84.07	3.26		0.0	13.000	28.504		
to		120		0.0	0.0	0.0		
22	167.99	0.0266		0.0	13.000	0.346		Vel = 6.46
22	39.17	3.26	2E	18.815	66.875	28.850		
to		120	1T	20.159	38.974	-2.815		
23	207.16	0.0393		0.0	105.849	4.161		Vel = 7.96
23	0.0	3.26	3E	28.223	24.500	30.196		
to		120		0.0	28.223	2.815		
TR	207.16	0.0393		0.0	52.723	2.072		Vel = 7.96
TR	0.0	3.26	1Zac	0.0	5.000	35.083		
to		120	1Z	9.408	9.408	2.268		* Fixed loss = 2.268
BR	207.16	0.0393		0.0	14.408	0.566		Vel = 7.96
BR	100.00	4.1	1G	2.907	25.000	37.917		Qa = 100
to		140	1T	29.067	31.974	0.0		
TEST	307.16	0.0201		0.0	56.974	1.143		Vel = 7.46
	0.0							
	307.16					39.060		K Factor = 49.15

Hydraulic Design Information Sheet

Name - USM 25 Bedford St. Date - 6-1-12
Location - Maintenance Shop
Building - System No. - 1 of 1
Contractor - Residential Fire Proctection Contract No. - C12017
Calculated By - JAL Drawing No. - 1 of 1
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height - 12'-9"
Occupancy - Maintenance shop

SYSTEM DESIGN

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

Specific Ruling	Made By	Date

Area of Sprinkler Operation - 1500	System Type	Sprinkler/Nozzle
Density - .20	(X) Wet	Make Victaulic
Area Per Sprinkler - 130	( ) Dry	Model V2704
Elevation at Highest Outlet - 17.800	( ) Deluge	Size 1/2"
Hose Allowance - Inside -	( ) Preaction	K-Factor 5.6
Rack Sprinkler Allowance -	( ) Other	Temp.Rat.155
Hose Allowance - Outside - 100		

Note Safety Margin: 24.338

Calculation Summary: Flow Required - 626.880 Press Required - 73.793
C-Factor Used: 120 Overhead 140 Underground

WATER SUPPLY

Water Flow Test:	Pump Data:	Tank or Reservoir:
Date of Test - 8-23-07		Cap. -
Time of Test -	Rated Cap.-	Elev.-
Static Press - 104	@ Press -	
Residual Press - 20	Elev. -	Well
Flow - 2642		Proof Flow
Elevation - 0		

Location -

Source of Information -

COMMODITY STORAGE

Commodity Class Location
Storage Ht. Area Aisle W.
Storage Method: Solid Piled % Palletized % Rack

( ) Single Row	( ) Conven. Pallet	( ) Auto. Storage	( ) Encap.
( ) Double Row	( ) Slave Pallet	( ) Solid Shelf	( ) Non
( ) Mult. Row		( ) Open Shelf	

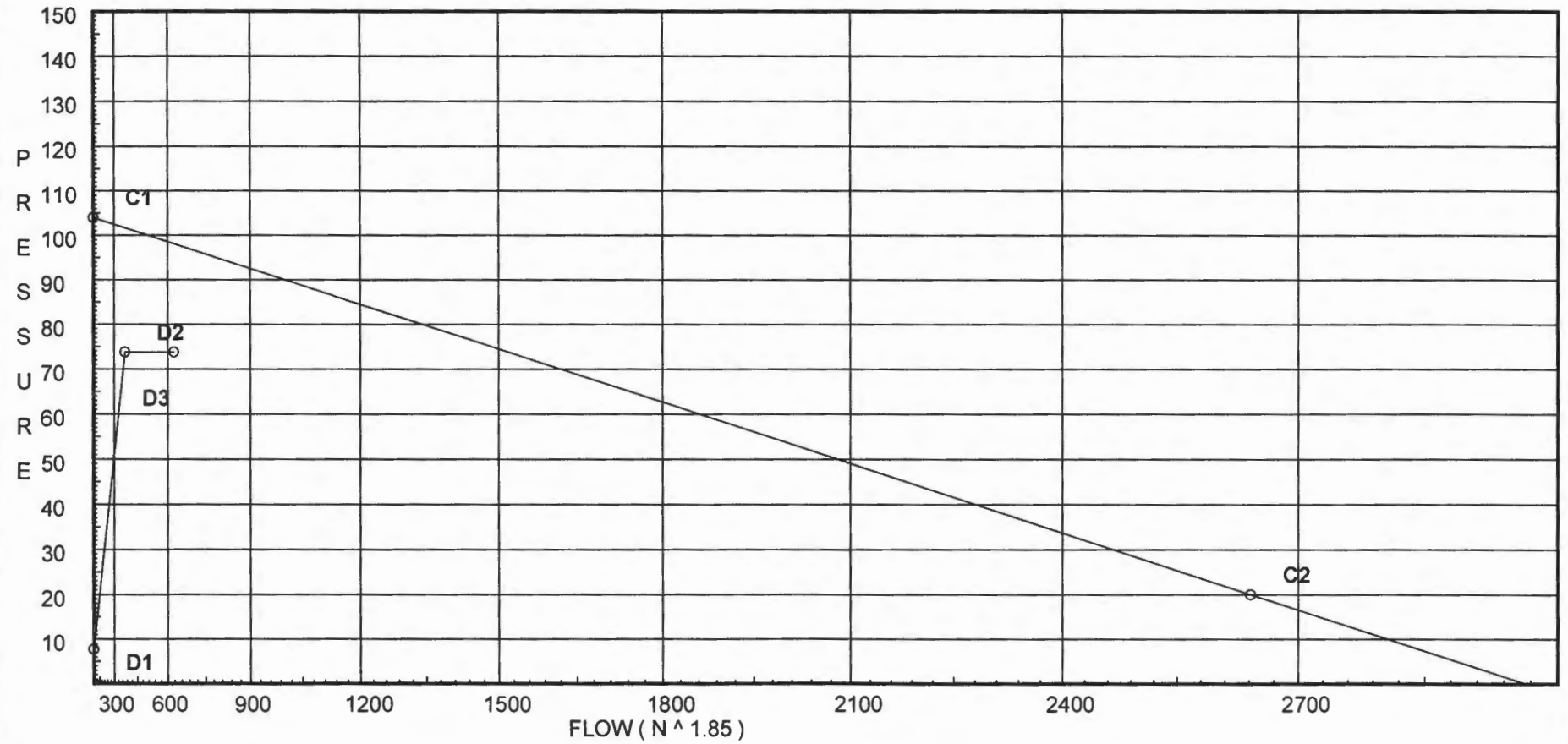
Flue Spacing Clearance:Storage to Ceiling
Longitudinal Transverse

Horizontal Barriers Provided:

City Water Supply:
- C1 - Static Pressure : 104
- C2 - Residual Pressure: 20
- C2 - Residual Flow : 2642

Demand:

D1 - Elevation	:	7.709
D2 - System Flow	:	376.88
D2 - System Pressure	:	73.794
Hose (Adj City)	:	
Hose (Demand)	:	250
D3 - System Demand	:	626.88
Safety Margin	:	24.338



Fittings Used Summary

RESIDENTIAL FIRE PROTECTION
USM Shop AREA

Date 06-01-12

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	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
Z	Generic Flow Switch	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			

Pressure / Flow Summary - STANDARD

RESIDENTIAL FIRE PROTECTION
USM Shop AREA

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	17.8	5.6	21.56	na	26.0	0.2	130	7.0
2	17.8	5.6	23.67	na	27.25	0.2	130	7.0
3	17.8	5.6	30.84	na	31.1	0.2	130	7.0
4	17.8	5.6	35.74	na	33.48	0.2	130	7.0
5	17.8	5.6	38.14	na	34.58	0.2	130	7.0
6	17.8	5.6	21.71	na	26.09	0.2	130	7.0
7	17.8	5.6	23.84	na	27.34	0.2	130	7.0
8	17.8	5.6	31.06	na	31.21	0.2	130	7.0
9	17.8	5.6	35.99	na	33.6	0.2	130	7.0
10	17.8	5.6	38.41	na	34.7	0.2	130	7.0
11	17.8	5.6	42.22	na	36.39	0.2	130	7.0
12	17.8	5.6	39.37	na	35.14	0.2	130	7.0
20	0.0		49.25	na				
21	0.0		49.54	na				
22	0.0		50.59	na				
23	0.0		59.77	na				
TR	0.0		66.04	na				
BR	0.0		71.79	na				
UG1	0.0		73.46	na	250.0			
TEST	0.0		73.79	na				

The maximum velocity is 19.84 and it occurs in the pipe between nodes 7 and 8

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
1	26.00	1.049		0.0	10.000	21.556		K Factor = 5.60
to		120		0.0	0.0	0.0		
2	26.0	0.2114		0.0	10.000	2.114		Vel = 9.65
2	27.25	1.049		0.0	9.000	23.670		K Factor = 5.60
to		120		0.0	0.0	0.0		
3	53.25	0.7964		0.0	9.000	7.168		Vel = 19.77
3	31.09	1.38		0.0	10.000	30.838		K Factor = 5.60
to		120		0.0	0.0	0.0		
4	84.34	0.4904		0.0	10.000	4.904		Vel = 18.09
4	33.48	1.61	1T	8.0	5.500	35.742		K Factor = 5.60
to		120		0.0	8.000	7.709		
20	117.82	0.4298		0.0	13.500	5.802		Vel = 18.57
	0.0							
	117.82					49.253		K Factor = 16.79
5	34.58	1.049	1T	5.0	4.500	38.139		K Factor = 5.60
to		120		0.0	5.000	7.709		
20	34.58	0.3584		0.0	9.500	3.405		Vel = 12.84
	0.0							
	34.58					49.253		K Factor = 4.93
6	26.09	1.049		0.0	10.000	21.713		K Factor = 5.60
to		120		0.0	0.0	0.0		
7	26.09	0.2128		0.0	10.000	2.128		Vel = 9.69
7	27.35	1.049		0.0	9.000	23.841		K Factor = 5.60
to		120		0.0	0.0	0.0		
8	53.44	0.8017		0.0	9.000	7.215		Vel = 19.84
8	31.21	1.38		0.0	10.000	31.056		K Factor = 5.60
to		120		0.0	0.0	0.0		
9	84.65	0.4938		0.0	10.000	4.938		Vel = 18.16
9	33.59	1.61	1T	8.0	5.500	35.994		K Factor = 5.60
to		120		0.0	8.000	7.709		
21	118.24	0.4325		0.0	13.500	5.839		Vel = 18.63
	0.0							
	118.24					49.542		K Factor = 16.80
10	34.70	1.049	1T	5.0	4.500	38.406		K Factor = 5.60
to		120		0.0	5.000	7.709		
21	34.7	0.3607		0.0	9.500	3.427		Vel = 12.88
	0.0							
	34.70					49.542		K Factor = 4.93
11	36.39	1.61	1T	8.0	5.500	42.221		K Factor = 5.60
to		120		0.0	8.000	7.709		
22	36.39	0.0489		0.0	13.500	0.660		Vel = 5.73
	0.0							
	36.39					50.590		K Factor = 5.12
12	35.14	1.049	1T	5.0	4.500	39.374		K Factor = 5.60
to		120		0.0	5.000	7.709		
22	35.14	0.3692		0.0	9.500	3.507		Vel = 13.04
	0.0							
	35.14					50.590		K Factor = 4.94

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
USM Shop AREA

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
20	152.41	3.26		0.0	13.000	49.253		
to		120		0.0	0.0	0.0		
21	152.41	0.0222		0.0	13.000	0.289		Vel = 5.86
21	152.94	3.26		0.0	13.000	49.542		
to		120		0.0	0.0	0.0		
22	305.35	0.0806		0.0	13.000	1.048		Vel = 11.74
22	71.53	3.26	1T	20.159	57.000	50.590		
to		120		0.0	20.159	0.0		
23	376.88	0.1189		0.0	77.159	9.176		Vel = 14.49
23	0.0	3.26	3E	28.223	24.500	59.766		
to		120		0.0	28.223	0.0		
TR	376.88	0.1189		0.0	52.723	6.270		Vel = 14.49
TR	0.0	3.26	1Zac	0.0	5.000	66.036		
to		120	1Z	9.408	9.408	4.040		* Fixed loss = 4.04
BR	376.88	0.1189		0.0	14.408	1.713		Vel = 14.49
BR	0.0	4.1	1G	2.907	25.000	71.789		
to		140	1T	29.067	31.974	0.0		
UG1	376.88	0.0293		0.0	56.974	1.668		Vel = 9.16
UG1	250.00	8.27	1G	6.326	75.000	73.457		Qa = 250
to		140	1T	55.354	61.680	0.0		
TEST	626.88	0.0025		0.0	136.680	0.337		Vel = 3.74
	0.0							
	626.88					73.794		K Factor = 72.97