

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK CITY OF PORTLAND

Please Read
Application And
Notes, if Any,
Attached

BUILDING INSPECTION

Permit Number: 100675

PERMIT

This is to certify that H FINKLEMAN INC/Residential Fire Protection /Stan Carls
has permission to install a Water-Based fire suppression system
AT 560 Riverside St PL 321 A001001

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statutes of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of buildings and structures, and of the application on file in this department.

Apply to Public Works for street line and grade if nature of work requires such information.

Notification of inspection must be given and written permission procured before this building or part thereof is lath or other work is used-in. 24 HOUR NOTICE IS REQUIRED.

A certificate of occupancy must be prepared by owner before this building or part thereof is occupied.

OTHER REQUIRED APPROVALS
Fire Dept. CAPT. R. Santos
Health Dept. _____
Appeal Board _____
Other _____
Department Name

[Signature]
City of Portland
Director - Building & Inspection Services

PENALTY FOR REMOVING THIS CARD

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 10-0675	Issue Date:	CBL: 321 A001001
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Location of Construction: 560 Riverside St	Owner Name: H FINKLEMAN INC	Owner Address: 3200 NW YEON	Phone:
Business Name: SCHNITZER RECYCLING	Contractor Name: Residential Fire Protection /Stan Ca	Contractor Address: 64 Daggett Hill Road Greene	Phone: 2079463474
Lessee/Buyer's Name	Phone:	Permit Type: Fire Suppression System	Zone: I-H

Past Use: Commercial	Proposed Use: Commercial - install a Water-Based fire suppression system permit	Permit Fee: \$340.00	Cost of Work: \$31,286.00	CEO District: 5	RPE w REAL
FIRE DEPT: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied * See Conditions		INSPECTION: Use Group: <input checked="" type="checkbox"/> FIRE SUPPRESSION Type: NFPA/IBC			

Proposed Project Description: install a Water-Based fire suppression system permit	Signature:	Signature:
PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)		
Action: <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied		
Signature:	Date:	

Permit Taken By: Idobson	Date Applied For: 06/11/2010	Zoning Approval
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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 electrical work. 3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..	Special Zone or Reviews <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetland <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan Maj <input type="checkbox"/> Minor <input type="checkbox"/> MMS	Zoning Appeal <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied	Historic Preservation <input checked="" type="checkbox"/> Not in District or Landmark <input type="checkbox"/> Does Not Require Review <input type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied
	Date:	Date:	Date:

PERMIT ISSUED

JUN 25 2010

City of Portland

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 application 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

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 10-0675	Date Applied For: 06/11/2010	CBL: 321 A001001
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Location of Construction: 560 Riverside St	Owner Name: H FINKLEMAN INC	Owner Address: 3200 NW YEON	Phone:
Business Name: SCHNITZER RECYCLING	Contractor Name: Residential Fire Protection /Stan Ca	Contractor Address: 64 Daggett Hill Road Greene	Phone: (207) 946-3474
Lessee/Buyer's Name	Phone:	Permit Type: Fire Suppression System	

Proposed Use: Commercial - install a Water-Based fire suppression system permit	Proposed Project Description: install a Water-Based fire suppression system permit
------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------

Dept: Zoning	Status: Approved	Reviewer: Marge Schmuckal	Approval Date: 06/14/2010
Note:			Ok to Issue: ✓
Dept: Building	Status: Approved	Reviewer: Tammy Munson	Approval Date: 06/25/2010
Note:			Ok to Issue: ✓
Dept: Fire	Status: Approved with Conditions	Reviewer: Capt Keith Gautreau	Approval Date: 06/16/2010
Note:			Ok to Issue: ✓
<p>1) 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.</p> <p>2) The Fire alarm and Sprinkler systems shall be reviewed by a licensed contractor[s] for code compliance. Compliance letters are required.</p> <p>3) The sprinkler system shall be installed in accordance with NFPA 13.</p> <p>4) Application requires State Fire Marshal approval.</p> <p>5) Fire department connection type and location shall be approved in writing by fire prevention bureau.</p> <p>6) The Fire Department will require knox locking caps on all Fire Department Connections on the exterior of the building.</p> <p>7) System acceptance and commissioning must be co-ordinated with alarm and suppression system contractors and the Fire Department. Call 874-8703 to schedule.</p>			

PERMIT ISSUED

JUN 25 2010

City of Portland

BUILDING PERMIT INSPECTION PROCEDURES

**Please call 874-8703 or 874-8693 (ONLY)
or email: buildinginspections@portlandmaine.gov**

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the City of Portland Inspection Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months, if the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue with construction.**

 X **A final inspection is required by the Fire Department and a test report must be submitted at that time.**

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OR CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



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.

*Residential Fire Protection
64 DeSsett Hill Rd
Greene, ME 04040*

Installation address: 560 636 Riverside St CBL: 321-A-1 / 322 A1

Exact location: (within structure) Entire building

Type of occupancy(s) (NFPA & ICC): Metal Recycling Ord. Hazard GRP II

Building owner: Schnitzer Northeast

Managing Supervisor (RMS): Stan Camic License No: 080

Supervisor phone: 713-5912 E-mail: SCAMIC@RFPLLC.NET

Installing contractor: Residential Fire Protection License No: 511

Contractor phone: 946-8473 E-mail: _____

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, FM Global Edition: _____

*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: <u>\$31,286</u>
PERMIT FEE: <u>\$333.00</u>
(\$10 PER \$1,000 + \$30 FOR THE FIRST \$1,000)
RECEIVED
JUN 11 2010

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: [Signature] Date: 6-11-10



State of Maine
Department of Public Safety
Fire Sprinkler System Permit



9100

Schnitzer Northeast

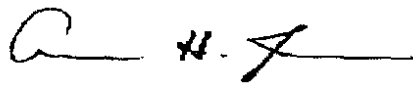
Located at: 636 Riverside St.
 In the Town of: Portland
 Occupancy/Use: Metal Processing
 Type of System:

Permission is hereby given to:

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

according to plans submittal filed with the Licensing and Inspections Unit and are now approved. This application form/plans are filed under log # **2101194**, and no departure from application form/plans 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 for failure to comply with local ordinances, zoning laws, or other pertinent legal restrictions. Each permit issued shall be displayed/available at the site of construction.

This permit was issued on **5/22/2010** for a fee paid of **\$153.00**
 This permit will expire at midnight on *Thursday, November 18, 2010*



Anne H. Jordan
 Commissioner

Fire Department Connection Location/Type per 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 Licensing and Inspections Unit 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 sprinkler licenses expire June 30th every year.

Job completed, tested and verified on date of _____

RMS for this job: Camic Stan

RMS Signature: _____

Hydraulic Design Information Sheet

Name - Schnitzer NE Office Uprights Date - 5-12-10
 Location - 1st floor above Office ceiling
 Building - System No. - 1
 Contractor - Residential Fire Protection LLC. Contract No. - C10007
 Calculated By - JAL Drawing No. - 1 of 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 12'
 Occupancy - uninhabited

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

S Other FM GLOBAL Hazard Group 1

T Specific Ruling Made By Date

M	Area of Sprinkler Operation - 1500	System Type	Sprinkler/Nozzle
	Density - .10	(X) Wet	Make Victaulic
D	Area Per Sprinkler - 125	() Dry	Model V2704
E	Elevation at Highest Outlet - 11'6	() Deluge	Size 1/2"
S	Hose Allowance - Inside -	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance -	() Other	Temp.Rat.200
G	Hose Allowance - Outside - 250		

N Note Safety Margin 49.766

Calculation Flow Required - 462.806 Press Required - 32.150
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 7-27-05		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 82	@ Press -	
R	Residual Press - 80	Elev. -	Well
	Flow - 2576		Proof Flow
S	Elevation - 0		

U Location - Riverside St. at Leighton St.

P Source of Information - Portland Water distric

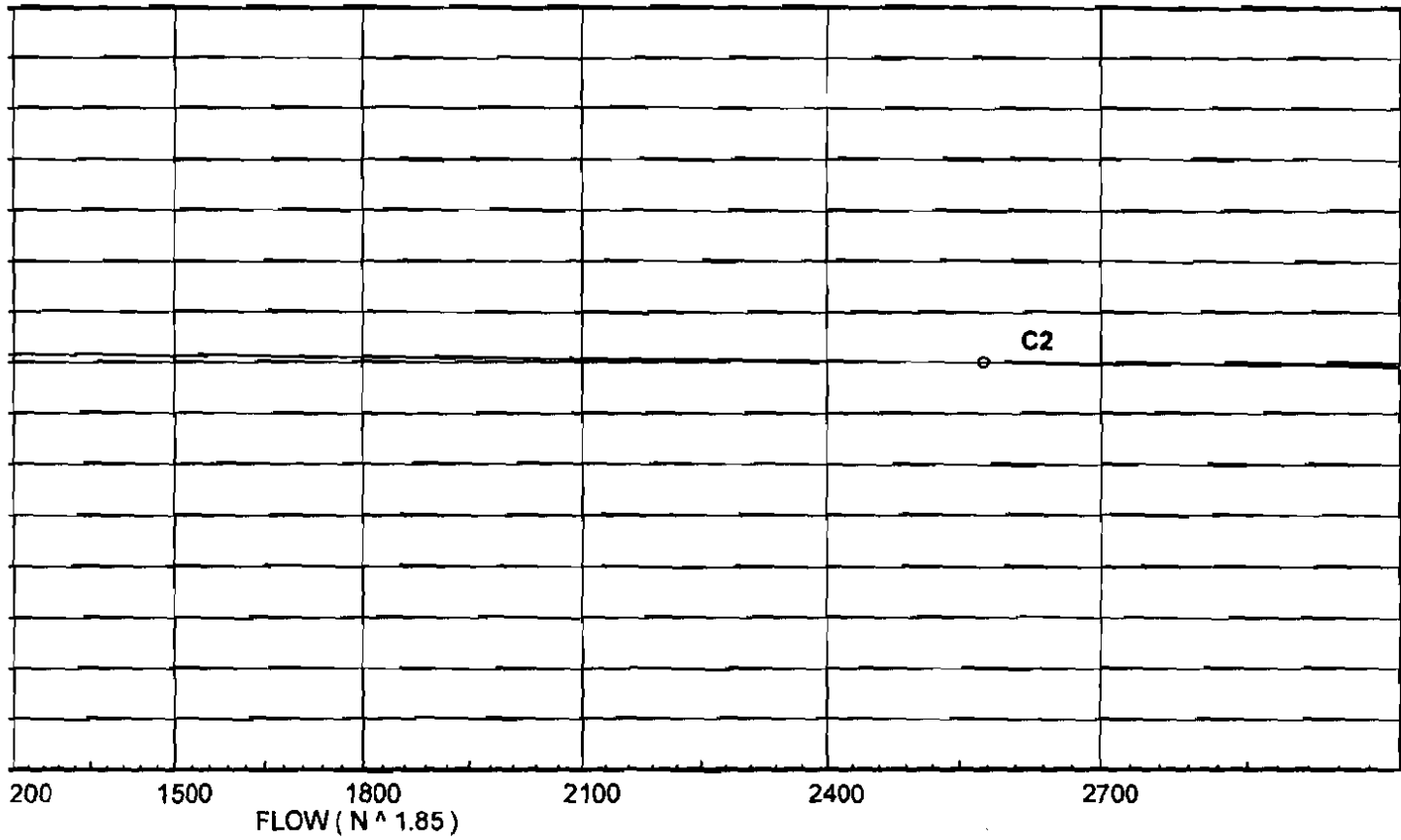
C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	%	Palletized % Rack
	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

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

G Horizontal Barriers Provided:

3

Demand:
D1 - Elevation : 4.114
D2 - System Flow : 212.806
D2 - System Pressure : 32.150
Hose (Adj City) :
Hose (Demand) : 250
D3 - System Demand : 462.806
Safety Margin : 49.766



$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6	8	10	12	14	16	18	20	24
2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
3	4	5	8	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61

Fiting generates a Fixed Loss Based on Flow

Pressure / Flow Summary - STANDARD

RESIDENTIAL FIRE PROTECTION
Office sprigups

Page 4
Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HD1	10.0	5.6	7.0	na	14.82	0.1	120	7.0
HD2	10.0	5.6	7.0	na	14.82	0.1	120	7.0
200	9.5	K = K @ SPG1	7.62	na	14.82			
301	9.5		8.41	na				
201	9.5	K = K @ SPG1	8.51	na	15.66			
302	9.5		9.93	na				
303	9.5		10.36	na				
202	9.5	K = K @ SPG1	10.4	na	17.31			
204	9.5	K = K @ SPG1	9.03	na	16.13			
305	9.5		9.31	na				
203	9.5	K = K @ SPG1	10.07	na	17.03			
304	9.5		10.47	na				
205	9.5	K = K @ SPG2	7.7	na	15.12			
306	9.5		7.76	na				
307	9.5		8.21	na				
206	9.5	K = K @ SPG1	8.64	na	15.78			
308	9.5		10.09	na				
309	9.5		10.53	na				
207	9.5	K = K @ SPG1	10.58	na	17.46			
209	9.5	K = K @ SPG2	8.74	na	16.1			
311	9.5		9.01	na				
208	9.5	K = K @ SPG1	9.77	na	16.77			
310	9.5		10.16	na				
210	9.5	K = K @ SPG2	8.32	na	15.71			
312	9.5		8.38	na				
313	9.5		8.87	na				
211	9.5	K = K @ SPG1	9.32	na	16.38			
314	9.5		11.53	na				
212	9.5	K = K @ SPG1	11.93	na	18.54			
220	9.5		11.22	na				
221	9.5		11.41	na				
222	9.5		12.12	na				
TR	1.5		28.97	na				
BR	1.0		30.86	na				
UG1	0.0		31.52	na				
UG2	0.0		32.12	na				
TEST	0.0		32.15	na	250.0			

The maximum velocity is 12.52 and it occurs in the pipe between nodes 222 and TR

Final Calculations - Hazen-Williams

RESIDENTIAL FIRE PROTECTION
Office sprigups

Page 5
Date

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 to SPG1	14.82	1.049 120	1T	5.0 0.0	0.400 5.000	7.000 0.217			K Factor = 5.60	
	14.82	0.0746		0.0	5.400	0.403			Vel = 5.50	
	0.0 14.82					7.620			K Factor = 5.37	
HD2 to SPG2	14.82	1.049 120	1E	2.0 0.0	0.400 2.000	7.000 0.217			K Factor = 5.60	
	14.82	0.0746		0.0	2.400	0.179			Vel = 5.50	
	0.0 14.82					7.396			K Factor = 5.45	
200 to 301	14.82	1.049 120		0.0 0.0	10.600 0.0	7.620 0.0			K Factor @ node SPG1	
	14.82	0.0747		0.0	10.600	0.792			Vel = 5.50	
301 to 201	0.0	1.049 120		0.0 0.0	1.330 0.0	8.412 0.0				
	14.82	0.0744		0.0	1.330	0.099			Vel = 5.50	
201 to 302	15.65	1.049 120		0.0 0.0	5.000 0.0	8.511 0.0			K Factor @ node SPG1	
	30.47	0.2836		0.0	5.000	1.418			Vel = 11.31	
302 to 303	0.0	1.38 120		0.0 0.0	5.750 0.0	9.929 0.0				
	30.47	0.0746		0.0	5.750	0.429			Vel = 6.54	
303 to 202	0.0	1.61 120		0.0 0.0	1.200 0.0	10.358 0.0				
	30.47	0.0358		0.0	1.200	0.043			Vel = 4.80	
202 to 220	17.31	1.61 120	1T	8.0 0.0	2.100 8.000	10.401 0.0			K Factor @ node SPG1	
	47.78	0.0809		0.0	10.100	0.817			Vel = 7.53	
	0.0 47.78					11.218			K Factor = 14.27	
204 to 305	16.13	1.049 120		0.0 0.0	3.200 0.0	9.030 0.0			K Factor @ node SPG1	
	16.13	0.0872		0.0	3.200	0.279			Vel = 5.99	
305 to 203	0.0	1.049 120		0.0 0.0	8.700 0.0	9.309 0.0				
	16.13	0.0875		0.0	8.700	0.761			Vel = 5.99	
203 to 304	17.03	1.049 120		0.0 0.0	1.200 0.0	10.070 0.0			K Factor @ node SPG1	
	33.16	0.3317		0.0	1.200	0.398			Vel = 12.31	
304 to 220	0.0	1.38 120		0.0 0.0	8.600 0.0	10.468 0.0				
	33.16	0.0872		0.0	8.600	0.750			Vel = 7.11	
	0.0 33.16					11.218			K Factor = 9.90	
205 to 306	15.12	1.049 120		0.0 0.0	0.750 0.0	7.700 0.0			K Factor @ node SPG2	
	15.12	0.0773		0.0	0.750	0.058			Vel = 5.61	
306 to 307	0.0	1.049 120		0.0 0.0	5.870 0.0	7.758 0.0				
	15.12	0.0775		0.0	5.870	0.455			Vel = 5.61	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Office sprigups

Page 6
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
307	0.0	1.049		0.0	5.500	8.213				
to		120		0.0	0.0	0.0				
206	15.12	0.0776		0.0	5.500	0.427		Vel =	5.61	
206	15.77	1.049		0.0	5.000	8.640		K Factor @	node SPG1	
to		120		0.0	0.0	0.0				
308	30.89	0.2908		0.0	5.000	1.454		Vel =	11.47	
308	0.0	1.38		0.0	5.750	10.094				
to		120		0.0	0.0	0.0				
309	30.89	0.0765		0.0	5.750	0.440		Vel =	6.63	
309	0.0	1.61		0.0	1.200	10.534				
to		120		0.0	0.0	0.0				
207	30.89	0.0358		0.0	1.200	0.043		Vel =	4.87	
207	17.46	1.61	1T	8.0	2.100	10.577		K Factor @	node SPG1	
to		120		0.0	8.000	0.0				
221	48.35	0.0828		0.0	10.100	0.836		Vel =	7.62	
	0.0									
	48.35					11.413		K Factor =	14.31	
209	16.10	1.049		0.0	3.150	8.735		K Factor @	node SPG2	
to		120		0.0	0.0	0.0				
311	16.1	0.0873		0.0	3.150	0.275		Vel =	5.98	
311	0.0	1.049		0.0	8.700	9.010				
to		120		0.0	0.0	0.0				
208	16.1	0.0871		0.0	8.700	0.758		Vel =	5.98	
208	16.78	1.049		0.0	1.200	9.768		K Factor @	node SPG1	
to		120		0.0	0.0	0.0				
310	32.88	0.3267		0.0	1.200	0.392		Vel =	12.21	
310	0.0	1.38	1T	6.0	8.600	10.160				
to		120		0.0	6.000	0.0				
221	32.88	0.0858		0.0	14.600	1.253		Vel =	7.05	
	0.0									
	32.88					11.413		K Factor =	9.73	
210	15.71	1.049		0.0	0.750	8.317		K Factor @	node SPG2	
to		120		0.0	0.0	0.0				
312	15.71	0.0840		0.0	0.750	0.063		Vel =	5.83	
312	0.0	1.049		0.0	5.860	8.380				
to		120		0.0	0.0	0.0				
313	15.71	0.0833		0.0	5.860	0.488		Vel =	5.83	
313	0.0	1.049		0.0	5.400	8.868				
to		120		0.0	0.0	0.0				
211	15.71	0.0833		0.0	5.400	0.450		Vel =	5.83	
211	16.39	1.049		0.0	7.100	9.318		K Factor @	node SPG1	
to		120		0.0	0.0	0.0				
314	32.1	0.3121		0.0	7.100	2.216		Vel =	11.92	
314	0.0	1.38		0.0	4.800	11.534				
to		120		0.0	0.0	0.0				
212	32.1	0.0821		0.0	4.800	0.394		Vel =	6.89	
212	18.53	1.61		0.0	2.100	11.928		K Factor @	node SPG1	
to		120		0.0	0.0	0.0				
222	50.63	0.0900		0.0	2.100	0.189		Vel =	7.98	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Office sprigups

Page 7
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Fing's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 50.63								
					12.117			K Factor = 14.54	
220 to 221	80.95	2.635 120	0.0 0.0	10.000 0.0	11.218 0.0				
221 to 222	80.95	0.0195	0.0	10.000	0.195			Vel = 4.76	
221 to 222	81.22	2.635 120	0.0 0.0	10.000 0.0	11.413 0.0				
222 to TR	162.17	0.0704	0.0	10.000	0.704			Vel = 9.54	
222 to TR	50.64	2.635 120	3E 24.711 1T 16.474	56.580 41.185	12.117 3.465				
TR to BR	212.81	0.1165	0.0	97.765	11.387			Vel = 12.52	
TR to BR	0.0	4.26 120	1Zia 0.0 1E 13.167	7.000 52.668	26.969 3.217			* Fixed loss = 3	
BR to UG1	212.81	0.0112	1T 26.334 1Z 13.167	59.668	0.669			Vel = 4.79	
BR to UG1	0.0	6.16 140	1G 4.304 2E 40.168	75.000 87.509	30.855 0.433				
UG1 to UG2	212.81	0.0014	1T 43.037	162.509	0.228			Vel = 2.29	
UG1 to UG2	0.0	6.16 140	1G 4.304 1T 43.037	385.000 47.341	31.516 0.0				
UG2 to TEST	212.81	0.0014	0.0	432.341	0.606			Vel = 2.29	
UG2 to TEST	0.0	12.34 140	0.0 0.0	600.000 0.0	32.122 0.0				
TEST	212.81	0.0	0.0	600.000	0.028			Vel = 0.57	
	250.00 462.81							Qa = 250.00 K Factor = 81.62	
					32.150				

Residential Fire Protection

64 Daggett Hill Rd.
Greene, ME 04236
Tel (207)946-3473 Fax (207)946-3474

Letter of Transmittal

To: Portland Fire Department

Date: 06-11-2010

Job No. C10007

Attn:

Re: Schnitzer Northeast

WE ARE SENDING YOU

Attached Under separate cover via overnight mail/regular mail the following

items:

SUB. AGREE.	PLANS	MATERIAL DATA SHEETS	SUBMITTAL	CHANGE ORDER	SAMPLES	SPECIFICATIONS	OTHER
	3						1

COPIES	DATE	NO.	DESCRIPTION
1ea	06-11-10		Sprinkler Plans 2 sheets
1ea	06-11-10		Permit application
1ea	06-11-10		4 sets Hydraulic calculations
1ea	06-11-10		State Permit
1ea	06-11-10		Check # 2684 \$333.00

THESE ARE TRANSMITTED as checked below:

- For approval
 Approved as submitted
 Resubmit ___ copies for approval
 For signature
 For your use
 Approved as noted
 Submit ___ copies for distribution
 As requested
 Returned for corrections
 Return ___ corrected prints
 For review and comment _____

Comments

CC: File _____

Signature: _____

Hydraulic Design Information Sheet

Name - Schnitzer NE Office Pendants Date - 5-12-10
 Location - Office 1st floor
 Building - System No. - 1
 Contractor - Residential Fire Protection LLC. Contract No. - C10007
 Calculated By - JAL Drawing No. - 1 of 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - Varies
 Occupancy - Offices

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

S Other FM GLOBAL Hazard Group 1

T Specific Ruling Made By Date

	Area of Sprinkler Operation - 1500	System Type	Sprinkler/Nozzle
M	Density - .10	(X) Wet	Make Victaulic
D	Area Per Sprinkler - 100	() Dry	Model V2708
E	Elevation at Highest Outlet - 9'10"	() 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 - 250		

Note Safety Margin 41.906

Calculation Flow Required - 507.143 Press Required - 39.995
 Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 7-27-05		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 82	@ Press -	
R	Residual Press - 80	Elev. -	Well
	Flow - 2576		Proof Flow
S	Elevation - 0		

U Location - Riverside St. at Leighton St.

P Source of Information - Portland Water distric

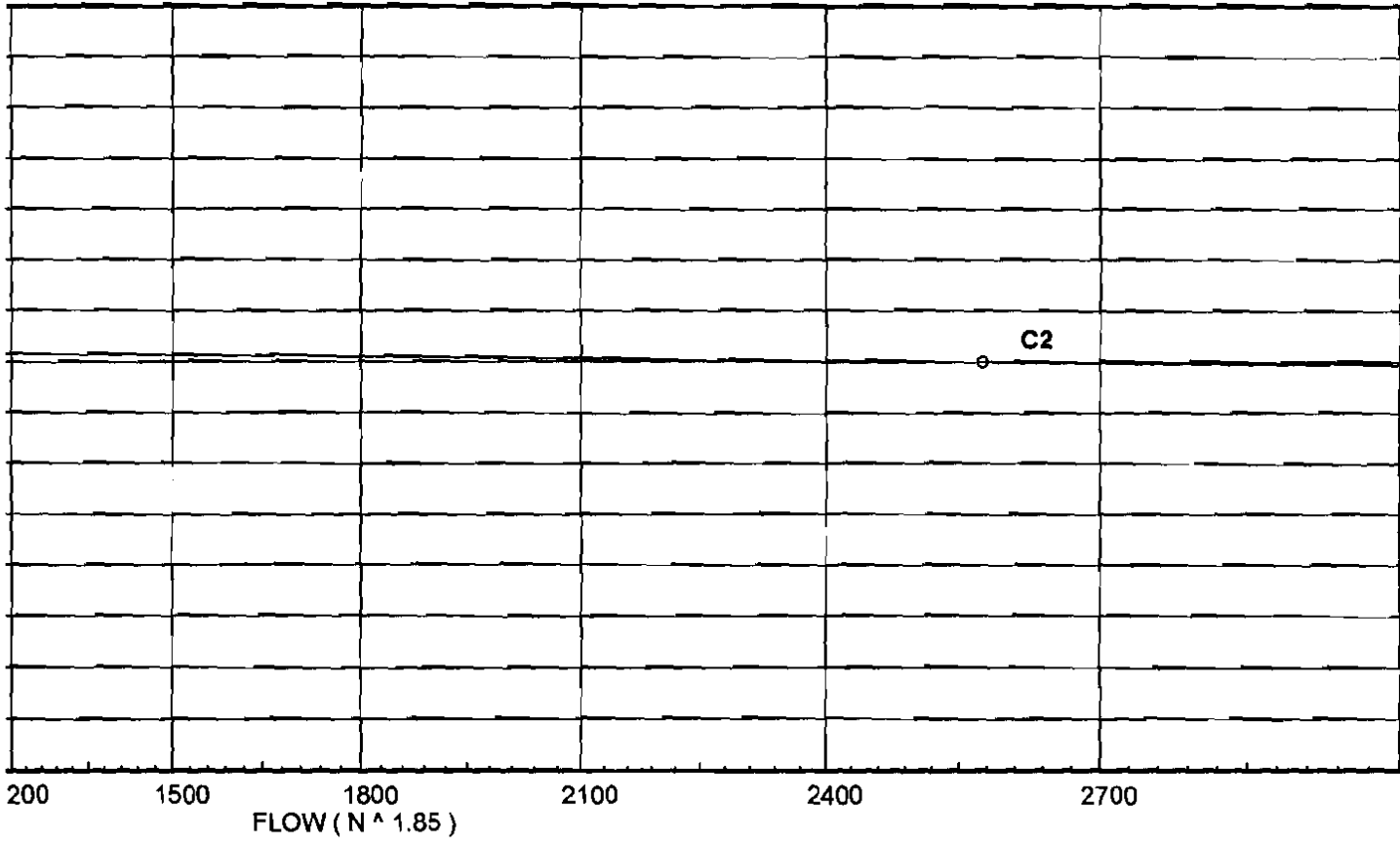
C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method: Solid Piled	% Palletized	% Rack
M	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row	() Open Shelf	

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

E Horizontal Barriers Provided:

6

Demand:
D1 - Elevation : 4.114
D2 - System Flow : 257.143
D2 - System Pressure : 39.995
Hose (Adj City) :
Hose (Demand) : 250
D3 - System Demand : 507.143
Safety Margin : 41.906



½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61

Fitting generates a Fixed Loss Based on Flow

Pressure / Flow Summary - STANDARD

RESIDENTIAL FIRE PROTECTION
Office pendants

Page 4
Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HD1	9.5	5.6	7.0	na	14.82	0.1	120	7.0
HD2	9.5	5.6	7.0	na	14.82	0.1	120	7.0
HD3	9.5	5.6	7.0	na	14.82	0.1	120	7.0
HD4	9.5	5.6	7.0	na	14.82	0.1	120	7.0
HD5	9.5	5.6	7.0	na	14.82	0.1	120	7.0
HD6	9.5	5.6	7.0	na	14.82	0.1	120	7.0
HD7	9.5	5.6	7.0	na	14.82	0.1	120	7.0
300	9.5	K = K @ DRP4	7.69	na	15.09			
301	9.5	K = K @ DRP3	8.62	na	15.74			
201	9.5		9.0	na				
302	9.5	K = K @ DRP1	10.45	na	17.46			
303	9.5	K = K @ DRP2	11.46	na	18.38			
202	9.5		11.64	na				
305	9.5	K = K @ DRP2	10.62	na	17.69			
203	9.5		11.53	na				
304	9.5	K = K @ DRP2	11.65	na	16.53			
306	9.5	K = K @ DRP1	7.52	na	14.82			
307	9.5	K = K @ DRP6	7.96	na	14.95			
206	9.5		9.45	na				
308	9.5	K = K @ DRP1	10.81	na	17.76			
309	9.5	K = K @ DRP1	11.79	na	18.55			
207	9.5		11.97	na				
311	9.5	K = K @ DRP2	10.87	na	17.9			
208	9.5		11.79	na				
310	9.5	K = K @ DRP2	11.92	na	18.75			
312	9.5	K = K @ DRP5	8.99	na	15.85			
313	9.5	K = K @ DRP6	9.49	na	16.32			
211	9.5		11.18	na				
314	9.5	K = K @ DRP5	13.41	na	19.38			
212	9.5		14.35	na				
220	9.5		13.15	na				
221	9.5		13.45	na				
222	9.5		14.55	na				
TR	1.5		34.17	na				
BR	1.0		38.34	na				
UG1	0.0		39.1	na				
UG2	0.0		39.95	na				
TEST	0.0		40.0	na	250.0			

The maximum velocity is 15.13 and it occurs in the pipe between nodes 222 and TR

Final Calculations - Hazen-Williams

RESIDENTIAL FIRE PROTECTION
Office pendants

Page 5
Date

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 SPG1	14.82	1.049 120		0.0	0.300	7.000			K Factor = 5.60	
	14.82	0.0733		0.0	0.300	0.022			Vel = 5.50	
	0.0 14.82					7.022			K Factor = 5.59	
HD2 to DRP1	14.82	1.049 120	1T	5.0	2.000	7.000			K Factor = 5.60	
	14.82	0.0747		0.0	7.000	0.523			Vel = 5.50	
	0.0 14.82					7.523			K Factor = 5.40	
HD3 to DRP2	14.82	1.049 120	1T	5.0	1.000	7.000			K Factor = 5.60	
	14.82	0.0747		0.0	6.000	0.448			Vel = 5.50	
	0.0 14.82					7.448			K Factor = 5.43	
HD4 to DRP3	14.82	1.049 120	1T 1E	5.0 2.0	1.500 7.000	7.000 0.0			K Factor = 5.60	
	14.82	0.0747		0.0	8.500	0.635			Vel = 5.50	
	0.0 14.82					7.635			K Factor = 5.36	
HD5 to DRP4	14.82	1.049 120	2E	4.0	1.500	7.000			K Factor = 5.60	
	14.82	0.0747		0.0	5.500	0.411			Vel = 5.50	
	0.0 14.82					7.411			K Factor = 5.44	
HD6 to DRP5	14.82	1.049 120	1T 1E	5.0 2.0	4.400 7.000	7.000 0.0			K Factor = 5.60	
	14.82	0.0747		0.0	11.400	0.852			Vel = 5.50	
	0.0 14.82					7.852			K Factor = 5.29	
HD7 to DRP6	14.82	1.049 120	1T 1E	5.0 2.0	4.000 7.000	7.000 0.0			K Factor = 5.60	
	14.82	0.0747		0.0	11.000	0.822			Vel = 5.50	
	0.0 14.82					7.822			K Factor = 5.30	
300 to 301	15.09	1.049 120		0.0	12.000	7.689			K Factor @ node DRP4	
	15.09	0.0773		0.0	12.000	0.928			Vel = 5.60	
301 to 201	15.74	1.049 120		0.0	1.330	8.617			K Factor @ node DRP3	
	30.83	0.2895		0.0	1.330	0.385			Vel = 11.44	
201 to 302	0.0	1.049 120		0.0	5.000	9.002				
	30.83	0.2898		0.0	5.000	1.449			Vel = 11.44	
302 to 303	17.47	1.38 120		0.0	5.750	10.451			K Factor @ node DRP1	
	48.3	0.1750		0.0	5.750	1.006			Vel = 10.36	
303 to 202	18.37	1.61 120		0.0	1.200	11.457			K Factor @ node DRP2	
	66.67	0.1500		0.0	1.200	0.180			Vel = 10.51	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Office pendants

Page 6
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
202	0.0	1.61	1T	8.0	2.100	11.637				
to		120		0.0	8.000	0.0				
220	66.67	0.1498		0.0	10.100	1.513			Vel = 10.51	
	0.0									
	66.67					13.150			K Factor = 18.39	
305	17.69	1.049		0.0	8.750	10.619			K Factor @ node DRP2	
to		120		0.0	0.0	0.0				
203	17.69	0.1037		0.0	8.750	0.907			Vel = 6.57	
203	0.0	1.049		0.0	1.200	11.526				
to		120		0.0	0.0	0.0				
304	17.69	0.1042		0.0	1.200	0.125			Vel = 6.57	
304	18.53	1.38	1T	6.0	8.600	11.651			K Factor @ node DRP2	
to		120		0.0	6.000	0.0				
220	36.22	0.1027		0.0	14.600	1.499			Vel = 7.77	
	0.0									
	36.22					13.150			K Factor = 9.99	
306	14.82	1.049		0.0	5.870	7.523			K Factor @ node DRP1	
to		120		0.0	0.0	0.0				
307	14.82	0.0746		0.0	5.870	0.438			Vel = 5.50	
307	14.94	1.049		0.0	5.500	7.961			K Factor @ node DRP6	
to		120		0.0	0.0	0.0				
206	29.76	0.2716		0.0	5.500	1.494			Vel = 11.05	
206	0.0	1.049		0.0	5.000	9.455				
to		120		0.0	0.0	0.0				
308	29.76	0.2714		0.0	5.000	1.357			Vel = 11.05	
308	17.77	1.38		0.0	5.750	10.812			K Factor @ node DRP1	
to		120		0.0	0.0	0.0				
309	47.53	0.1697		0.0	5.750	0.976			Vel = 10.20	
309	18.54	1.61		0.0	1.200	11.788			K Factor @ node DRP1	
to		120		0.0	0.0	0.0				
207	66.07	0.1475		0.0	1.200	0.177			Vel = 10.41	
207	0.0	1.61	1T	8.0	2.100	11.965				
to		120		0.0	8.000	0.0				
221	66.07	0.1474		0.0	10.100	1.489			Vel = 10.41	
	0.0									
	66.07					13.454			K Factor = 18.01	
311	17.90	1.049		0.0	8.700	10.873			K Factor @ node DRP2	
to		120		0.0	0.0	0.0				
208	17.9	0.1060		0.0	8.700	0.922			Vel = 6.64	
208	0.0	1.049		0.0	1.200	11.795				
to		120		0.0	0.0	0.0				
310	17.9	0.1058		0.0	1.200	0.127			Vel = 6.64	
310	18.75	1.38	1T	6.0	8.600	11.922			K Factor @ node DRP2	
to		120		0.0	6.000	0.0				
221	36.65	0.1049		0.0	14.600	1.532			Vel = 7.86	
	0.0									
	36.65					13.454			K Factor = 9.99	
312	15.85	1.049		0.0	5.860	8.990			K Factor @ node DRP5	
to		120		0.0	0.0	0.0				
313	15.85	0.0846		0.0	5.860	0.496			Vel = 5.88	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Office pendants

Page 7
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	***** Notes *****
313 to 211	16.32 32.17	1.049 120 0.3135	0.0 0.0 0.0	5.400 0.0 5.400	9.486 0.0 1.693		K Factor @ node DRP6 Vel = 11.94
211 to 314	0.0 32.17	1.049 120 0.3135	0.0 0.0 0.0	7.100 0.0 7.100	11.179 0.0 2.226		Vel = 11.94
314 to 212	19.36 51.53	1.38 120 0.1971	0.0 0.0 0.0	4.800 0.0 4.800	13.405 0.0 0.946		K Factor @ node DRP5 Vel = 11.05
212 to 222	0.0 51.53	1.61 120 0.0933	0.0 0.0 0.0	2.100 0.0 2.100	14.351 0.0 0.196		Vel = 8.12
	0.0 51.53				14.547		K Factor = 13.51
220 to 221	102.89 102.89	2.635 120 0.0304	0.0 0.0 0.0	10.000 0.0 10.000	13.150 0.0 0.304		Vel = 6.05
221 to 222	102.72 205.61	2.635 120 0.1093	0.0 0.0 0.0	10.000 0.0 10.000	13.454 0.0 1.093		Vel = 12.10
222 to TR	51.53 257.14	2.635 120 0.1653	3E 24.711 1T 16.474 0.0	56.580 41.185 97.765	14.547 3.465 16.160		Vel = 15.13
TR to BR	0.0 257.14	4.26 120 0.0159	1Zia 0.0 1E 13.167 1T 26.334 1Z 13.167	7.000 52.668 59.668	34.172 3.217 0.950		* Fixed loss = 3 Vel = 5.79
BR to UG1	0.0 257.14	6.16 140 0.0020	1G 4.304 2E 40.168 1T 43.037	75.000 87.509 162.509	38.339 0.433 0.324		Vel = 2.77
UG1 to UG2	0.0 257.14	6.16 140 0.0020	1G 4.304 1T 43.037 0.0	385.000 47.341 432.341	39.096 0.0 0.859		Vel = 2.77
UG2 to TEST	0.0 257.14	12.34 140 0.0001	0.0 0.0 0.0	600.000 0.0 600.000	39.955 0.0 0.040		Vel = 0.69
	250.00 507.14				39.995		Qa = 250.00 K Factor = 80.19

Hydraulic Design Information Sheet

Name - Schnitzer NEProcess Area system1 Date - 5-12-10
Location - Process Area System 1
Building - System No. - 1
Contractor - Residential Fire Protection LLC. Contract No. - C10007
Calculated By - JAL Drawing No. - 1 of 2
Construction: (X) Combustible () Non-Combustible Ceiling Height - 26'7
Occupancy - Metal Processing

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve
S Other FM GLOBAL Hazard Group 2

T	Specific Ruling	Made By	Date
M	Area of Sprinkler Operation - 2500	System Type	Sprinkler/Nozzle
	Density - .2	(X) Wet	Make Victaulic
D	Area Per Sprinkler - 125	() Dry	Model V3401
E	Elevation at Highest Outlet - 26.420	() Deluge	Size 17/32"
S	Hose Allowance - Inside -	() Preaction	K-Factor 8.0
I	Rack Sprinkler Allowance -	() Other	Temp.Rat.200
G	Hose Allowance - Outside - 250		
N	Note Safety Margin 19.772		

Calculation Flow Required - 804.910 Press Required - 61.996
Summary C-Factor Used: 120 Overhead 140 Underground

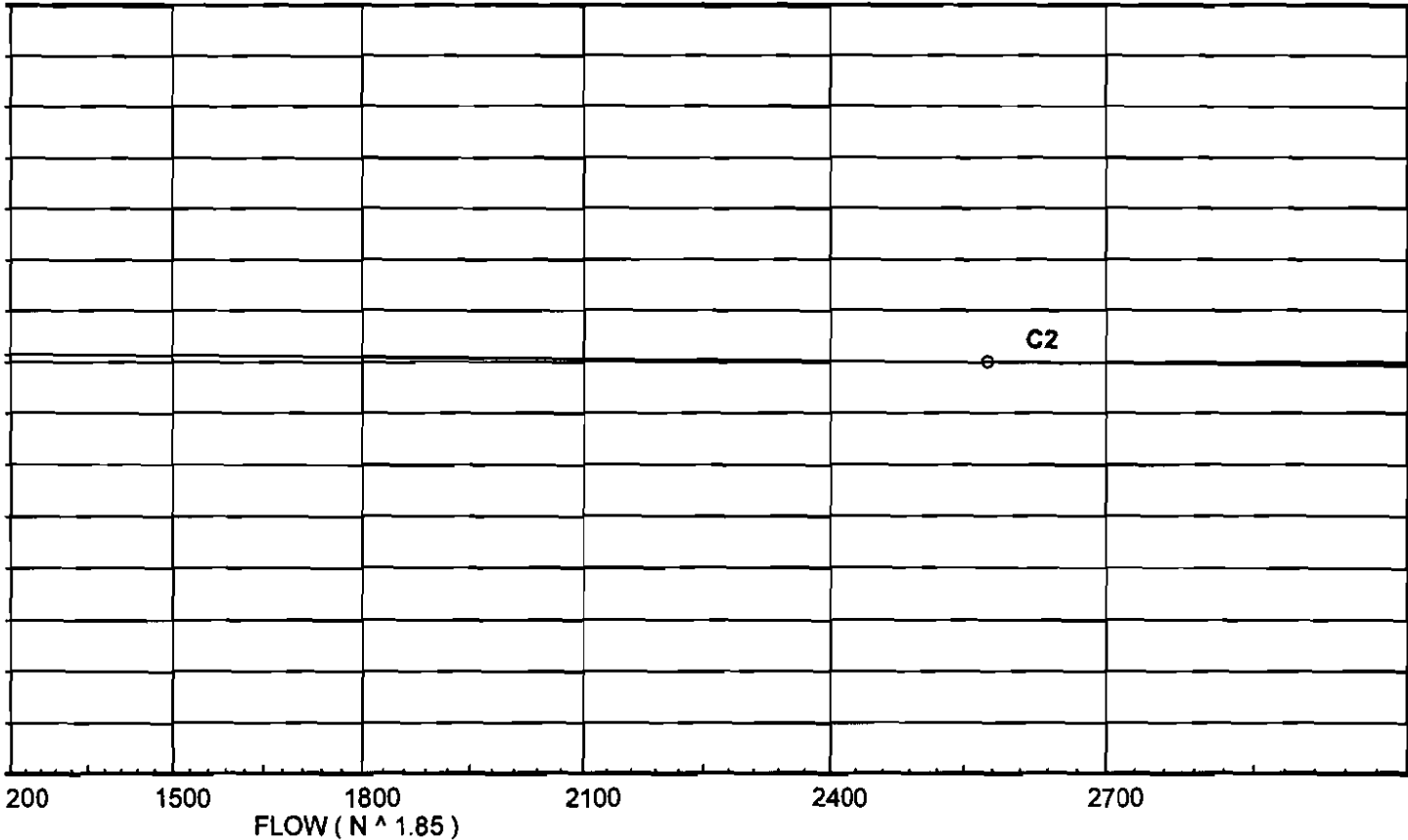
W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 7-27-05		Cap. -
T	Time of Test -	Rated Cap.-	Elev.-
E	Static Press - 82	@ Press -	
R	Residual Press - 80	Elev. -	Well
	Flow - 2576		Proof Flow
S	Elevation - 0		

U
P Location - Riverside St. at Leighton St.
P
L Source of Information - Portland Water distric
Y

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	Solid Piled %	Palletized % Rack
M	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S R	() Double Row	() Slave Pallet	() Solid Shelf () Non
T A	() Mult. Row		() Open Shelf
O C			
R K	Flue Spacing	Clearance:Storage to Ceiling	
A	Longitudinal	Transverse	
G			
E	Horizontal Barriers Provided:		

5

Demand:
D1 - Elevation : 11.443
D2 - System Flow : 554.91
D2 - System Pressure : 61.517
Hose (Adj City) : _____
Hose (Demand) : 250
D3 - System Demand : 804.91
Safety Margin : 20.250



½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61

Fitting generates a Fixed Loss Based on Flow

Pressure / Flow Summary - STANDARD

RESIDENTIAL FIRE PROTECTION
Schitzer Northeast Process Area

Page 4
Date 4-15-10

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
1	24.75	8	12.08	na	27.8	0.2	125	9.8
2	25.58	8	10.39	na	25.78	0.2	125	9.8
3	26.42	8	9.8	na	25.04	0.2	125	9.8
4	26.42	8	9.93	na	25.21	0.2	125	9.8
5	25.58	8	11.23	na	26.81	0.2	125	9.8
6	24.75	8	14.3	na	30.25	0.2	125	9.8
7	24.75	8	12.2	na	27.94	0.2	125	9.8
8	25.58	8	10.48	na	25.9	0.2	125	9.8
9	26.42	8	9.89	na	25.16	0.2	125	9.8
10	26.42	8	10.02	na	25.32	0.2	125	9.8
11	25.58	8	11.31	na	26.91	0.2	125	9.8
12	24.75	8	14.38	na	30.34	0.2	125	9.8
13	24.75	8	12.63	na	28.43	0.2	125	9.8
14	25.58	8	10.83	na	26.33	0.2	125	9.8
15	26.42	8	10.21	na	25.58	0.2	125	9.8
16	26.42	8	10.32	na	25.7	0.2	125	9.8
17	25.58	8	11.61	na	27.26	0.2	125	9.8
18	24.75	8	14.69	na	30.67	0.2	125	9.8
19	24.75	8	18.51	na	34.42	0.2	125	9.8
20	25.58	8	18.15	na	34.08	0.2	125	9.8
50	22.0		17.89	na				
51	22.0		18.08	na				
52	22.0		18.74	na				
53	22.0		20.18	na				
30	22.0		23.17	na				
31	22.0		23.28	na				
32	22.0		23.67	na				
33	22.0		24.5	na				
34	22.0		25.52	na				
35	22.0		26.67	na				
36	22.0		27.96	na				
37	22.0		29.39	na				
38	22.0		30.97	na				
70	22.0		32.73	na				
39	22.0		32.71	na				
40	22.0		32.56	na				
41	22.0		32.49	na				
42	22.0		32.35	na				
43	22.0		32.33	na				
54	22.0		22.12	na				
55	22.0		23.75	na				
56	22.0		25.12	na				
57	22.0		26.25	na				
58	22.0		27.16	na				
59	22.0		27.85	na				
60	22.0		28.33	na				
61	22.0		28.64	na				
62	22.0		29.07	na				
63	22.0		29.13	na				
64	22.0		29.15	na				
TR	1.5		44.3	na				
BR	1.0		56.01	na				
UG1	0.0		57.78	na				
UG2	0.0		61.35	na				
TEST	0.0		61.52	na	250.0			

The maximum velocity is 19.75 and it occurs in the pipe between nodes 18 and 32

Final Calculations - Hazen-Williams

RESIDENTIAL FIRE PROTECTION
Schitzer Northeast Process Area

Page 5
Date 4-15-10

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	-41.67	1.38		0.0	10.000	12.078				
to		120		0.0	0.0	-0.359			K Factor = 8.00	
2	-41.67	-0.1331		0.0	10.000	-1.331			Vel = 8.94	
2	25.78	1.38		0.0	10.000	10.388			K Factor = 8.00	
to		120		0.0	0.0	-0.364				
3	-15.89	-0.0224		0.0	10.000	-0.224			Vel = 3.41	
3	25.04	1.38	2E	6.0	10.500	9.800			K Factor = 8.00	
to		120		0.0	6.000	0.0				
4	9.15	0.0081		0.0	16.500	0.133			Vel = 1.96	
4	25.22	1.38		0.0	10.000	9.933			K Factor = 8.00	
to		120		0.0	0.0	0.364				
5	34.37	0.0931		0.0	10.000	0.931			Vel = 7.37	
5	26.80	1.38		0.0	10.000	11.228			K Factor = 8.00	
to		120		0.0	0.0	0.359				
6	61.17	0.2709		0.0	10.000	2.709			Vel = 13.12	
6	30.25	1.38	1E	3.0	4.500	14.296			K Factor = 8.00	
to		120	1T	6.0	9.000	1.191				
30	91.42	0.5693		0.0	13.500	7.686			Vel = 19.61	
	0.0									
	91.42					23.173			K Factor = 18.99	
7	-42.06	1.38		0.0	10.000	12.197			K Factor = 8.00	
to		120		0.0	0.0	-0.359				
8	-42.06	-0.1355		0.0	10.000	-1.355			Vel = 9.02	
8	25.90	1.38		0.0	10.000	10.483			K Factor = 8.00	
to		120		0.0	0.0	-0.364				
9	-16.16	-0.0230		0.0	10.000	-0.230			Vel = 3.47	
9	25.16	1.38	2E	6.0	10.500	9.889			K Factor = 8.00	
to		120		0.0	6.000	0.0				
10	9.0	0.0078		0.0	16.500	0.129			Vel = 1.93	
10	25.32	1.38		0.0	10.000	10.018			K Factor = 8.00	
to		120		0.0	0.0	0.364				
11	34.32	0.0929		0.0	10.000	0.929			Vel = 7.36	
11	26.90	1.38		0.0	10.000	11.311			K Factor = 8.00	
to		120		0.0	0.0	0.359				
12	61.22	0.2712		0.0	10.000	2.712			Vel = 13.13	
12	30.34	1.38	1E	3.0	4.500	14.382			K Factor = 8.00	
to		120	1T	6.0	9.000	1.191				
31	91.56	0.5710		0.0	13.500	7.708			Vel = 19.64	
	0.0									
	91.56					23.281			K Factor = 18.98	
13	-43.45	1.38		0.0	10.000	12.628			K Factor = 8.00	
to		120		0.0	0.0	-0.359				
14	-43.45	-0.1439		0.0	10.000	-1.439			Vel = 9.32	
14	26.33	1.38		0.0	10.000	10.830			K Factor = 8.00	
to		120		0.0	0.0	-0.364				
15	-17.12	-0.0256		0.0	10.000	-0.256			Vel = 3.67	
15	25.56	1.38	2E	6.0	10.500	10.210			K Factor = 8.00	
to		120		0.0	6.000	0.0				
16	8.44	0.0069		0.0	16.500	0.114			Vel = 1.81	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schitzer Northeast Process Area

Page 6
Date 4-15-10

Hyd. Ref. Point	Qa Qt	Dia. "C" Pff/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
16	25.70	1.38		0.0	10.000	10.324			K Factor = 8.00	
to		120		0.0	0.0	0.364				
17	34.14	0.0920		0.0	10.000	0.920			Vel = 7.32	
17	27.26	1.38		0.0	10.000	11.608			K Factor = 8.00	
to		120		0.0	0.0	0.359				
18	61.4	0.2727		0.0	10.000	2.727			Vel = 13.17	
18	30.66	1.38	1E	3.0	4.500	14.694			K Factor = 8.00	
to		120	1T	6.0	9.000	1.191				
32	92.06	0.5768		0.0	13.500	7.787			Vel = 19.75	
	0.0									
	92.06					23.672			K Factor = 18.92	
19	-2.42	1.38		0.0	10.000	18.514			K Factor = 8.00	
to		120		0.0	0.0	-0.359				
20	-2.42	-0.0007		0.0	10.000	-0.007			Vel = 0.52	
20	34.08	1.38	3E	9.0	45.000	18.148			K Factor = 8.00	
to		120	1T	6.0	15.000	1.550				
33	31.66	0.0801		0.0	60.000	4.804			Vel = 6.79	
	0.0									
	31.66					24.502			K Factor = 6.40	
50	-69.48	1.38	1E	3.0	4.500	17.895				
to		120	1T	6.0	9.000	-1.191				
1	-69.48	-0.3427		0.0	13.500	-4.626			Vel = 14.90	
	0.0									
	-69.48					12.078			K Factor = -19.99	
51	-70.00	1.38	1E	3.0	4.500	18.078				
to		120	1T	6.0	9.000	-1.191				
7	-70.0	-0.3474		0.0	13.500	-4.690			Vel = 15.02	
	0.0									
	-70.00					12.197			K Factor = -20.04	
52	-71.88	1.38	1E	3.0	4.500	18.745				
to		120	1T	6.0	9.000	-1.191				
13	-71.88	-0.3649		0.0	13.500	-4.926			Vel = 15.42	
	0.0									
	-71.88					12.628			K Factor = -20.23	
53	-36.84	1.38		0.0	4.500	20.182				
to		120		0.0	0.0	-1.191				
19	-36.84	-0.1060		0.0	4.500	-0.477			Vel = 7.90	
	0.0									
	-36.84					18.514			K Factor = -8.56	
30	91.42	3.26		0.0	12.500	23.173				
to		120		0.0	0.0	0.0				
31	91.42	0.0086		0.0	12.500	0.108			Vel = 3.51	
31	91.56	3.26		0.0	12.500	23.281				
to		120		0.0	0.0	0.0				
32	182.98	0.0313		0.0	12.500	0.391			Vel = 7.03	
32	92.07	3.26		0.0	12.500	23.672				
to		120		0.0	0.0	0.0				
33	275.05	0.0664		0.0	12.500	0.830			Vel = 10.57	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schitzer Northeast Process Area

Page 7
Date 4-15-10

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
33	31.66	3.26		0.0	12.500	24.502				
to		120		0.0	0.0	0.0				
34	306.71	0.0812		0.0	12.500	1.015			Vel = 11.79	
34	21.96	3.26		0.0	12.500	25.517				
to		120		0.0	0.0	0.0				
35	328.67	0.0923		0.0	12.500	1.154			Vel = 12.63	
35	20.25	3.26		0.0	12.500	26.671				
to		120		0.0	0.0	0.0				
36	348.92	0.1031		0.0	12.500	1.289			Vel = 13.41	
36	19.93	3.26		0.0	12.500	27.960				
to		120		0.0	0.0	0.0				
37	368.85	0.1142		0.0	12.500	1.428			Vel = 14.18	
37	21.03	3.26		0.0	12.500	29.388				
to		120		0.0	0.0	0.0				
38	389.88	0.1266		0.0	12.500	1.583			Vel = 14.99	
38	23.35	3.26		0.0	12.500	30.971				
to		120		0.0	0.0	0.0				
70	413.23	0.1410		0.0	12.500	1.763			Vel = 15.88	
70	-554.91	3.26		0.0	1.000	32.734				
to		120		0.0	0.0	0.0				
39	-141.68	-0.0200		0.0	1.000	-0.020			Vel = 5.45	
39	24.65	3.26		0.0	11.500	32.714				
to		120		0.0	0.0	0.0				
40	-117.03	-0.0137		0.0	11.500	-0.157			Vel = 4.50	
40	24.71	3.26		0.0	7.500	32.557				
to		120		0.0	0.0	0.0				
41	-92.32	-0.0088		0.0	7.500	-0.066			Vel = 3.55	
41	23.49	3.26	2E	18.815	8.000	32.491				
to		120		0.0	18.815	0.0				
42	-68.83	-0.0051		0.0	26.815	-0.137			Vel = 2.65	
42	22.92	3.26		0.0	11.000	32.354				
to		120		0.0	0.0	0.0				
43	-45.91	-0.0025		0.0	11.000	-0.027			Vel = 1.76	
43	22.83	3.26		0.0	12.000	32.327				
to		120		0.0	0.0	0.0				
44	-23.08	-0.0007		0.0	12.000	-0.008			Vel = 0.89	
	0.0									
	-23.08					32.319			K Factor = -4.06	
50	69.48	2.635		0.0	12.500	17.895				
to		120		0.0	0.0	0.0				
51	69.48	0.0146		0.0	12.500	0.183			Vel = 4.09	
51	70.00	2.635		0.0	12.500	18.078				
to		120		0.0	0.0	0.0				
52	139.48	0.0534		0.0	12.500	0.667			Vel = 8.21	
52	71.88	2.635		0.0	12.500	18.745				
to		120		0.0	0.0	0.0				
53	211.36	0.1150		0.0	12.500	1.437			Vel = 12.44	
53	36.84	2.635		0.0	12.500	20.182				
to		120		0.0	0.0	0.0				
54	248.2	0.1549		0.0	12.500	1.936			Vel = 14.60	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schitzer Northeast Process Area

Page 8
Date 4-15-10

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Fng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
54	-21.96	2.635	0.0	12.500	22.118				
to		120	0.0	0.0	0.0				
55	226.24	0.1304	0.0	12.500	1.630		Vel = 13.31		
55	-20.25	2.635	0.0	12.500	23.748				
to		120	0.0	0.0	0.0				
56	205.99	0.1097	0.0	12.500	1.371		Vel = 12.12		
56	-19.93	2.635	0.0	12.500	25.119				
to		120	0.0	0.0	0.0				
57	186.06	0.0908	0.0	12.500	1.135		Vel = 10.95		
57	-21.02	2.635	0.0	12.500	26.254				
to		120	0.0	0.0	0.0				
58	165.04	0.0728	0.0	12.500	0.910		Vel = 9.71		
58	-23.36	2.635	0.0	12.500	27.164				
to		120	0.0	0.0	0.0				
59	141.68	0.0549	0.0	12.500	0.686		Vel = 8.34		
59	-24.65	2.635	0.0	12.500	27.850				
to		120	0.0	0.0	0.0				
60	117.03	0.0386	0.0	12.500	0.482		Vel = 6.89		
60	-24.71	2.635	0.0	12.500	28.332				
to		120	0.0	0.0	0.0				
61	92.32	0.0248	0.0	12.500	0.310		Vel = 5.43		
61	-23.49	2.635	2E 16.474	12.830	28.642				
to		120	0.0	16.474	0.0				
62	68.83	0.0144	0.0	29.304	0.423		Vel = 4.05		
62	-22.92	2.635	0.0	9.750	29.065				
to		120	0.0	0.0	0.0				
63	45.91	0.0069	0.0	9.750	0.067		Vel = 2.70		
63	-22.83	2.635	0.0	9.900	29.132				
to		120	0.0	0.0	0.0				
64	23.08	0.0019	0.0	9.900	0.019		Vel = 1.36		
	0.0								
	23.08				29.151		K Factor = 4.27		
54	21.97	1.38	4E 12.0	59.500	22.118				
to		120	2T 12.0	24.000	0.0				
34	21.97	0.0407	0.0	83.500	3.399		Vel = 4.71		
	0.0								
	21.97				25.517		K Factor = 4.35		
55	20.24	1.38	4E 12.0	59.500	23.748				
to		120	2T 12.0	24.000	0.0				
35	20.24	0.0350	0.0	83.500	2.923		Vel = 4.34		
	0.0								
	20.24				26.671		K Factor = 3.92		
56	19.94	1.38	4E 12.0	59.500	25.119				
to		120	2T 12.0	24.000	0.0				
36	19.94	0.0340	0.0	83.500	2.841		Vel = 4.28		
	0.0								
	19.94				27.960		K Factor = 3.77		
57	21.02	1.38	4E 12.0	59.500	26.254				
to		120	2T 12.0	24.000	0.0				
37	21.02	0.0375	0.0	83.500	3.134		Vel = 4.51		

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schitzer Northeast Process Area

Page 9
Date 4-15-10

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 21.02						29.388	K Factor = 3.88	
58 to 38	23.35	1.38 120 0.0456	4E 12.0 2T 12.0 0.0	59.500 24.000 83.500	27.164 0.0 3.807			Vel = 5.01	
	0.0 23.35						30.971	K Factor = 4.20	
59 to 39	24.66	1.38 120 0.0504	5E 15.0 2T 12.0 0.0	69.500 27.000 96.500	27.850 0.0 4.864			Vel = 5.29	
	0.0 24.66						32.714	K Factor = 4.31	
60 to 40	24.71	1.38 120 0.0506	4E 12.0 2T 12.0 0.0	59.500 24.000 83.500	28.332 0.0 4.225			Vel = 5.30	
	0.0 24.71						32.557	K Factor = 4.33	
61 to 41	23.49	1.38 120 0.0461	4E 12.0 2T 12.0 0.0	59.500 24.000 83.500	28.642 0.0 3.849			Vel = 5.04	
	0.0 23.49						32.491	K Factor = 4.12	
62 to 42	22.92	1.38 120 0.0440	2E 6.0 2T 12.0 0.0	56.670 18.000 74.670	29.065 0.0 3.289			Vel = 4.92	
	0.0 22.92						32.354	K Factor = 4.03	
63 to 43	22.82	1.38 120 0.0437	2E 6.0 2T 12.0 0.0	55.126 18.000 73.126	29.132 0.0 3.195			Vel = 4.89	
	0.0 22.82						32.327	K Factor = 4.01	
64 to 44	23.08	1.38 120 0.0446	2E 6.0 2T 12.0 0.0	53.000 18.000 71.000	29.151 0.0 3.168			Vel = 4.95	
	0.0 23.08						32.319	K Factor = 4.06	
70 to TR	554.91	4.26 120 0.0661	1E 13.167 1T 26.334 0.0	1.200 39.501 40.701	32.734 8.879 2.690			Vel = 12.49	
TR to BR	0.0	4.26 120 0.0661	1Zia 0.0 1E 13.167 1T 26.334 1Z 13.167	22.500 52.668 75.168	44.303 6.738 4.969			* Fixed loss = 6.521 Vel = 12.49	
BR to UG1	0.0	6.16 140 0.0082	1G 4.304 2E 40.168 1T 43.037	75.000 87.509 162.509	56.010 0.433 1.340			Vel = 5.97	
UG1 to UG2	0.0	6.16 140 0.0082	1G 4.304 1T 43.037 0.0	385.000 47.341 432.341	57.783 0.0 3.566			Vel = 5.97	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schitzer Northeast Process Area

Page 10
Date 4-15-10

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
UG2	0.0	12.34	0.0	600.000	61.349				
to		140	0.0	0.0	0.0				
TEST	554.91	0.0003	0.0	600.000	0.168		Vel = 1.49		
	250.00						Qa = 250.00		
	804.91				61.517		K Factor = 102.62		

Hydraulic Design Information Sheet

Name - Schnitzer NE Dry system2 Date - 5-12-10
 Location - Dry System 2
 Building - System No. - 2
 Contractor - Residential Fire Protection LLC. Contract No. - C10007
 Calculated By - JAL Drawing No. - 1 of 2
 Construction: (X) Combustible () Non-Combustible Ceiling Height - 26'7
 Occupancy - Metal Processing

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
 Y () NFPA 231 () NFPA 231C () Figure Curve
 S Other FM GLOBAL Hazard Group 2
 T Specific Ruling Made By Date

E
 M Area of Sprinkler Operation - 2500 System Type Sprinkler/Nozzle
 Density - .2 () Wet Make Victaulic
 D Area Per Sprinkler - 125 (X) Dry Model V3401
 E Elevation at Highest Outlet - 26.420 () Deluge Size 17/32"
 S Hose Allowance - Inside - () Preaction K-Factor 8.0
 I Rack Sprinkler Allowance - () Other Temp.Rat.200
 G Hose Allowance - Outside - 250
 N Note Safety Margin 10.645

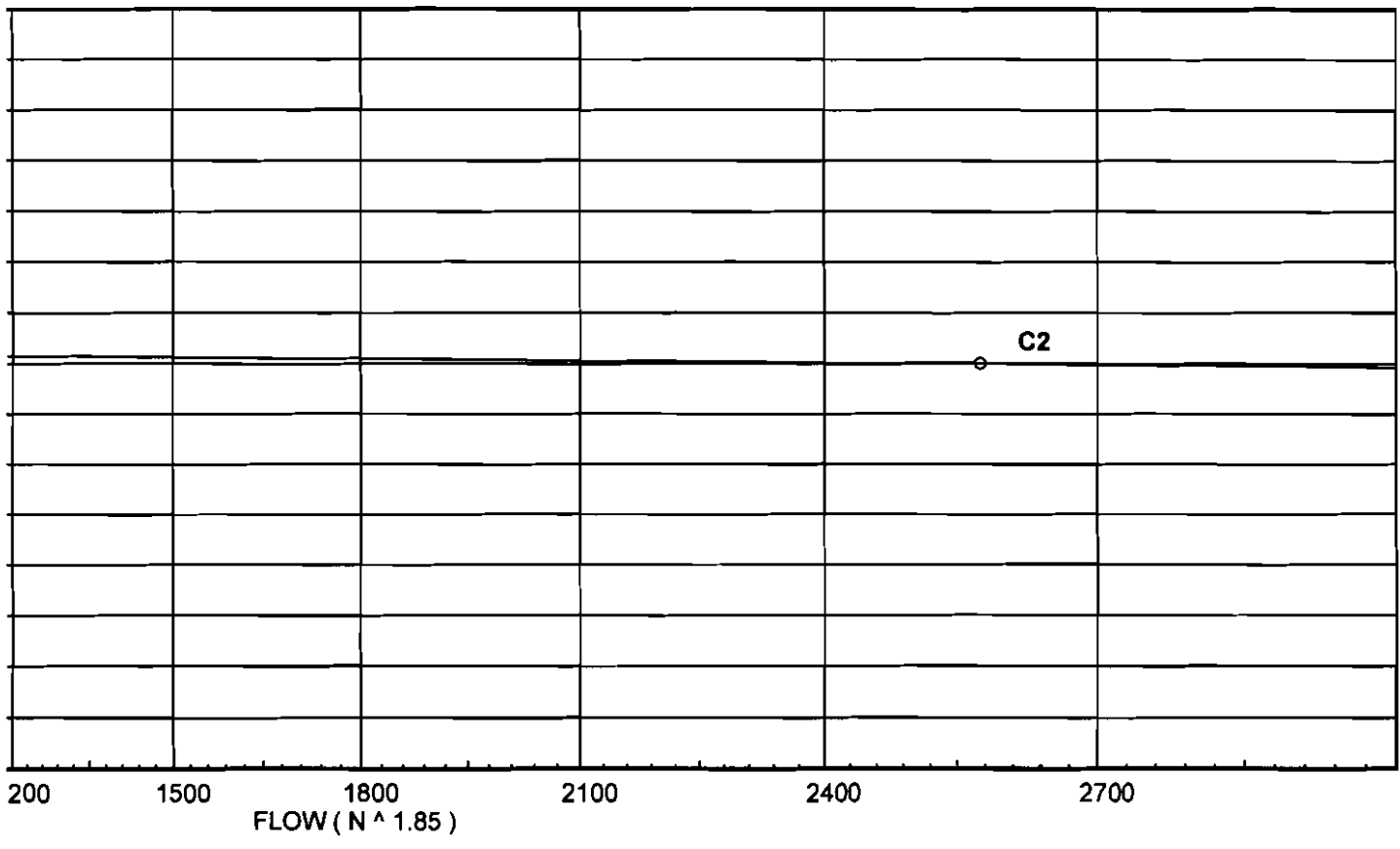
Calculation Flow Required - 632.384 Press Required - 71.207
 Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
 A Date of Test - 7-27-05 Cap. -
 T Time of Test - Rated Cap.- Elev.-
 E Static Press - 82 @ Press -
 R Residual Press - 80 Elev. - Well
 Flow - 2576 Proof Flow
 S Elevation - 0
 U
 P Location - Riverside St. at Leighton St.
 P
 L Source of Information - Portland Water distric
 Y

C Commodity Class Location
 O Storage Ht. Area Aisle W.
 M Storage Method: Solid Piled % Palletized % Rack
 M
 () Single Row () Conven. Pallet () Auto. Storage () Encap.
 S R () Double Row () Slave Pallet () Solid Shelf () Non
 T A () Mult. Row () Open Shelf
 O C
 R K Flue Spacing Clearance:Storage to Ceiling
 A Longitudinal Transverse
 G
 E Horizontal Barriers Provided:

5

Demand:
D1 - Elevation : 10.351
D2 - System Flow : 382.384
D2 - System Pressure : 71.207
Hose (Adj City) :
Hose (Demand) : 250
D3 - System Demand : 632.384
Safety Margin : 10.645



½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
0	0	0	0	0	0	7	10	0	12	9	10	12	19	21	0	0	0	0	0
0	0	0	0	0	0	9.5	17	0	28	0	47	0	0	0	0	0	0	0	0
2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
0	0	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61

Fitting generates a Fixed Loss Based on Flow

Pressure / Flow Summary - STANDARD

RESIDENTIAL FIRE PROTECTION
Schnitzer Northeast Dry system2

Page 4
Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
SPG1	24.3	8	15.26	na	31.25	0.25	125	7.0
SPG2	25.125	8	15.26	na	31.25	0.25	125	7.0
SPG3	25.96	8	15.26	na	31.25	0.25	125	7.0
100	23.9	K = K @ HD1	16.76	na	31.96			
101	23.9	K = K @ HD2	17.57	na	31.25			
102	23.9	K = K @ HD3	18.93	na	31.9			
105	23.9	K = K @ HD1	16.76	na	31.96			
104	23.9	K = K @ HD2	17.57	na	31.25			
103	23.9	K = K @ HD3	18.93	na	31.9			
106	23.9	K = K @ HD1	17.11	na	32.29			
107	23.9	K = K @ HD2	17.94	na	31.58			
108	23.9	K = K @ HD3	19.32	na	32.23			
111	23.9	K = K @ HD1	17.11	na	32.29			
110	23.9	K = K @ HD2	17.94	na	31.58			
109	23.9	K = K @ HD3	19.32	na	32.23			
120	23.9		20.21	na				
121	23.9		20.63	na				
TD	4.0		35.87	na				
BD	23.9		33.85	na				
1	23.9		46.35	na				
2	23.9		45.76	na				
3	23.9		45.16	na				
4	23.9		44.18	na				
5	23.9		43.59	na				
6	23.9		42.99	na				
7	23.9		46.59	na				
8	23.9		46.15	na				
9	23.9		45.72	na				
10	23.9		44.99	na				
11	23.9		44.55	na				
12	23.9		44.12	na				
13	23.9		46.87	na				
14	23.9		46.56	na				
15	23.9		46.25	na				
16	23.9		45.74	na				
17	23.9		45.43	na				
18	23.9		45.12	na				
19	23.9		47.36	na				
20	23.9		47.13	na				
50	23.9		47.15	na				
51	23.9		47.18	na				
52	23.9		47.28	na				
53	23.9		47.46	na				
30	23.9		42.19	na				
31	23.9		43.52	na				
32	23.9		44.7	na				
33	23.9		45.76	na				
34	23.9		46.72	na				
35	23.9		47.62	na				
36	23.9		48.47	na				
37	23.9		49.33	na				
38	23.9		50.23	na				
70	23.9		51.2	na				
39	23.9		51.19	na				
40	23.9		51.14	na				
41	23.9		51.11	na				
42	23.9		51.06	na				
43	23.9		51.05	na				
54	23.9		47.73	na				
55	23.9		48.06	na				
56	23.9		48.45	na				

Flow Summary - Standard

RESIDENTIAL FIRE PROTECTION
Schnitzer Northeast Dry system2

Page 5
Date

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
57	23.9		48.82	na				
58	23.9		48.15	na				
59	23.9		49.4	na				
60	23.9		49.58	na				
61	23.9		49.69	na				
62	23.9		49.85	na				
63	23.9		49.87	na				
64	23.9		49.88	na				
TR	1.5		62.25	na				
BR	1.0		68.23	na				
UG1	0.0		69.33	na				
UG2	0.0		71.12	na				
TEST	0.0		71.21	na	250.0			

The maximum velocity is 14.7 and it occurs in the pipe between nodes 121 and TD

Final Calculations - Hazen-Williams

RESIDENTIAL FIRE PROTECTION
Schnitzer Northeast Dry system2

Page 6
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
SPG1 to HD1	31.25	1.049 120 0.2970	1E	2.0 0.0	0.0 2.000	15.259 0.173			K Factor = 8.00	
	0.0 31.25						16.026		Vel = 11.60	
SPG2 to HD2	31.25	1.049 120 0.2970	1T	5.0 0.0	1.000 5.000	15.259 0.531			K Factor = 8.00	
	0.0 31.25						17.572		Vel = 11.60	
SPG3 to HD3	31.25	1.049 120 0.2972	1T	5.0 0.0	1.800 5.000	15.259 0.892			K Factor = 8.00	
	0.0 31.25						18.172		Vel = 11.60	
100 to 101	31.96	1.38 120 0.0814		0.0 0.0	10.000 0.0	16.758 0.0			K Factor @ node HD1	
	31.96			0.0	10.000	0.814			Vel = 6.86	
101 to 102	31.25	1.61 120 0.1358		0.0 0.0	10.000 0.0	17.572 0.0			K Factor @ node HD2	
	63.21			0.0	10.000	1.358			Vel = 9.96	
102 to 120	31.89	2.067 120 0.0856	1T	10.0 0.0	5.000 10.000	18.930 0.0			K Factor @ node HD3	
	95.1			0.0	15.000	1.284			Vel = 9.09	
	0.0 95.10						20.214		K Factor = 21.15	
105 to 104	31.96	1.38 120 0.0814		0.0 0.0	10.000 0.0	16.758 0.0			K Factor @ node HD1	
	31.96			0.0	10.000	0.814			Vel = 6.86	
104 to 103	31.25	1.61 120 0.1358		0.0 0.0	10.000 0.0	17.572 0.0			K Factor @ node HD2	
	63.21			0.0	10.000	1.358			Vel = 9.96	
103 to 120	31.89	2.067 120 0.0856	1T	10.0 0.0	5.000 10.000	18.930 0.0			K Factor @ node HD3	
	95.1			0.0	15.000	1.284			Vel = 9.09	
	0.0 95.10						20.214		K Factor = 21.15	
106 to 107	32.29	1.38 120 0.0830		0.0 0.0	10.000 0.0	17.110 0.0			K Factor @ node HD1	
	32.29			0.0	10.000	0.830			Vel = 6.93	
107 to 108	31.58	1.61 120 0.1384		0.0 0.0	10.000 0.0	17.940 0.0			K Factor @ node HD2	
	63.87			0.0	10.000	1.384			Vel = 10.07	
108 to 121	32.22	2.067 120 0.0873	1T	10.0 0.0	5.000 10.000	19.324 0.0			K Factor @ node HD3	
	96.09			0.0	15.000	1.310			Vel = 9.19	
	0.0 96.09						20.634		K Factor = 21.15	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schnitzer Northeast Dry system2

Page 7
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
111 to 110	32.29	1.38 120 0.0830		0.0	10.000 0.0	17.110 0.0			K Factor @ node HD1	
110 to 109	32.29	1.61 120 0.1384		0.0	10.000 0.0	17.940 0.0			Vel = 6.93	
109 to 121	31.58	2.067 120 0.0873	1T	10.0	5.000 10.000 15.000	19.324 0.0 1.310			K Factor @ node HD3	
	0.0 96.09					20.634			K Factor = 21.15	
120 to 121	190.20	3.26 120 0.0336		0.0	12.500 0.0	20.214 0.0			Vel = 7.31	
121 to TD	192.18	3.26 120 0.1221	2E	18.815	35.330 18.815 54.145	20.634 8.619 6.613			Vel = 14.70	
TD to BD	0.0	3.26 120 0.1222	1D 1B	22.847 13.44	17.750 36.287 54.037	35.866 -8.619 6.601			Vel = 14.70	
BD to 30	0.0	3.26 120 0.1222	4E	37.631	30.660 37.631 68.291	33.848 0.0 8.342			Vel = 14.70	
	0.0 382.38					42.190			K Factor = 58.87	
1 to 2	-26.95	1.38 120 -0.0595		0.0	10.000 0.0	46.351 0.0			Vel = 5.78	
2 to 3	0.0	1.38 120 -0.0594		0.0	10.000 0.0	45.756 0.0			Vel = 5.78	
3 to 4	-26.95	1.38 120 -0.0594	2E	6.0	10.500 6.000 16.500	45.162 0.0 -0.980			Vel = 5.78	
4 to 5	0.0	1.38 120 -0.0595		0.0	10.000 0.0	44.182 0.0			Vel = 5.78	
5 to 6	-26.95	1.38 120 -0.0594		0.0	10.000 0.0	43.587 0.0			Vel = 5.78	
6 to 30	0.0	1.38 120 -0.0595	1E 1T	3.0 6.0	4.500 9.000 13.500	42.993 0.0 -0.803			Vel = 5.78	
	0.0 -26.95					42.190			K Factor = -4.15	
7 to 8	-22.86	1.38 120 -0.0438		0.0	10.000 0.0	46.593 0.0			Vel = 4.90	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schnitzer Northeast Dry system2

Page 8
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
8	0.0	1.38		0.0	10.000	46.155				
to		120		0.0	0.0	0.0				
9	-22.86	-0.0439		0.0	10.000	-0.439		Vel =	4.90	
9	0.0	1.38	2E	6.0	10.500	45.716				
to		120		0.0	6.000	0.0				
10	-22.86	-0.0438		0.0	16.500	-0.723		Vel =	4.90	
10	0.0	1.38		0.0	10.000	44.993				
to		120		0.0	0.0	0.0				
11	-22.86	-0.0438		0.0	10.000	-0.438		Vel =	4.90	
11	0.0	1.38		0.0	10.000	44.555				
to		120		0.0	0.0	0.0				
12	-22.86	-0.0439		0.0	10.000	-0.439		Vel =	4.90	
12	0.0	1.38	1E	3.0	4.500	44.116				
to		120	1T	6.0	9.000	0.0				
31	-22.86	-0.0439		0.0	13.500	-0.592		Vel =	4.90	
	0.0									
	-22.86					43.524		K Factor =	-3.47	
13	-18.93	1.38		0.0	10.000	46.867				
to		120		0.0	0.0	0.0				
14	-18.93	-0.0309		0.0	10.000	-0.309		Vel =	4.06	
14	0.0	1.38		0.0	10.000	46.558				
to		120		0.0	0.0	0.0				
15	-18.93	-0.0309		0.0	10.000	-0.309		Vel =	4.06	
15	0.0	1.38	2E	6.0	10.500	46.249				
to		120		0.0	6.000	0.0				
16	-18.93	-0.0309		0.0	16.500	-0.510		Vel =	4.06	
16	0.0	1.38		0.0	10.000	45.739				
to		120		0.0	0.0	0.0				
17	-18.93	-0.0309		0.0	10.000	-0.309		Vel =	4.06	
17	0.0	1.38		0.0	10.000	45.430				
to		120		0.0	0.0	0.0				
18	-18.93	-0.0309		0.0	10.000	-0.309		Vel =	4.06	
18	0.0	1.38	1E	3.0	4.500	45.121				
to		120	1T	6.0	9.000	0.0				
32	-18.93	-0.0309		0.0	13.500	-0.417		Vel =	4.06	
	0.0									
	-18.93					44.704		K Factor =	-2.83	
19	-16.07	1.38		0.0	10.000	47.361				
to		120		0.0	0.0	0.0				
20	-16.07	-0.0228		0.0	10.000	-0.228		Vel =	3.45	
20	0.0	1.38	3E	9.0	45.000	47.133				
to		120	1T	6.0	15.000	0.0				
33	-16.07	-0.0228		0.0	60.000	-1.371		Vel =	3.45	
	0.0									
	-16.07					45.762		K Factor =	-2.38	
50	-26.95	1.38	1E	3.0	4.500	47.153				
to		120	1T	6.0	9.000	0.0				
1	-26.95	-0.0594		0.0	13.500	-0.802		Vel =	5.78	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schnitzer Northeast Dry system2

Page 9
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 -26.95					46.351			K Factor = -3.96	
51 to 7	-22.86	1.38 120	1E 1T	3.0 6.0	4.500 9.000	47.185 0.0			Vel = 4.90	
	-22.86	-0.0439		0.0	13.500	-0.592				
	0.0 -22.86					46.593			K Factor = -3.35	
52 to 13	-18.93	1.38 120	1E 1T	3.0 6.0	4.500 9.000	47.284 0.0			Vel = 4.06	
	-18.93	-0.0309		0.0	13.500	-0.417				
	0.0 -18.93					46.867			K Factor = -2.77	
53 to 19	-16.07	1.38 120		0.0 0.0	4.500 0.0	47.464 0.0			Vel = 3.45	
	-16.07	-0.0229		0.0	4.500	-0.103				
	0.0 -16.07					47.361			K Factor = -2.34	
30 to 31	355.43	3.26 120		0.0 0.0	12.500 0.0	42.190 0.0			Vel = 13.66	
	355.43	0.1067		0.0	12.500	1.334				
31 to 32	-22.86	3.26 120		0.0 0.0	12.500 0.0	43.524 0.0			Vel = 12.78	
	332.57	0.0944		0.0	12.500	1.180				
32 to 33	-18.93	3.26 120		0.0 0.0	12.500 0.0	44.704 0.0			Vel = 12.06	
	313.64	0.0846		0.0	12.500	1.058				
33 to 34	-16.07	3.26 120		0.0 0.0	12.500 0.0	45.762 0.0			Vel = 11.44	
	297.57	0.0768		0.0	12.500	0.960				
34 to 35	-11.38	3.26 120		0.0 0.0	12.500 0.0	46.722 0.0			Vel = 11.00	
	286.19	0.0715		0.0	12.500	0.894				
35 to 36	-7.36	3.26 120		0.0 0.0	12.500 0.0	47.616 0.0			Vel = 10.72	
	278.83	0.0681		0.0	12.500	0.851				
36 to 37	1.29	3.26 120		0.0 0.0	12.500 0.0	48.467 0.0			Vel = 10.77	
	280.12	0.0686		0.0	12.500	0.858				
37 to 38	7.81	3.26 120		0.0 0.0	12.500 0.0	49.325 0.0			Vel = 11.07	
	287.93	0.0723		0.0	12.500	0.904				
38 to 70	11.82	3.26 120		0.0 0.0	12.500 0.0	50.229 0.0			Vel = 11.52	
	299.75	0.0778		0.0	12.500	0.973				
70 to 39	-382.38	3.26 120		0.0 0.0	1.000 0.0	51.202 0.0			Vel = 3.18	
	-82.63	-0.0070		0.0	1.000	-0.007				
39 to 40	14.38	3.26 120		0.0 0.0	11.500 0.0	51.195 0.0			Vel = 2.62	
	-68.25	-0.0050		0.0	11.500	-0.058				

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schnitzer Northeast Dry system2

Page 10
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftrng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
40 to 41	14.41 -53.84	3.26 120 -0.0033	0.0 0.0 0.0	7.500 0.0 7.500	51.137 0.0 -0.025		Vel = 2.07		
41 to 42	13.70 -40.14	3.26 120 -0.0019	2E 18.815 0.0 0.0	8.000 18.815 26.815	51.112 0.0 -0.050		Vel = 1.54		
42 to 43	13.37 -26.77	3.26 120 -0.0009	0.0 0.0 0.0	11.000 0.0 11.000	51.062 0.0 -0.010		Vel = 1.03		
43 to 44	13.31 -13.46	3.26 120 -0.0002	0.0 0.0 0.0	12.000 0.0 12.000	51.052 0.0 -0.003		Vel = 0.52		
	0.0 -13.46				51.049		K Factor = -1.88		
50 to 51	26.95 26.95	2.635 120 0.0026	0.0 0.0 0.0	12.500 0.0 12.500	47.153 0.0 0.032		Vel = 1.59		
51 to 52	22.86 49.81	2.635 120 0.0079	0.0 0.0 0.0	12.500 0.0 12.500	47.185 0.0 0.099		Vel = 2.93		
52 to 53	18.93 68.74	2.635 120 0.0144	0.0 0.0 0.0	12.500 0.0 12.500	47.284 0.0 0.180		Vel = 4.04		
53 to 54	16.08 84.82	2.635 120 0.0213	0.0 0.0 0.0	12.500 0.0 12.500	47.464 0.0 0.266		Vel = 4.99		
54 to 55	11.38 96.2	2.635 120 0.0268	0.0 0.0 0.0	12.500 0.0 12.500	47.730 0.0 0.335		Vel = 5.66		
55 to 56	7.35 103.55	2.635 120 0.0307	0.0 0.0 0.0	12.500 0.0 12.500	48.065 0.0 0.384		Vel = 6.09		
56 to 57	-1.29 102.26	2.635 120 0.0300	0.0 0.0 0.0	12.500 0.0 12.500	48.449 0.0 0.375		Vel = 6.02		
57 to 58	-7.81 94.45	2.635 120 0.0259	0.0 0.0 0.0	12.500 0.0 12.500	48.824 0.0 0.324		Vel = 5.56		
58 to 59	-11.82 82.63	2.635 120 0.0202	0.0 0.0 0.0	12.500 0.0 12.500	49.148 0.0 0.253		Vel = 4.86		
59 to 60	-14.38 68.25	2.635 120 0.0142	0.0 0.0 0.0	12.500 0.0 12.500	49.401 0.0 0.178		Vel = 4.02		
60 to 61	-14.41 53.84	2.635 120 0.0091	0.0 0.0 0.0	12.500 0.0 12.500	49.579 0.0 0.114		Vel = 3.17		
61 to 62	-13.70 40.14	2.635 120 0.0053	2E 16.474 0.0 0.0	12.830 16.474 29.304	49.693 0.0 0.156		Vel = 2.36		

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schnitzer Northeast Dry system2

Page 11
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftnng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
62 to 63	-13.37 26.77	2.635 120 0.0026		0.0 0.0 0.0	9.750 0.0 9.750	49.849 0.0 0.025			Vel = 1.57	
63 to 64	-13.31 13.46	2.635 120 0.0007		0.0 0.0 0.0	9.900 0.0 9.900	49.874 0.0 0.007			Vel = 0.79	
	0.0 13.46					49.881			K Factor = 1.91	
54 to 34	-11.38 -11.38	1.38 120 -0.0121	4E 2T	12.0 12.0 0.0	59.500 24.000 83.500	47.730 0.0 -1.008			Vel = 2.44	
	0.0 -11.38					46.722			K Factor = -1.66	
55 to 35	-7.36 -7.36	1.38 120 -0.0054	4E 2T	12.0 12.0 0.0	59.500 24.000 83.500	48.065 0.0 -0.449			Vel = 1.58	
	0.0 -7.36					47.616			K Factor = -1.07	
56 to 36	1.29 1.29	1.38 120 0.0002	4E 2T	12.0 12.0 0.0	59.500 24.000 83.500	48.449 0.0 0.018			Vel = 0.28	
	0.0 1.29					48.467			K Factor = 0.19	
57 to 37	7.81 7.81	1.38 120 0.0060	4E 2T	12.0 12.0 0.0	59.500 24.000 83.500	48.824 0.0 0.501			Vel = 1.68	
	0.0 7.81					49.325			K Factor = 1.11	
58 to 38	11.82 11.82	1.38 120 0.0129	4E 2T	12.0 12.0 0.0	59.500 24.000 83.500	49.148 0.0 1.081			Vel = 2.54	
	0.0 11.82					50.229			K Factor = 1.67	
59 to 39	14.38 14.38	1.38 120 0.0186	5E 2T	15.0 12.0 0.0	69.500 27.000 96.500	49.401 0.0 1.794			Vel = 3.08	
	0.0 14.38					51.195			K Factor = 2.01	
60 to 40	14.41 14.41	1.38 120 0.0187	4E 2T	12.0 12.0 0.0	59.500 24.000 83.500	49.579 0.0 1.558			Vel = 3.09	
	0.0 14.41					51.137			K Factor = 2.02	
61 to 41	13.70 13.7	1.38 120 0.0170	4E 2T	12.0 12.0 0.0	59.500 24.000 83.500	49.693 0.0 1.419			Vel = 2.94	
	0.0 13.70					51.112			K Factor = 1.92	

Final Calculations - Standard

RESIDENTIAL FIRE PROTECTION
Schnitzer Northeast Dry system2

Page 12
Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
62	13.37	1.38	2E	6.0	56.670	49.849				
to		120	2T	12.0	18.000	0.0				
42	13.37	0.0162		0.0	74.670	1.213			Vel = 2.87	
	0.0									
	13.37					51.062			K Factor = 1.87	
63	13.31	1.38	2E	6.0	55.126	49.874				
to		120	2T	12.0	18.000	0.0				
43	13.31	0.0161		0.0	73.126	1.178			Vel = 2.86	
	0.0									
	13.31					51.052			K Factor = 1.86	
64	13.46	1.38	2E	6.0	53.000	49.881				
to		120	2T	12.0	18.000	0.0				
44	13.46	0.0165		0.0	71.000	1.168			Vel = 2.89	
	0.0									
	13.46					51.049			K Factor = 1.88	
70	382.38	4.26	1E	13.167	1.200	51.202				
to		120	1T	26.334	39.501	9.701				
TR	382.38	0.0332		0.0	40.701	1.351			Vel = 8.61	
TR	0.0	4.26	1Zia	0.0	22.500	62.254				
to		120	1E	13.167	52.668	3.476			* Fixed loss = 3.259	
BR	382.38	0.0332	1T	26.334	75.168	2.496			Vel = 8.61	
			1Z	13.167						
BR	0.0	6.16	1G	4.304	75.000	68.226				
to		140	2E	40.168	87.509	0.433				
UG1	382.38	0.0041	1T	43.037	162.509	0.673			Vel = 4.12	
UG1	0.0	6.16	1G	4.304	385.000	69.332				
to		140	1T	43.037	47.341	0.0				
UG2	382.38	0.0041		0.0	432.341	1.790			Vel = 4.12	
UG2	0.0	12.34		0.0	600.000	71.122				
to		140		0.0	0.0	0.0				
TEST	382.38	0.0001		0.0	600.000	0.085			Vel = 1.03	
	250.00								Qa = 250.00	
	632.38					71.207			K Factor = 74.94	