



# ***Mammoth Fire Protection Systems, Inc.***

*176 Walker Street Lowell, MA 01854*

## **AUTOMATIC FIRE SPRINKLER SYSTEM WATER SUPPLY EVALUATION DECEMBER 30, 2021**

**KOOPMAN LUMBER  
29 GILMORE DRIVE  
SUTTON MASSACHUSETTS**

### **PURPOSE**

The purpose of this evaluation is to determine that the existing water supply and fire service line is of adequate size and capacity for both the Koopman Lumber 20,000 SF expansion into existing building space as well as a proposed 30,000 SF building addition fire sprinkler systems.

### **BUILDING DESCRIPTION**

The existing building is type IIB construction and has an overall area of 60,000 square feet. Koopman Lumber currently occupies a total of 40,000 square feet consisting of 34,000 square feet of warehouse and 6,000 square feet of office area. The balance of the existing building area, 20,000 square feet, is currently occupied by a tenant. Koopman proposes to expand into this existing tenant space and construct a 30,000 square foot building addition.

### **DESIGN CRITERIA**

The existing warehouse fire sprinkler system was upgraded in 2015 per the attached narrative and hydraulic calculations by Performance Consultants, Inc. The design and system upgrade for the currently proposed expansion into existing building tenant space as well as the



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proposed building addition will match the “Basis of Design” requirements within the 2015 Performance Consultants narrative. MFPS performed a recent flow test on November 9, 2021, at this location. We’ve plotted the water supply curve onto the existing calculations. The hydraulic calculations dated 10/05/15 with a design density of .33/2000 sq ft with hose stream of 500 GPM has an 11.026 safety cushion, with the new flow test data the cushion should increase to 12.520. The hydraulic calculations dated 10/05/15 with a design density of .30/2000 sq ft with a hose stream of 500 GPM has a 6.919 safety cushion, with the new flow test data the cushion should increase to 8.218.

### CONCLUSION

Based on the above information and current flow test data, the existing water supply and 8”-inch fire service line will be adequate to accommodate both Koopman’s expansion into existing 20,000 SF tenant space and the proposed 30,000 SF building addition fire sprinkler systems as defined above and as described in the narrative from 2015. The existing fire sprinkler riser can be modified and adapted to provide the necessary coverage for both the expansion and addition areas without the need for an additional fire service line.

*Gary C. Robidoux*

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Gary C Robidoux  
NICET # 77843  
Mass. License # SC003065

# PERFORMANCE CONSULTANTS, INC.

## *LICENSED FIRE PROTECTION ENGINEERS*

31 MASSACONNIC TRAIL HOLLAND, MA 01521 (413) 245-3716

Town of Sutton  
Building & Zoning Department  
Attn John Couture, Commissioner  
Uxbridge Road  
Sutton, MA 01590

October 5, 2015.

Re: 29 Gilmore Drive, Sutton, MA – Fire Protection Narrative

### **SUMMARY**

This narrative is submitted on behalf of Koopman Lumber & Hardware for the building they intend to occupy at 29 Gilmore Drive in Sutton. It is provided in supplement to documents being submitted in pursuit of a building permit for the occupancy of the building and the erection of storage racking in the warehouse portion of the building. This is an update to a narrative that was submitted on 9/28/15. The changes primarily relate to the determination that some of Koopman's exterior doors exceed the threshold for allowable plastic content in Class IV commodities, and as a result additional sprinkler system modifications are required in the racks where these products are stored.

This document is formatted in accordance with guidelines approved and published by the Massachusetts Board of Building Regulations and Standards on 5/14/09.

### **1.a) Basis (Methodology) of Design**

#### Building Description

- a) Building "Use" Group(s) – S-1, Moderate Hazard Storage
- b) Total square footage of the building – approximately 60,000 sq ft, 20,000 sq ft of which is for an existing, adjacent tenant (i.e. non-Koopman space) and approximately 6,000 sq ft of which is an office support area.
- c) Building Height – 28 ft at the eaves, 32' at the peak
- d) Number of floors above grade – one
- e) Number of floors below grade – none
- f) Square footage per floor – approximately 60,000 sq ft.
- g) Types of occupancies (hazards) within the building – storage of doors, windows, trim and related items
- h) Type of construction – IIB
- i) Hazardous material usage and storage – None

- j) High storage of commodities within a building usually over 12 ft – up to 25 ft rack storage of Class I-IV commodities (i.e. less than 15% by weight and 25% by volume of Group A plastics). Group A plastic storage is permitted in designated racks only, and Koopman intends to store such < 10' tall.
- k) Site access arrangement for emergency vehicle access – The building is on the west side of Gilmore Drive. Three sides are paved and accessible by emergency apparatus. The fourth (i.e. west) side is not paved but is open.

#### Applicable Laws, Regulations and Standards

The design of the fire protection systems was based on:

- 780 CMR, *Massachusetts Building Code*, 8<sup>th</sup> edition
- 527 CMR, *Massachusetts Fire Prevention Regulations*, effective Jan 2015
- NFPA 13, *Standard for the Installation of Sprinkler System*, 2013 edition

#### Design Responsibility for Fire Protection Systems

The sprinkler system modifications were designed by Performance Consultants, Inc. (PCI) of Holland, MA. Mr. William E. Pucci, P.E. of PCI will be performing engineer-of-record and construction supervision duties for the work

#### Fire Protection Systems to be Installed

The existing sprinkler system utilizes an 8" diameter underground feed and a 6" diameter riser. The warehouse portion of the system is gridded with 4" diameter feed and cross mains and 2" diameter branch lines. Branch lines are 12'6" apart and sprinklers are spaced 8 ft apart on branch lines (exception – the two southwest-most lines of sprinklers are 10'x10'). Sprinklers are Viking Model VK530. These are extra-large orifice, standard spray upright sprinklers with a 5/8" orifice and a K-factor of 11.2. The temperature rating of the sprinklers at the ceiling of the warehouse is 286F.

There is also a 4" diameter, currently unused riser dedicated to (past and future) in-rack systems. There is also a 4" diameter feed main off this riser that runs northeast to southwest through the middle of the warehouse.

Koopman plans to erect single, double, and multiple row racks for storage of their products. Information provided by their suppliers supports that the majority of the products intended to be stored in the racks are less than 15% by weight and less than 25% by volume of Group A plastics (exception: exterior door products). Excluding the exterior doors, an NFPA 13 commodity classification of Class IV has been assigned to the remainder of the materials in the building. Exterior doors are considered a Group A Plastic.

A single level of in-rack sprinklers must be added to each group of racks at or just above 1/2 of the maximum expected storage height. 2" diameter drops (3" for Type A racks – see below) are to be installed from the existing 4" diameter in-rack sprinkler feed main described above. Single and double row rack will each have one 2" diameter line; the multiple row rack (i.e. the AutoStak area) will have two, 2" diameter lines.

A second level of in-rack sprinklers must be added in racks to be used for exterior door storage. The protection must extend one rack bay beyond the intended storage area. Koopman plans to use the eight northwestern most rack bays in both "Type A" racks for exterior doors. The drops for racks with two levels of in-racks will be 3"

diameter. Each rack will have one, 2" diameter line. The line will be capped after the ninth bay for potential future expansion of the Group A plastic storage area.

In addition to the in-rack piping, an additional ten (10) sprinklers must be added at the ceiling (as shown on the design drawings) to address greater than allowed distances to walls. And sidewall sprinklers must be added underneath the two overhead doors in the loading dock area to address the obstruction when the door is in the fully open position. (Note: if the doors are modified such that there is no horizontal project (i.e. no sprinkler obstruction) in the fully open position, then additional sprinklers are not required.

There is a single small hose station (1" diameter feed) positioned in the middle of the warehouse. NFPA 13-2013 only requires small hose stations if the authority having jurisdiction requires such. Additional hose stations can be provided upon request.

The sprinkler system (with the proposed improvements and addition of in-rack sprinklers) is capable of providing:

0.33 gpm/sq ft over 2000 sq ft at the ceiling plus 15 psi through each of (8) in-rack sprinklers when provided with 1374 gpm at a pressure of 53 psi at the connection to the 16" town water main in Gilmore Dr. A 500 gpm hose stream allowance is included and a pressure cushion of 11 psi is provided.

0.30 gpm/sq ft over 2000 sq ft at the ceiling plus 15 psi through each of (14) in-rack sprinklers when provided with 1520 gpm at a pressure of 57 psi at the connection to the 16" town water main in Gilmore Dr. A 500 gpm hose stream allowance is included and a pressure cushion of 7 psi is provided.

0.35 gpm/sq ft over 2000 sq ft at the ceiling (without any in-rack sprinklers) when provided with 1251 gpm at a pressure of 55 psi at the connection to the 16" town water main in Gilmore Dr. A 500 gpm hose stream allowance is included and a pressure cushion of 6 psi is provided.

The above design criteria (combined with the proposed improvements and addition of in-rack sprinklers) is capable of protecting

- Up to 25 ft high Class I-IV commodities in single and double row racks (with minimum 8 ft aisles) per NFPA 13-2013 Table 16.2.1.3.2 & Figure 16.2.1.3.2(D) curve A.
- Up to 25 ft high Group A plastic commodities in select double row racks per NFPA 13-2013 Figures 17.1.2.1 & 17.2.1.2.1(f).
- Up to 18 ft Class I-IV commodities in multiple row racks (i.e. >16 ft deep) per NFPA 13-2013 Table 16.2.1.3.3.2 & Figure 16.2.1.3.2(D) Curve C modified per Figure 16.2.1.3.4.1.
- Up to 22 ft high Class I-IV commodities stored on the floor (i.e. solid piled, palletized, etc.) per NFPA 13-2013 Figure 14.2.4.2 modified per Figure 14.2.4.3
- Up to 19 ft of Class III commodities in single or double row racks (with minimum 8 ft aisles) without in-rack sprinklers per NFPA 13-2013 Table 16.2.1.3.2 & Figure 16.2.1.3.2(C) curve E modified per Figure 16.2.1.3.4.1.
- Up to 16-1/2 ft of Class IV commodities in single or double row racks (with minimum 8 ft aisles) without in-rack sprinklers per NFPA 13-2013 Table 16.2.1.3.2 & Figure 16.2.1.3.2(D) curve E modified per Figure 16.2.1.3.4.1.
- Up to 5 ft high group A plastics per NFPA 13-2013 Section 15.2.1, Table 13.2.1 (& 15.2.6(a)).
- Extra Hazard Group 1 occupancies (i.e. saw mills) per NFPA 13-2013 Figure 11.2.3.1.1 modified per section 11.2.3.2.6.

#### Features Used in the Design Methodology

- a) Building occupancy notification and evacuation procedures – typical
- b) Emergency response personnel, site and system features

Fire Hydrant Location(s) and Water Supply Information – There is a hydrant 90 ft south of the driveway for #29 Gilmore and another hydrant 620 ft north.

A hydrant flow test was conducted using these two hydrants jointly by RC Shaw Sprinkler Co., Inc and the Whitinsville Water District on 3/11/15. The static pressure was 66 psi and the residual pressure was 44 psi with 1341 gpm flowing.

Fire Department Connection Location – There is a 4” Storz connection on the front of the building adjacent to the service entrance (just north of the office support structure).

Fire Alarm System Control Equipment Location – The fire alarm control panel is located in the IT immediately adjacent to the fire protection service entrance / riser/controls (see below)

Sprinkler System Control Equipment Location – The sprinkler system risers and controls are located on the front wall approximately in the center of the building. The easiest access to the risers and controls is through the man door at the loading dock near the northeast corner of the building. Once inside the building look for the man door in the far left corner – the risers and controls are immediately through this door on the left.

- c) Safeguards, fire prevention and emergency procedures during new construction and impairment plans associated with existing system modifications – The existing ceiling sprinkler system shall not be taken offline without permission of the head of the fire department. The existing in-rack riser is currently unused and independent of the riser that feeds the ceiling system. The adjacent tenant is fed by another (third) riser, and therefore will be unaffected by the work in the Koopman space.
- d) Methods for future testing and maintenance of systems and documentation – the sprinkler contractor will be required to provide the owners with information regarding the proper inspection, testing and maintenance (ITM) of the systems.
- e) The sprinkler system modifications will be performed by RC Shaw Sprinkler Co., Inc. 95 Webster Street, Worcester, MA 01603. The owner will be required to hire a licensed fire alarm contractor to modify the existing zone descriptions on the fire alarm system (and on the remote annunciator located at the entrance to the office support structure on the front of the building).

#### Special Consideration and Description

- a) Application of “performance-based design” in lieu of prescriptive code requirements – none
- b) Interpretation/clarification between designer and code officials –
  - (1) Additional small hose stations only if required by fire department
  - (2) In-rack sprinklers in racks for Group A plastics NOT staggered as required by NFPA 13-2013 Figure 17.2.1.2.1(f). The plastics will only be stored on the lowest level of the rack, and unlike the figure there will be no transverse flue spaces at the midpoint of the rack bays. So the staggering would, in our professional opinion, offer marginal (if any) additional protection and would only increase the likelihood of mechanical damage from fork truck operators. The staggering can be implemented if required by the fire department.
  - (3) Sprinklers in tenant space and office support areas not addressed.
- c) Waiver or variance sought through the regulatory appeal process – none

## 1.b) Sequence of Operation

The sequence of operations for the automatic sprinkle system is as follows:

- Operation of a sprinkler will activate a flow switch, which shall send an alarm signal to the fire alarm control panel for the building. Notification appliances throughout the building will activate.
- Closure of a control valve in the sprinkler system piping will activate a tamper switch and shall result in a supervisory signal on the main control panel for the building. A trouble/supervisory indicator will sound/illuminate on the control panel.

Note: It is the responsible of the owner to retain a licensed fire alarm contractor to confirm that all trouble, supervisory and alarm signals are properly received and retransmitted to an approved supervising station.

## 1.c) Testing Criteria

The installing contractor will test the system in accordance with NFPA 13-2013 upon completion of work and will provide a testing completion certificate.

The sprinkler system contractor is required to conduct a 200 psi hydrostatic test on all new in-rack piping for two hours. The contractor shall also test all tamper and flow switches upon completion of work. Tamper switches will be tested by physically turning the valve(s), not by reaching in and flicking the indicator with a finger. In accordance with section 12.3.3.5.2 of NFPA 25-2011, the tamper switch shall be determined to be working properly if and only if the switch indicates movement from the valve's normal position during either the first two revolutions of the hand wheel or when the stem of the valve has moved one-fifth of the distance from its normal position. Prior to conducting a test of the flow switch, the sprinkler system contractor shall verify that a K5.6 sprinkler is installed in the outlet of the inspector's test connection piping.

The material and test certificate in the latest edition of NFPA 13 shall be utilized and all items shall be filled out. If an item is not applicable it shall be marked N/A. No items shall be left blank.

The testing certificate shall be presented to both the fire department and the engineer-of-record prior to requesting a final inspection. The installing contractor shall be in charge of setting up the final inspection upon completion of work.

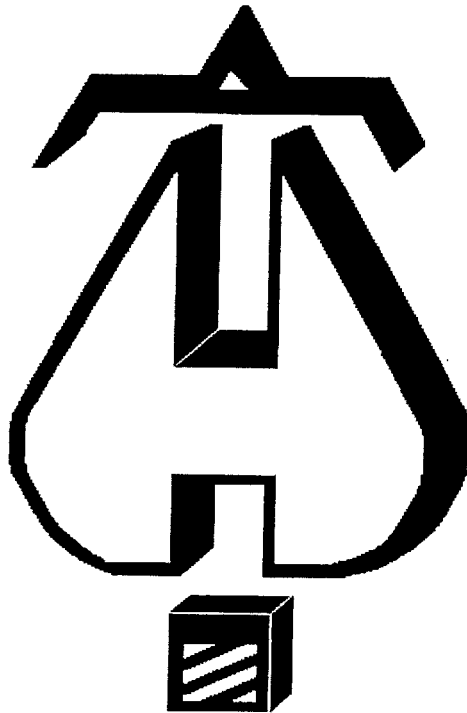
If you have any questions regarding this document please contact us at (413) 245-3716.

Sincerely,



William E. Pucci, P.E.  
President

Cc: Chief Matthew Belsito - Sutton Fire Department  
Anthony Brookhouse, Fred Andrews & Eric Sampson - Koopman Lumber  
Ray Shaw - RC Shaw Sprinkler Co., Inc



... Fire Protection by Computer Design

Performance Consultants Inc  
31 Massaconnic Trail  
Holland MA 01521  
413-245-3716



Job Name : Koopman  
Building : Warehouse Area  
Location : 29 Gilmore Dr, Sutton, MA  
System :  
Contract : 2647B  
Data File : IN-RACK2.WX1



Hydraulic Design Information Sheet

Name - Koopman Lumber & Hardware Date - 100515  
Location - 29 Gilmore Dr, Sutton, MA  
Building - Warehouse Area  
Contractor - Cogswell Sprinkler Co., Inc System No. -  
Calculated By - WEP Contract No. - 2647B  
Construction: ( ) Combustible (x) Non-Combustible Drawing No. - FP-1  
Occupancy - Rack Storage Ceiling Height - 32'

S (x) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.  
Y ( ) NFPA 231 ( ) NFPA 231C ( ) Figure 17.2.1.2.1(f) Curve  
S Other (see drawing notes & narrative for additional NFPA 13 refs)  
T Specific Ruling Made By Date

M	Area of Sprinkler Operation - 2000	System Type	Sprinkler/Nozzle
	Density - 0.30	(x) Wet	Make Viking/Tyco
D	Area Per Sprinkler - 100	( ) Dry	Model VK530/TY3231
E	Elevation at Highest Outlet - 31.5	( ) Deluge	Size 5/8 & 1/2
S	Hose Allowance - Inside -	( ) Preaction	K-Factor 11.2/5.6
I	Rack Sprinkler Allowance -	( ) Other	Temp.Rat.286/155F
G	Hose Allowance - Outside - 500		

Note

Calculation	Flow Required - 1520	Press Required - 57	At Test
Summary	C-Factor Used: 120	Overhead 120	Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 3/11/15		Cap. -
T	Time of Test - 10:30AM	Rated Cap.-	Elev.-
E	Static Press - 66	@ Press -	
R	Residual Press - 64	Elev. - 0	Well
	Flow - 1341		Proof Flow
S	Elevation - 0		

U Location - Vicinity of 29 Gilmore

P Source of Information - RC Shaw Sprinkler Co., Inc  
L  
Y

C	Commodity Exterior Doors	Class Plastic Location
O	Storage Ht. 25'	Area Aisle W. >8'
M	Storage Method: Solid Piled	% Palletized % Rack 100
M	( ) Single Row (x) Conven. Pallet	( ) Auto. Storage ( ) Encap.
S	(x) Double Row ( ) Slave Pallet	( ) Solid Shelf (x) Non
T	( ) Mult. Row	( ) Open Shelf
O		
C		
R	Flue Spacing	Clearance:Storage to Ceiling 5-10'
A	Longitudinal	Transverse
G		
E	Horizontal Barriers Provided:	

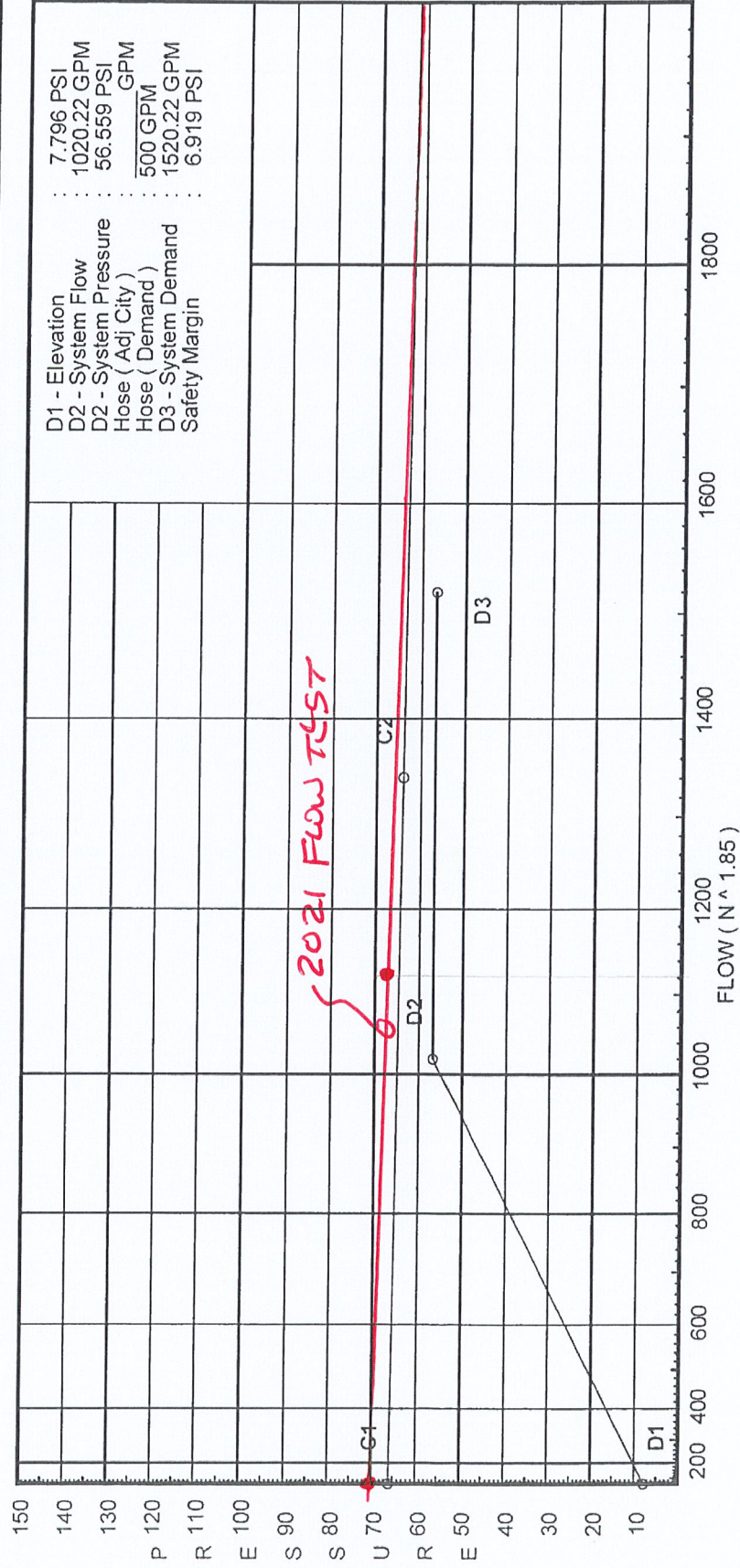
# Water Supply Curve (C)

Performance Consultants Inc  
Koopman

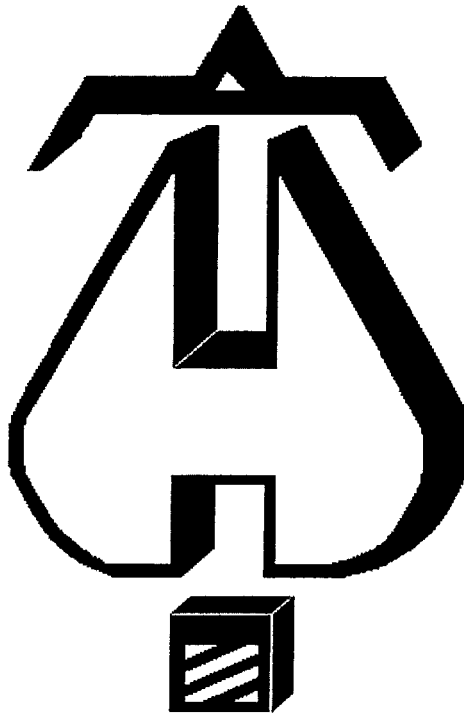
2021

City Water Supply:  
C1 - Static Pressure : 66 PSI  
C2 - Residual Pressure: 64 PSI  
C2 - Residual Flow : 1341 GPM

70 PSI  
68 PSI  
920 GPM



D1 - Elevation : 7.796 PSI  
D2 - System Flow : 1020.22 GPM  
D2 - System Pressure : 56.559 PSI  
Hose ( Adj City ) : 500 GPM  
Hose ( Demand ) : 1520.22 GPM  
D3 - System Demand : 6.919 PSI  
Safety Margin



. . . Fire Protection by Computer Design

Performance Consultants Inc  
31 Massaconnic Trail  
Holland MA 01521  
413-245-3716



Job Name : Koopman  
Building : Warehouse Area  
Location : 29 Gilmore Dr, Sutton, MA  
System :  
Contract : 2647B  
Data File : IN-RACK.WX1

Hydraulic Design Information Sheet

Name - Koopman Lumber & Hardware Date - 100515  
Location - 29 Gilmore Dr, Sutton, MA  
Building - Warehouse Area  
Contractor - Cogswell Sprinkler Co., Inc  
Calculated By - WEP  
Construction: ( ) Combustible (x) Non-Combustible  
Occupancy - Rack Storage

System No. -  
Contract No. - 2647B  
Drawing No. - FP-1  
Ceiling Height - 32'

S (x) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.  
Y ( ) NFPA 231 ( ) NFPA 231C ( ) Figure 16.2.1.3.2(D) Curve A/C  
S Other (see drawing notes & narrative for additional NFPA 13 refs)  
T Specific Ruling Made By Date

E	Area of Sprinkler Operation - 2000	System Type	Sprinkler/Nozzle
M	Density - 0.33	(x) Wet	Make Viking/Tyco
D	Area Per Sprinkler - 100	( ) Dry	Model VK530/TY3231
E	Elevation at Highest Outlet - 31.5	( ) Deluge	Size 5/8 & 1/2
S	Hose Allowance - Inside -	( ) Preaction	K-Factor 11.2/5.6
I	Rack Sprinkler Allowance -	( ) Other	Temp.Rat.286/155F
G	Hose Allowance - Outside - 500		

Note

Calculation	Flow Required - 1374	Press Required - 53	At Test
Summary	C-Factor Used: 120	Overhead 120	Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 3/11/15		Cap. -
T	Time of Test - 10:30AM	Rated Cap. -	Elev. -
E	Static Press - 66	@ Press -	
R	Residual Press - 64	Elev. - 0	Well
	Flow - 1341		Proof Flow
S	Elevation - 0		

U Location - Vicinity of 29 Gilmore

P Source of Information - RC Shaw Sprinkler Co., Inc  
L  
Y

C	Commodity	Doors	Windows	Trim	Class IV	Location
O	Storage Ht. 25'				Area	Aisle W. >8'
M	Storage Method:	Solid Piled	%	Palletized 50	%	Rack 50
M		(x) Single Row	(x) Conven. Pallet	( ) Auto. Storage	( ) Encap.	
S	R	(x) Double Row	( ) Slave Pallet	( ) Solid Shelf	(x) Non	
T	A	(x) Mult. Row		( ) Open Shelf		
O	C					

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

E Horizontal Barriers Provided:



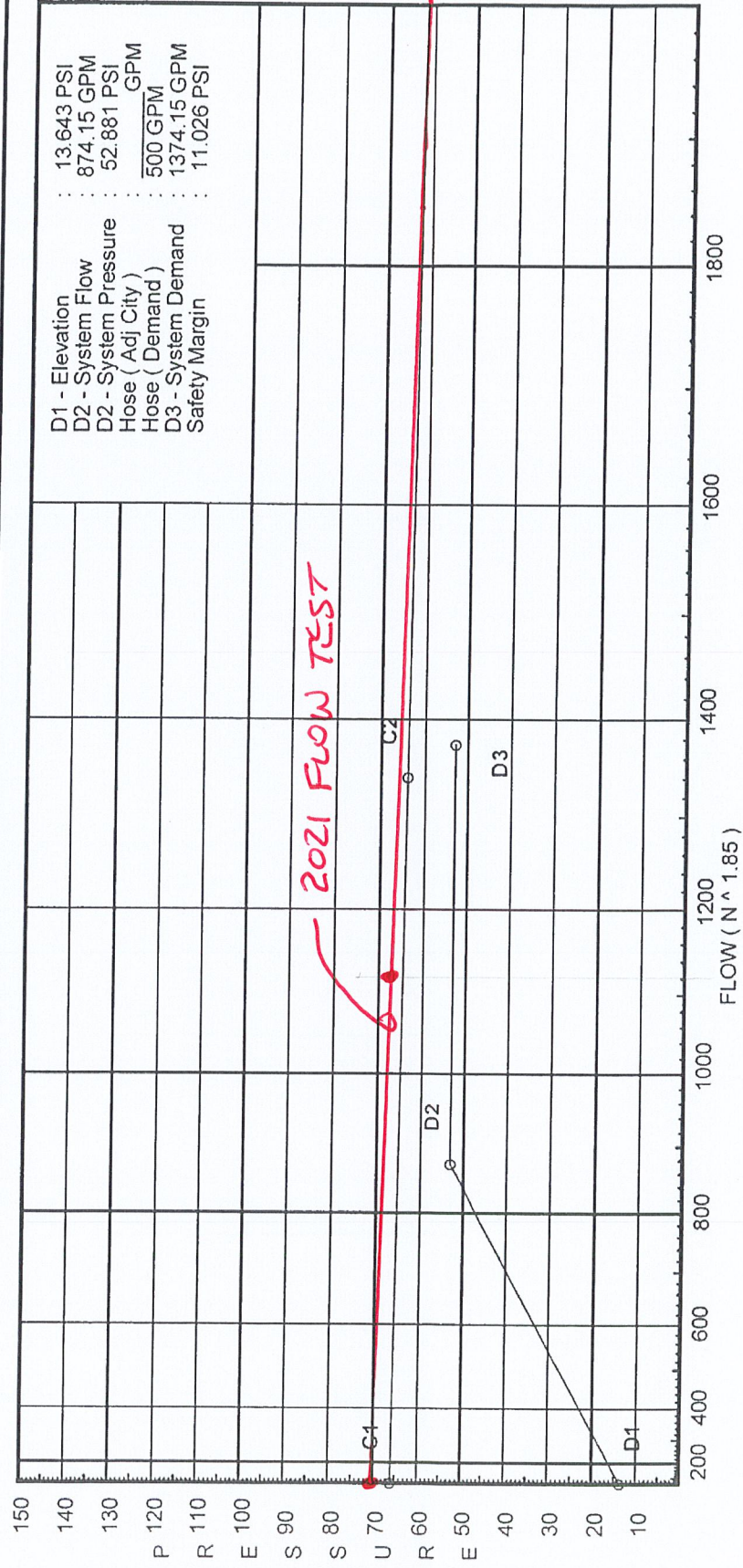
# Water Supply Curve (C)

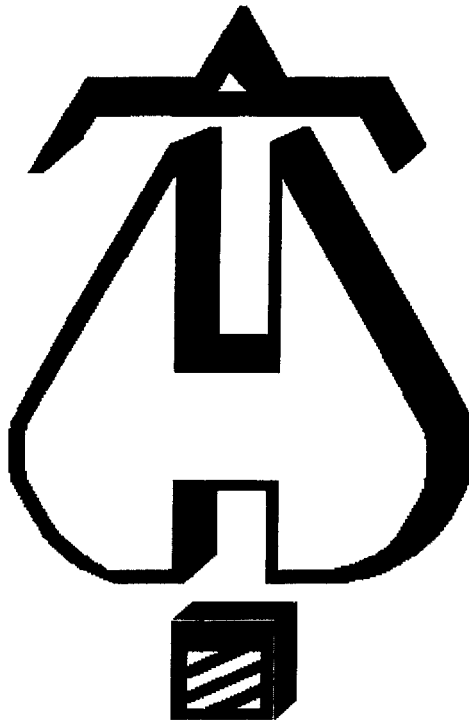
Performance Consultants Inc  
Koopman

2021

City Water Supply:  
C1 - Static Pressure : 66 PSI  
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C2 - Residual Flow : 1341 GPM

70 PSI  
68 PSI  
920 GPM





... Fire Protection by Computer Design

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31 Massaconnic Trail  
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413-245-3716



Job Name : Koopman  
Building : Warehouse Area  
Location : 29 Gilmore Dr, Sutton, MA  
System :  
Contract : 2647B  
Data File : IN-RACK.WX1

Hydraulic Design Information Sheet

Name - Koopman Lumber & Hardware Date - 092815  
Location - 29 Gilmore Dr, Sutton, MA  
Building - Warehouse Area  
Contractor - RC Shaw Sprinkler Co., Inc  
Calculated By - WEP  
Construction: ( ) Combustible (x) Non-Combustible  
Occupancy - Rack Storage

System No. -  
Contract No. - 2647B  
Drawing No. - FP-1  
Ceiling Height - 32'

S (x) NFPA 13 ( ) Lt. Haz. Ord.Haz.Gp. ( ) 1 ( ) 2 ( ) 3 ( ) Ex.Haz.  
Y ( ) NFPA 231 ( ) NFPA 231C ( ) Figure 16.2.1.3.2(D) Curve A/C  
S Other (see drawing notes for additional NFPA 13 refs)

T Specific Ruling Made By Date

E  
M Area of Sprinkler Operation - 2000 System Type Sprinkler/Nozzle  
Density - 0.33 (x) Wet Make Viking/Tyco  
D Area Per Sprinkler - 100 ( ) Dry Model VK530/TY3231  
E Elevation at Highest Outlet - 31.5 ( ) Deluge Size 5/8 & 1/2  
S Hose Allowance - Inside ( ) Preaction K-Factor 11.2/5.6  
I Rack Sprinkler Allowance - ( ) Other Temp.Rat.286/155F  
G Hose Allowance - Outside - 500

N  
Note

Calculation Flow Required - 1374 Press Required - 53 At Test  
Summary C-Factor Used: 120 Overhead 120 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:  
A Date of Test - 3/11/15 Cap. -  
T Time of Test - 10:30AM Rated Cap.- Elev.-  
E Static Press - 66 @ Press -  
R Residual Press - 64 Elev. - 0 Well  
Flow - 1341 Proof Flow  
S Elevation - 0

U  
P Location - Vicinity of 29 Gilmore

P  
L Source of Information - RC Shaw Sprinkler Co., Inc  
Y

C Commodity Doors Windows Trim Class IV Location  
O Storage Ht. 25' Area Aisle W. >8'  
M Storage Method: Solid Piled % Palletized 50 % Rack 50  
M  
(x) Single Row (x) Conven. Pallet ( ) Auto. Storage ( ) Encap.  
S R (x) Double Row ( ) Slave Pallet ( ) Solid Shelf (x) Non  
T A (x) Mult. Row ( ) Open Shelf

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

G  
E Horizontal Barriers Provided:



# Water Supply Curve (C)

Performance Consultants Inc  
Koopman

2021

70 PSI  
68 PSI  
920 GPM

City Water Supply:  
C1 - Static Pressure : 66 PSI  
C2 - Residual Pressure: 64 PSI  
C2 - Residual Flow : 1341 GPM

