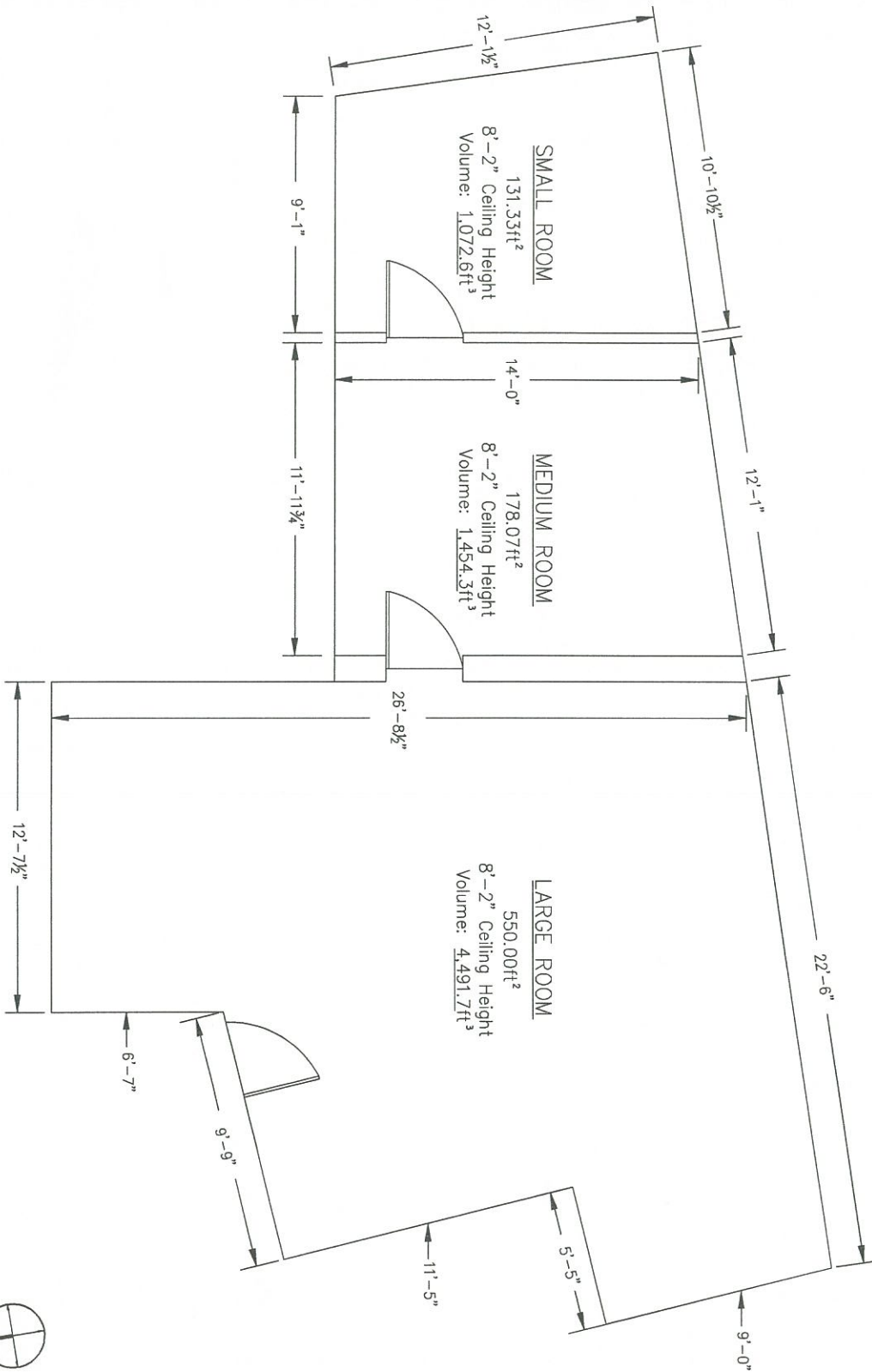


# Hazard Area Dimensions



**FIRESAFE EQUIPMENT CO., INC.**  
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 AUBURN, ME  
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SHEET TITLE		CLEAN AGENT FIRE SUPPRESSION SYSTEM PLANS	
ELEC FILE NAME		A&M PARTNERS - THREE ROOMS	
Job No.		A&M PARTNERS 400 CONGRESS ST. PORTLAND, ME 04101	SHEET NO.
Date	10/1/2014		3 OF 12
Engr	DPW		
Scale	N/S		

Project Name: A&M Partners - Three Rooms  
 Project Description: A&M Partners - Three Rooms  
 Name of Building Owner: Kepware  
 Name of Occupant: A&M Partners  
 Location of Facility: 400 Congress St.  
 Portland, ME 04101

Hazards Being Protected: Three Rooms - Servers & Computers  
 Hazard Occupancy: Not Normally Occupied  
 Hazard Class: A (Surface) & C  
 System Description: Amerex CPS (Clean Agent Pre-Engineered Fire Suppression System)

Agent Used: HFC-227ea (FM-200)  
 Minimum Design Concentration: 7%  
 Minimum Hazard Temperature: 60°F  
 Maximum Hazard Temperature: 85°F  
 Hazard Elevation (Distance Above Sea Level): Less than 3,000ft above sea level  
 Atmospheric Correction Factor: 1.00

Large Room Volume: 4,491.7ft<sup>3</sup>  
 Min. Agent Qty. Required for Computer Room: 156.45 LB.  
 Agent Quantity Supplied to Computer Room: 158.00 LB.  
 Concentration at Minimum Temperature: 7.06%  
 Concentration at Maximum Temperature: 7.41%  
 Medium Room Volume: 1,454.3ft<sup>3</sup>  
 Min. Agent Qty. Required for Computer Room: 50.65 LB.  
 Agent Quantity Supplied to Computer Room: 51.50 LB.  
 Concentration at Minimum Temperature: 7.11%  
 Concentration at Maximum Temperature: 7.46%

Small Room Volume: 1,072.6ft<sup>3</sup>  
 Min. Agent Qty. Required for Computer Room: 37.36 LB.  
 Agent Quantity Supplied to Computer Room: 37.36 LB.  
 Concentration at Minimum Temperature: 9.40%  
 Concentration at Maximum Temperature: 9.85%

Three Rooms	
Quantity and concentration calculations for FM200	
Min. Design Concentration:	7.00%
Min. & Max. Temp.:	60°F - 85°F
Atmospheric Correction Factor:	Less than 3000ft = 1.00
Large Room Volume:	4,491.7 cu.ft.
Qty. of Agent Supplied:	158.0 lbs.
Concentration @ Min. Temp.:	7.06%
Concentration @ Max. Temp.:	7.41%
Medium Room Volume:	1,454.3 cu.ft.
Qty. of Agent Supplied:	51.5 lbs.
Concentration @ Min. Temp.:	7.11%
Concentration @ Max. Temp.:	7.46%
Small Room Volume:	1,072.6 cu.ft.
Qty. of Agent Supplied:	51.5 lbs.
Concentration @ Min. Temp.:	9.40%
Concentration @ Max. Temp.:	9.85%
Internal Tank Volume:	1,875 cu.ft.
Storage Pressure @ 70°F:	360 psi
Nominal Capacity:	130 lbs.

**GENERAL INFORMATION**

**System Description**  
 The Amerex CPS is designed and tested to provide total flooding fire protection. This system is manufactured by the Amerex Corporation of Trussville, Alabama.

The Amerex CPS is a pre-engineered clean agent fire suppression system as defined by NFPA 2001 - Standard on Clean Agent Fire Extinguishing Systems. As a pre-engineered system each tank is piped to its nozzle or nozzle set independent of any other tank that may be discharged simultaneously, outlets cannot be connected to a common manifold. Specific limitations are contained in this manual defining pipe sizes, maximum pipe lengths, use of elbows and tees, nozzle orifice sizes, and nozzle coverage. To assure proper performance of the system and to achieve flow rates and nozzle pressures within the listing and approval of this system these parameters must not be exceeded.

Although the automatic fire detection and actuation system is not included in this manual it is an integral part of the total clean agent fire suppression system. To assure rapid fire detection and improve the chances for complete fire control by the clean agent system a compatible automatic smoke detection system should be provided.

**Listings and Approvals**  
 The Amerex CPS is listed by Underwriters Laboratories (UL) and Underwriters Laboratories Canada (ULC) and approved by Factory Mutual (FM) as a pre-engineered clean agent fire suppression system. The system has been evaluated and tested in accordance with UL L-2160 - Standard for Halocarbon Clean Agent Extinguishing System Units.

**Design**  
 The system is comprised of an agent tank/discharge valve assembly filled with the required weight of HFC-227ea to deliver a design concentration between 7% and 10.5% (for normally occupied spaces) to the space being protected. Nozzle orifice selection is predetermined based on tank fill weight and the number of nozzles connected to the tank to deliver the agent in 5 to 10 seconds. Pipe size, maximum pipe length, and maximum number of fittings are also predetermined to assure the flow rate and nozzle pressure are within the listed/approved parameters.

**System Performance Specifications**

- Minimum Temperature: 32°F (0°C)
- Maximum Temperature: 130°F (54°C)
- Maximum Ceiling Height: 16 ft. (4.88 m)
- Minimum Ceiling Height: 12 in. (304 mm)
- Maximum Nozzle Drop Below Finished Ceiling: 4 ft. (1.22 m)
- Nozzle Range (Radius): 44 ft. (13.41 m)
- Maximum Nozzle Height (Rise) Above Outlet: 30 ft. (9.14 m)

$$W = \frac{V}{s} \left( \frac{C}{100 - C} \right)$$

$$s = 1.885 + (0.0046 \times t)$$

$$C = \frac{100 \text{ Ws}}{V + (Ws)}$$

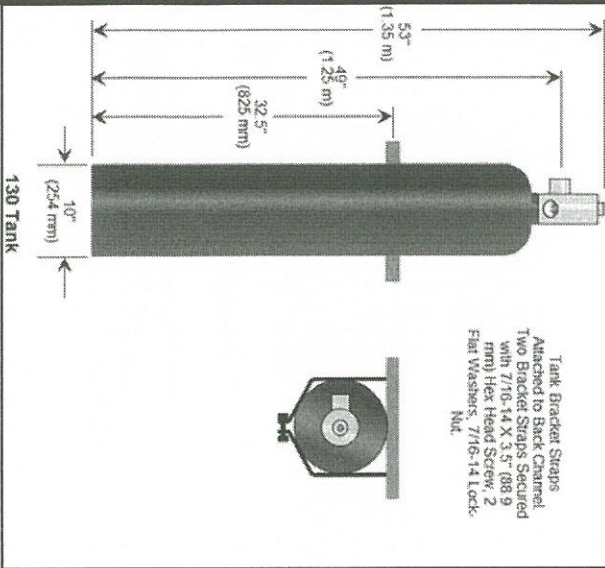
- W = Agent Weight in lbs.
- V = Room Volume in ft<sup>3</sup>
- C = Design Concentration, % by Volume
- s = Specific Vapor in ft<sup>3</sup>/lb.
- t = Minimum Room Temperature in °F

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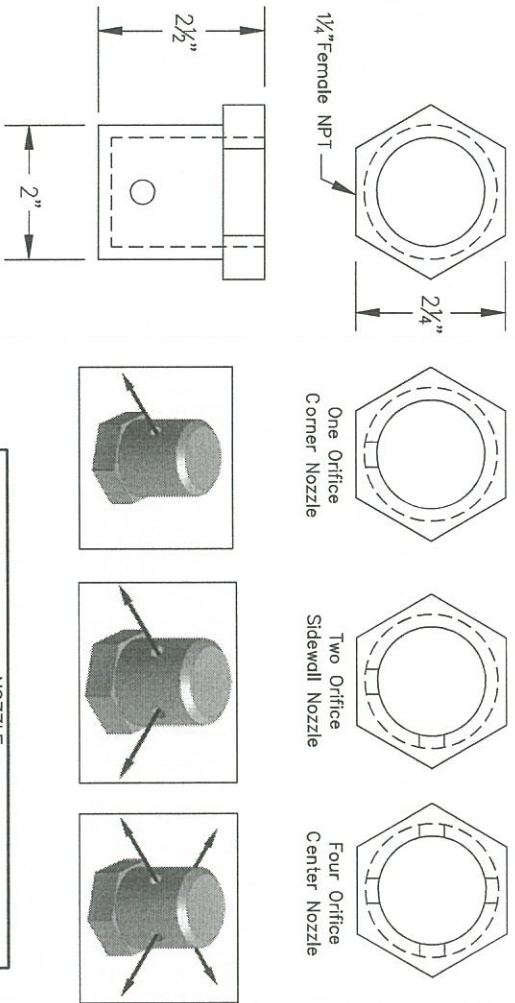
SHEET TITLE		CLEAN AGENT FIRE SUPPRESSION SYSTEM PLANS	
Job No.		A&M PARTNERS - THREE ROOMS	
Date	10/1/2014	A&M PARTNERS 400 CONGRESS ST. PORTLAND, ME 04101	SHEET NO. 2 OF 12
Engr	DPW		
Scale	N/S		

# Tank and Nozzle Specifications

Tank Size	Empty Weight	Tank Fill		
		Minimum	Maximum	Increment
44	36 lbs (16.3 kg)	18 lbs (7.3 kg)	44 lbs (20.0 kg)	2 lbs (0.9 kg)
130	77 lbs (35.0 kg)	46 lbs (20.9 kg)	130 lbs (59.0 kg)	3 lbs (1.4 kg)



LEGEND					
Tank #	Weight	Tank Part No.	Tank Location	Nozzle Part No.	Nozzle Location
1	79 LB	18079	Medium Room	(1) 19212	Large Room
2	79 LB	18079	Medium Room	(1) 19212	Large Room
3	103 LB	18103	Medium Room	(1) 19212	Small Room
				(1) 19212	Medium Room



Nozzle Material: Brass  
 Nozzle Thread Size: 1.25" Female NPT  
 Hex Size: 2.25"

#	Area		Part Number		
	sq. in.	(mm <sup>2</sup> )	Corner	Sidewall	Center
2	0.0693	(44.71)	19102	19202	19402
4	0.1503	(96.97)	19104	19204	19404
6	0.1726	(111.36)	19106	19206	19406
8	0.2216	(142.98)	19108	19208	19408
10	0.4058	(261.82)	19110	19210	19410
12	0.4604	(297.05)	19112	(19212)	19412
14	0.6230	(401.96)	19114	19214	19414
16	0.8836	(570.1)	19116	19216	19416
18	1.0499	(677.4)	19118	19218	19418

Room Nozzles → Each nozzle orifice has a maximum discharge range of 44 feet.

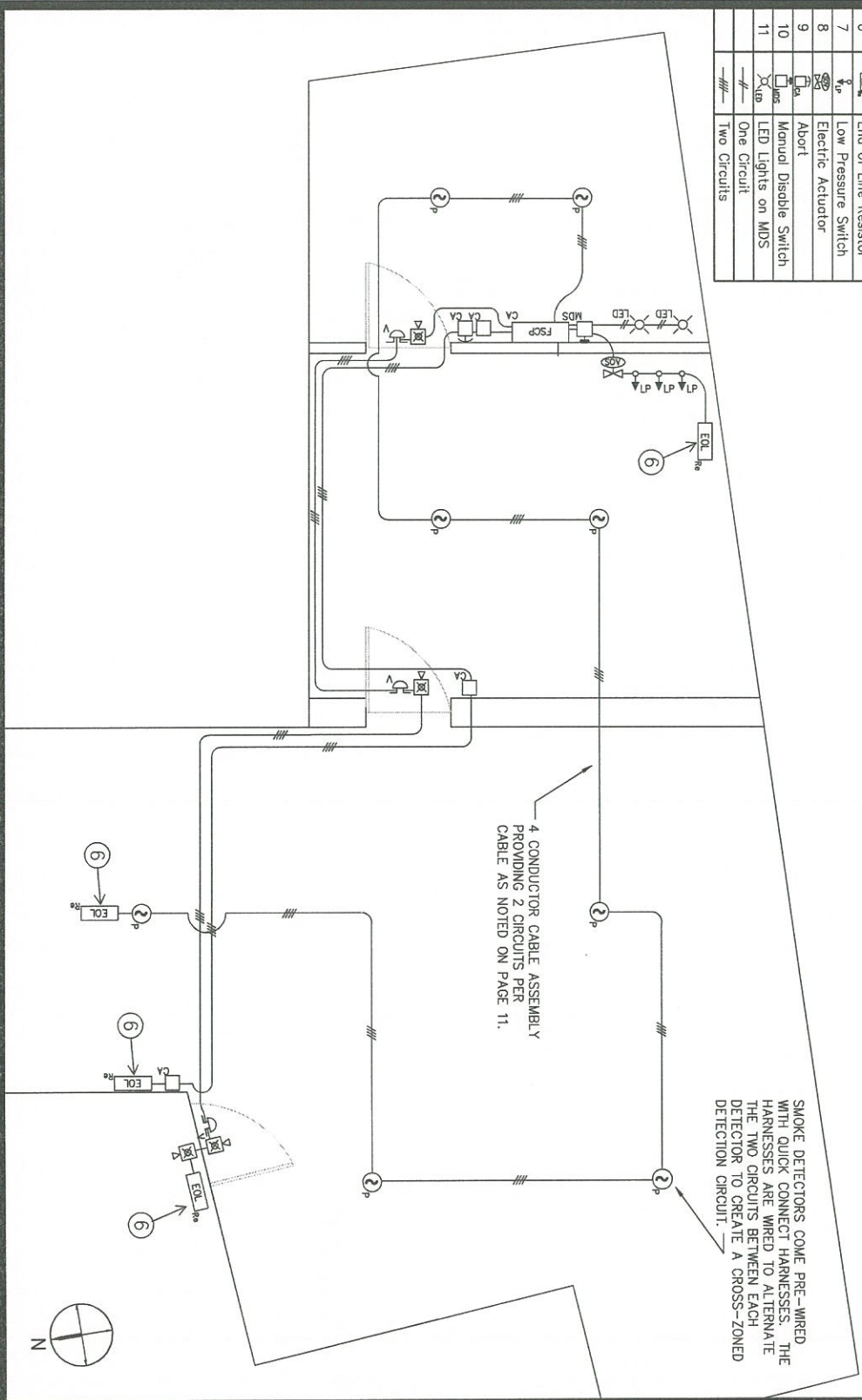
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SHEET TITLE: CLEAN AGENT FIRE SUPPRESSION SYSTEM PLANS		SHEET NO. 4 OF 12
Job No.	A&M PARTNERS - THREE ROOMS	
Date	10/1/2014	A&M PARTNERS 400 CONGRESS ST. PORTLAND, ME 04101
Engr	DPW	
Scale	N/S	

Item #	Symbol	Item Description
1		Amerex Control Panel
2		Manual Pull
3		Smoke Detector
4		Bell
5		Horn/Strobe
6		End of Line Resistor
7		Low Pressure Switch
8		Electric Actuator
9		Abort
10		Manual Disable Switch
11		LED Lights on MDS
		Two Circuits
		One Circuit

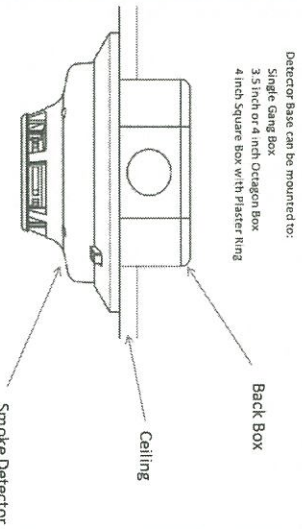
LEGEND

Three Rooms  
(Wiring Configuration)



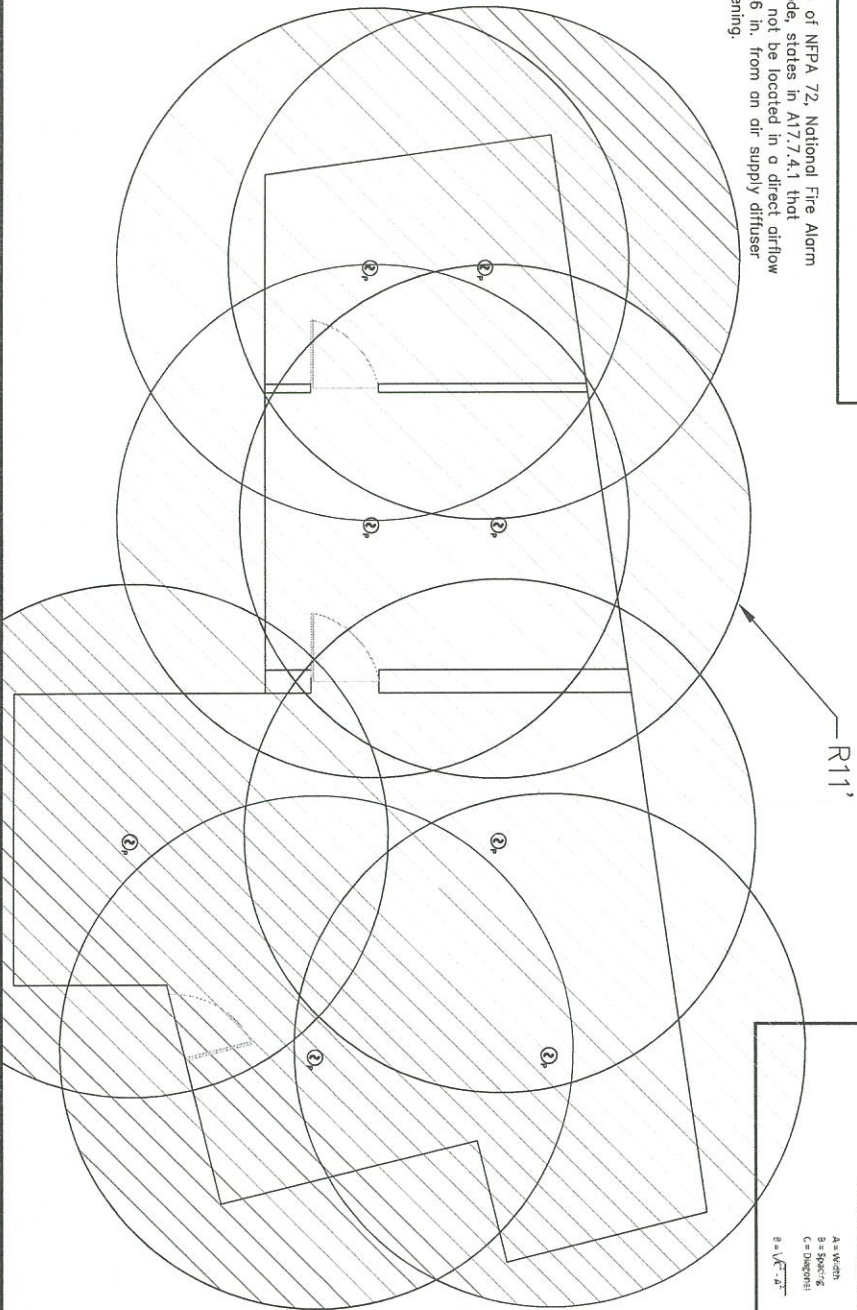
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AUBURN, ME  
PH: 207-784-7525  
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SHEET TITLE		CLEAN AGENT FIRE SUPPRESSION SYSTEM PLANS	
Job No.		ELEC FILE NAME A&M PARTNERS - THREE ROOMS	
Date	10/1/2014	A&M PARTNERS 400 CONGRESS ST. PORTLAND, ME 04101	
Engr	DPW	SHEET NO. 7 OF 12	
Scale	N/S		



The 2013 edition of NFPA 72, National Fire Alarm and Signaling Code, states in A17.7.4.1 that detectors should not be located in a direct airflow or closer than 36 in. from an air supply diffuser or return air opening.

## Detector Spacing Server Room



Smoke Detector Spacing Calculations  
For Pre-Engineered FRN-200 System

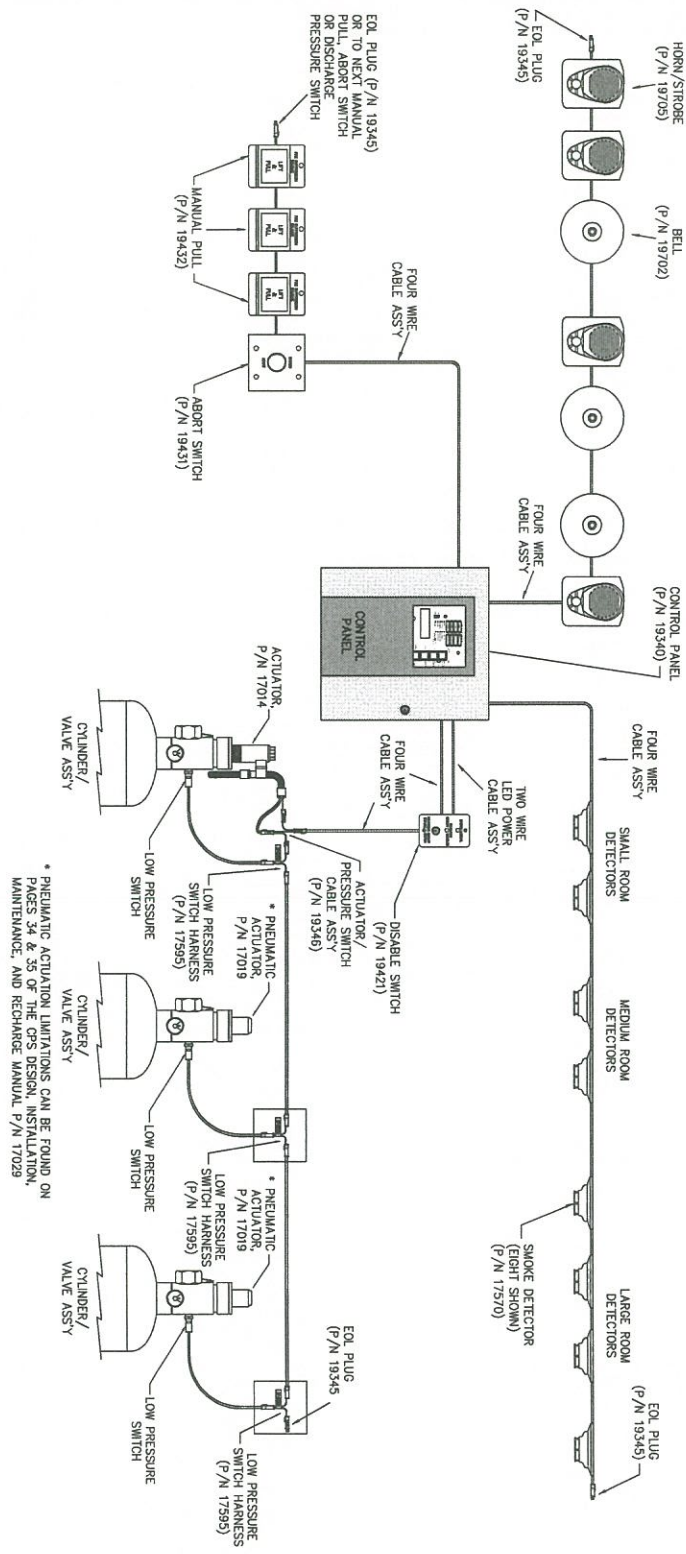
Coverage Area for Suppression Release	250 sq. ft.
Spacing Factor (Type of Area)	1.25 (1)
Maximum Distance to Nearest Detector (A, B, or C)	11.07 ft.

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Job No.		ELEC FILE NAME A&M PARTNERS - THREE ROOMS	
Date	10/1/2014	A&M PARTNERS 400 CONGRESS ST. PORTLAND, ME 04101	SHEET NO. 8 OF 12
Engr	DPW		
Scale	N/S		

# Wiring Diagram



\* PNEUMATIC ACTUATION LIMITATIONS CAN BE FOUND ON PAGES 34 & 35 OF THE GPS DESIGN, INSTALLATION, MAINTENANCE, AND RECHARGE MANUAL P/N 17029

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Job No.		A&M PARTNERS 400 CONGRESS ST. PORTLAND, ME 04101	SHEET NO. 9 OF 12
Date	10/1/2014		
Engr	DPW		
Scale	N/S		

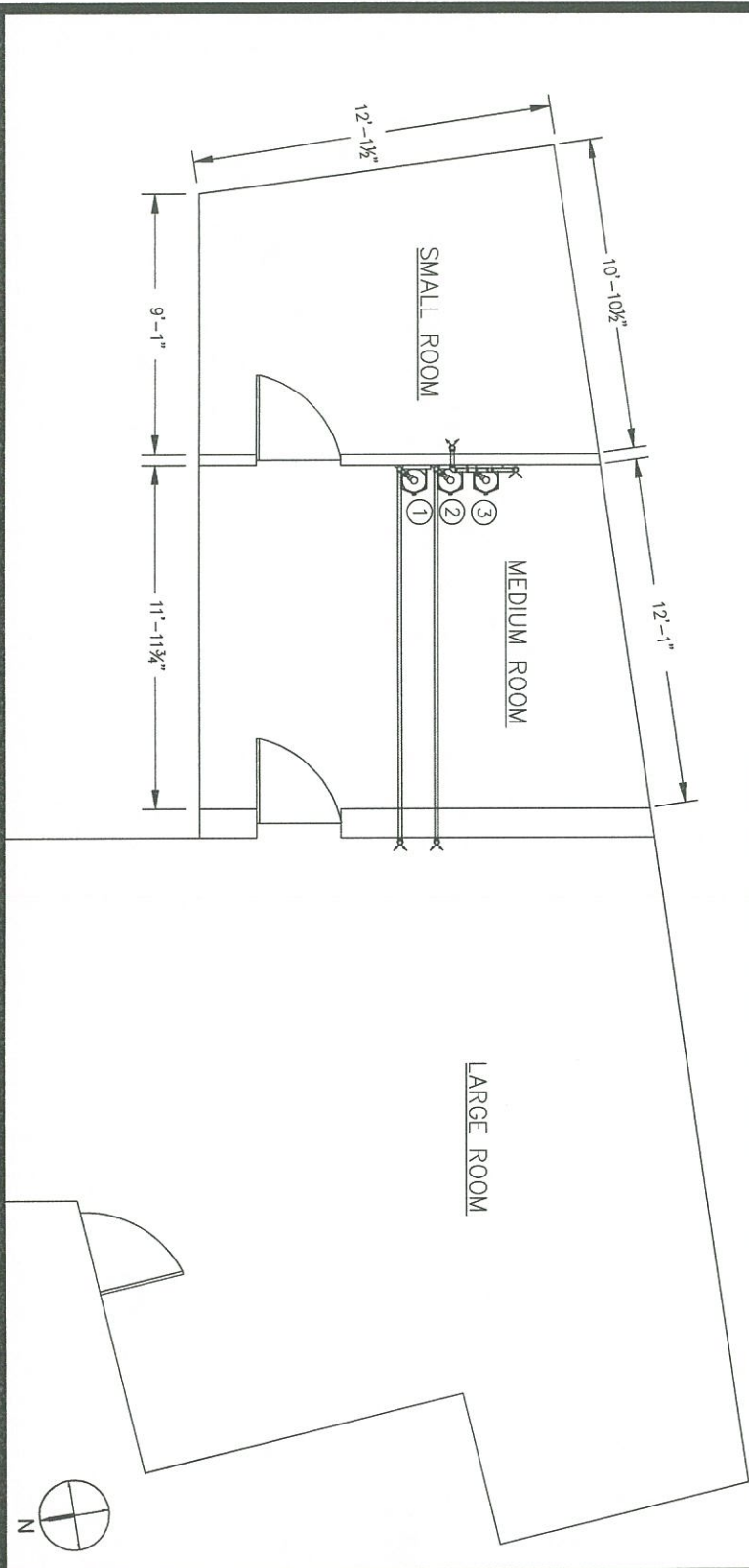
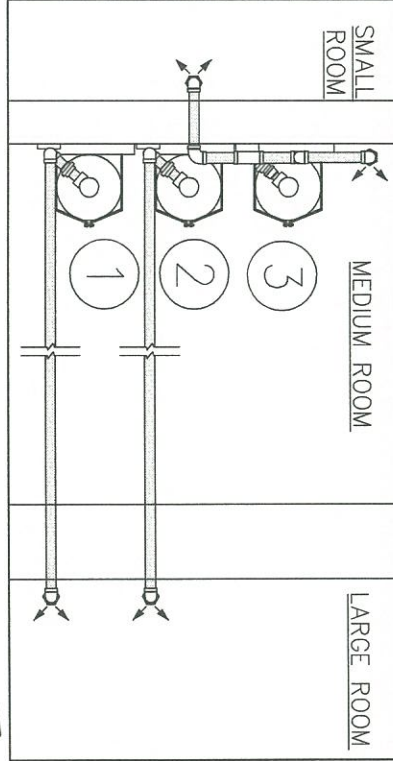
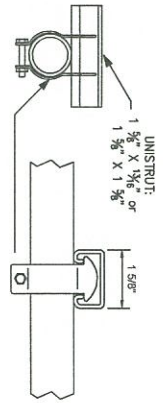
LEGEND					
Tank#	Weight	Tank Part No.	Tank Location	Nozzle Part No.	Nozzle Location
1	79 LB	18079	Medium Room	(1) 19212	Large Room
2	79 LB	18079	Medium Room	(1) 19212	Large Room
3	103 LB	18103	Medium Room	(1) 19212	Small Room
				(1) 19212	Medium Room

The piping system must be securely supported to prevent severe movement during discharge. The distance between hangers/supports must not exceed 11.25 m. Hangers/supports must be attached to a structure capable of supporting the weight of the pipe filled with agent as well as preventing movement caused by agent blast forces during discharge.

A hanger/support must be within 12 in. (305 mm) of the discharge nozzle.

For corner and sidewall nozzles hangers/supports must be installed to prevent the pipe from spinning due to thrust out the nozzle orifices.

Nozzles can be located up to 48 in. (1.2 m) below the finished ceiling. For 90°-corner and 180°-sidewall nozzles a hanger/support must be within 12 in. (305 mm) of the nozzle.



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Job No.	ELEC FILE NAME	A&M PARTNERS - THREE ROOMS	
Date		A&M PARTNERS	
Engr		400 CONGRESS ST.	
Scale		PORTLAND, ME 04101	
		SHEET NO.	5 OF 12