

## Special Hazard Systems

Symbol	Description	Equation	Source	Value	Units
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### Problem Statement

A 15 ft long by 12 ft wide by 10 ft tall space contains artwork storage consisting primarily of old paper and canvas. If the space is to be kept at 70 deg F and has fixed structure volume of 105 ft<sup>3</sup>, what minimum quantity of FM-200 agent would be required to protect the space in a full flood application if the design concentration is 6.7%?

- a. 51 lb
- b. 55 lb
- c. 66 lb
- d. 169 lb

### Given/Assumed

l	Length of Space	-	Given	15.0	ft
w	Width of Space	-	Given	12.0	ft
h	Height of Space	-	Given	10.0	ft
t	Temperature of Space	-	Given	70	deg F
V <sub>fixed</sub>	Fixed Volume within Space	-	Given	105.0	ft <sup>3</sup>
C	Design Concentration	-	Given	6.7	%

### Solution

V	Net Volume of Space	$V = lwh - V_{\text{fixed}}$ $= (15)(12)(10) - 105$	Definition of Volume	1,695	ft <sup>3</sup>
s	Specific volume of the agent	$s = 1.885 + 0.0046t$ $= 1.885 + 0.0046(70)$	SFPE 5th p 1512, NFPA 2001-2015 Table A.5.5.1(i), p70	2.21	ft <sup>3</sup> /lb
W	Agent Weight	$W = (V/s) [C/(100-C)]$ $= (1695 / 2.207) [6.7 / (100 - 6.7)]$	SFPE 5th p1512, NFPA 2001-2015 Table A.5.5.1(g), p68	55	lb

### References Used

1	SFPE	SFPE Handbook of Fire Protection Engineering, 5th Edition
2	NFPA 2001	Standard on Clean Agent Fire Extinguishing Systems, 2015 Edition

### Tips & Notes

(1) Questions like this (special hazard systems) make up about 8 questions (or 10%) of the exam.