

Firewater Demand for Sprinkler system in Packing & Storage Unit

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Abstract: The Intent of this paper is to provide a overview of firewater demand requirement for a packing & storage unit protected with sprinkler system.

Keywords: Fire Water, sprinkler, storage, Etc

I. INTRODUCTION

Fire sprinklers are widely recognized as the single most effective method for fighting the spread of fires in their early stages - before they can cause severe injury to people and damage to property. A wet pipe sprinkler system is a sprinkler system employing automatic sprinkler heads attached to a piping system containing water and connected to a water supply so that water discharges immediately from sprinklers opened by heat from a fire.

II. ESFR (EARLY SUPPRESSION, FAST RESPONSE)

ESFR ceiling mounted sprinklers are widely used in packing and storage units. ESFR high output, high volume systems are located in ceiling spaces as with conventional fire sprinkler systems. It incorporates very large high volume, high pressure heads to provide the necessary protection.

III. FIREWATER DEMAND FOR SPRINKLER SYSTEM

The purpose of sprinkler system demand, a bagging unit with storage is considered. Sprinkler system demand is calculated as per UAE Fire & Life Safety code and NFPA-13.

Fire Water Demand for Packing & Storage Facility	
Code	UAE FLS Code & NFPA 13
Commodity Class	Group A Plastics
Proposed Fire Protection System	Automatic Wet Pipe Early Suppression Fast-Response (ESFR) Upright Sprinkler
Maximum Storage Height as per UAE FLS Code, Table 9.7EE	6.1 m
Maximum Ceiling/ Roof Height as per UAE FLS Code, Table 9.7EE	11 m
Sprinkler K-Factor as per UAE FLS Code, Table 9.7EE and NFPA-13, Table 23.3.1	K-240(K-16.8), Pendent Sprinkler
Sprinkler Operating Pressure as per UAE FLS Code, Table 9.7EE and NFPA-13, Table 23.3.1	3.6 bar (g) (52psi)
Number of Sprinkler head operation as per UAE FLS Code, Table 9.7, Items 52, Section (i) and NFPA-13, Clause 23.2.2	12 Nos.
Firewater Requirement for one number ESFR Sprinkler with K factor K-240 @ 3.6 bar(g), $Q = K\sqrt{P}$	$240 \times \sqrt{3.6} = 455.4 \text{ lpm}$
Firewater Requirement for 12 number ESFR Sprinkler	$455.4 \times 12 = 5464.8 \text{ lpm}$
Adding 10% for hydraulic imbalance (A)	$5464.8 \times 1.1 = 6011.28 \text{ lpm}$
Hose Stream Allowance as per NFPA-13, Table 20.15.2.4 (B) (For hose reel inside the building)	380 lpm
Operation 1 Hydrant located outside the Packaging unit (C)	950 lpm (57 m ³ /hr)
Total Fire Water Demand for packing facility (A + B + C)	$6012 + 380 + 950 = 7342 \text{ lpm (441 m}^3\text{/hr)}$

IV. CONCLUSION

Based on the above calculation, Total fire water demand for sprinkler system at packing facility is 441 m³/hr. Hence, a standard NFPA 20 compliant pump of 454 m³/hr (7570 Lpm) can cater the required sprinkler system demand.

REFERENCES

- [1] NFPA20 – Standard for the Installation of Stationary Pumps for Fire Protection
- [2] NFPA 13 - Standard for the Installation of Sprinkler Systems
- [3] UAE Fire & Life Safety Code of Practice