PLASTICS STORED IN WIRE BASKETS

INTRODUCTION

The hazards associated with the storage of plastics products in portable wire baskets have been recognized. These portable baskets can be stacked to any height, in any area of a warehouse or along production lines. Protection using in-rack sprinklers cannot be provided relying solely upon the ceiling sprinkler system for adequate protection.

NFPA 13 covers single, double, and multiple-row rack storage of expanded and unexpanded plastics in corrugated cartons and exposed unexpanded on pallets. NFPA states portable racks should be treated as multi-row racks for commodity Classes I through IV but does not address how to protect plastic products in portable racks.

POSITION

Protect plastic products, except foamed latex or foamed polyurethane (See PRC.10.2.3), stored in stackable, wire baskets as follows:

General

- Install all sprinkler systems in accordance with NFPA 13 and PRC.12.1.1.0 as modified by this guideline.
- Install hose connections, with no more than 100 ft (30 m) of 1½ in. (40 mm) woven jacketed, lined hose and adjustable spray nozzles, so that two hose streams could be applied to any point in the storage area. Supply the hose connections by a separate supply or by check valve interconnections to two or more sprinkler systems.

When sheet steel lining is used:

- Use minimum 22 gauge (0.64 mm) sheet steel to line with bottom and sides of the baskets.
- Store to a maximum of 20 ft (6.1 m) high with a maximum clearance of 10 ft (3 m). When either the storage or clearance exceeds these parameters, submit the information to the Account Consultant for review.
- Store baskets in rows with a maximum depth of 9½ ft (2.9 m). Maintain a longitudinal flue space of 6 in. (152 mm) between the back-to-back baskets. Maintain an 8 ft (2.4 m) aisle between double rows of baskets.

TABLE 1
System Design for Control Mode Density/Area Application

	Head Temperature °F (°C)	Density gpm/ft² (L/min/m²)	Area of Application ft² (m²)
With Steel Sheet Liners	165 (74) 286 (141)	0.50 (20) 0.50 (20)	4000 (372) 3000 (279)
With Steel Partitions	286 (141)	0.60 (24)	4000 (372)
Without Steel Sheet Liners or Steel Partitions	165 (74) 286 (141)	0.70 (29) 0.70 (29)	4000 (372) 3000 (279)

When steel partition is used:

- Keep storage to a maximum of 14 ft (4.3 m) high in a maximum 20 ft (6.1 m) high building. When either the storage or clearance exceeds these parameters, submit the information to the Account Consultant for review.
- Provide an 18 gauge (1.02 mm) steel partition installed every 30 ft (9.1 m).
- Store the baskets to a maximum length of 30 ft (9.1 m).

When no linings and no partitions are used:

- Keep storage to a maximum of 20 ft (6.1 m) high with a maximum clearance of 5 ft (1.5 m). When either the storage or clearance exceeds these parameters, submit the information to the Account Consultant for review.
- Store baskets in rows with a maximum depth of 9½ ft (2.9 m). Maintain a longitudinal flue space of 6 in. (152 mm) between back-to-back baskets. Maintain an 8 ft (2.4 m) aisle between double rows of baskets.

Sprinkler System Design

- Provide a wet pipe sprinkler system design using spray sprinklers in accordance with Table 1.
- Other sprinklers, such as Control Mode Specific Application and ESFR, can be used to protect plastics in wire baskets provided the specific storage hazard to be protected is within the approved application limits of the sprinkler. The application limits include storage height, building height, commodity, packaging (or lack of) and rack type.
- Dry pipe sprinkler systems are not recommended for protection of plastics. Submit any request to protect plastics in wire baskets with a dry pipe system to the Account Consultant for review.
- Use a hose stream demand of 500 gpm (1890 L/min) in the sprinkler calculations.
- Use a 2 hr duration when calculating the water supply capacity.

DISCUSSION

There have been three series of large scale fire tests (22 tests in all) conducted on exposed plastic products in wire mesh baskets.

Two series (20 tests) were conducted using polystyrene, polypropylene, PVC, foamed urethane, and ABS products in wire mesh baskets with and without 22 gauge (0.64 mm) sheet steel liners. The test array for 18 out of the 20 tests was two stacks of baskets filled with product and a target stack located 7 ft (2.1 m) from the array. The remaining two tests were conducted on six stacks of baskets with 3 in. (75 mm) flues, one with a 2 ft (0.6 m) aisle and one with a 10 ft (3 m) aisle. These tests demonstrated the problems associated with protecting plastics in these baskets. The results of these tests indicated these plastic products could be protected by either high ceiling sprinkler densities or by sheet steel liners installed in the baskets and moderate ceiling sprinkler densities.

The third series of tests were conducted with 18 gauge (1.02 mm) steel partitions installed between rows of baskets. The first test was 14 ft (4.3 m) high storage in a 20 ft (6.1 m) high building. The second test was 19 ft (5.8 m) high storage in a 25 ft (7.6 m) high building. In the first test, fire was spread to the end of the exposed racks but did not penetrate the steel barrier. In the second test, fire spread to the ends of the exposed racks and penetrated the barrier.