POLYSTYRENE-FOAM PACKAGING MATERIALS

INTRODUCTION

Polystyrene-foam packaging materials are used as fill to protect the contents of shipping cartons. These materials are very low density, usually less than 0.5 lb/ft^3 (8 kg/m^3), and of a shape that allows it to "flow." It is manufactured by expanding polystyrene "beads" in steam expanders that define the shape of the materials. The degree of expansion determines the density. It will be found usually in the shipping or packaging area of warehouses in bags of 20 to 40 ft^3 (0.5 to 1 m^3) size or in cloth or plastic hoppers. To fill shipping cartons, the bags are inverted into a hopper and the material flows out of a dispensing "valve" into the carton. The amount of material is usually limited to one trailer load or less and represents a small portion of the overall warehouse combustible loading.

AXA XL Risk Consulting has witnessed full-scale fire tests of some of these materials and we are aware that the density and composition of the materials are very important in determining the burning characteristics. It is difficult to determine in the field the probable burning characteristics, even if the manufacturer (expander) of the fill materials or the supplier of the unexpanded polystyrene "beads" is known. For this reason, treat all of these materials equally, regardless of manufacturer. The amount and method of storage determine the degree of protection required.

POSITION

Storage in Polyethylene Bags or Hoppers Constructed of Metal or Thin Thermoplastic Materials

Additional protection is not required if pile storage of this material in polyethylene bags is 5 ft (1.5 m) or less in height or storage is in a hopper that is constructed of metal or thermoplastic cloth such as nylon or polyethylene and either configuration is:

- Less than 2400 ft^3 (67.2 m^3) in total volume.
- Separated from other storage by aisles at least 8 ft (2.4 m) wide.
- Protected by automatic sprinklers designed for at least Ordinary Hazard Group 2 Occupancy in accordance with NFPA 13

Other Storage Configurations

- Protect other storage configurations or storage amounts greater than previously discussed in accordance with NFPA 13 and PRC.12.1.1.0 for expanded Group A plastic. Packaging will determine if storage is protected as cartoned or exposed. All cartoned storage should be considered as stable.

Smoke Detectors Needed

In plants that rely on central station, remote station or proprietary system water flow alarms instead of watchman service, install products-of-combustion detectors over the piles.

Prohibit the storage of these materials in occupancies where corrosive degradation products may cause unusual or severe damage.

DISCUSSION

The introduction of cellulosic materials, such as cardboard, paper, or cotton cloth, will cause increased burning of the melted polystyrene foam since they provide a wick effect.

Pile stability has a sizable effect on the ability of sprinklers to control test fires. In some tests, early collapse of the pile resulted in control of the fire by very few sprinklers. In tests were the same commodities did not collapse, a greater number of sprinklers operated. To date, no piled commodity has been shown to be consistently unstable.

Since these materials tend to smolder for long periods with very little evolution of heat, it is unlikely that sprinklers will operate over a fire involving only these materials. Moderate amounts of smoke, which may be corrosive, are generated during this smoldering period.