

A vibrant, multi-colored image of the cosmic web, showing a complex network of blue and orange filaments and clusters of galaxies against a dark, star-filled background. The filaments are thin and thread-like, while the clusters are denser and more colorful, ranging from bright yellow to deep blue.

Sprinkler Systems: Special Risks



Aerosol Fires

AEROSOL FIRES

- Protection of Special Hazards.
- Non-bulk packing is used to transport or store smaller quantities of hazardous material.
- Aerosols contain flammable contents
- The protection of storage of aerosols is very challenging because of the following reasons:
 - ❖ Aerosols are under pressure;
 - ❖ If stored in huge quantities it can cause an explosion (if ignition source present);
 - ❖ Chemical properties: propane and butane based;
 - ❖ Fire ball and/or flaming missiles created; and
 - ❖ Flaming missiles spread fire to remote areas of the occupancy.



**FLAMMABLE
LIQUIDS
(Polar Solvents)**

FLAMMABLE LIQUIDS (POLAR SOLVENT)

- A flammable liquid fire possesses special risk.
- Flash points as low as $-49\text{ }^{\circ}\text{C}$ (Pentane).
- These types of fires need to be controlled with a fire suppression system (if hydrocarbon based, then with a foam additive introduced with the water stream).
- A foam-water fire sprinkler system is a special application system, discharging a mixture of water and low expansion foam concentrate, resulting in a foam spray from the sprinkler. The operation is as described above, depending on the occupancy and system type into which the foam is injected.

PALLETS

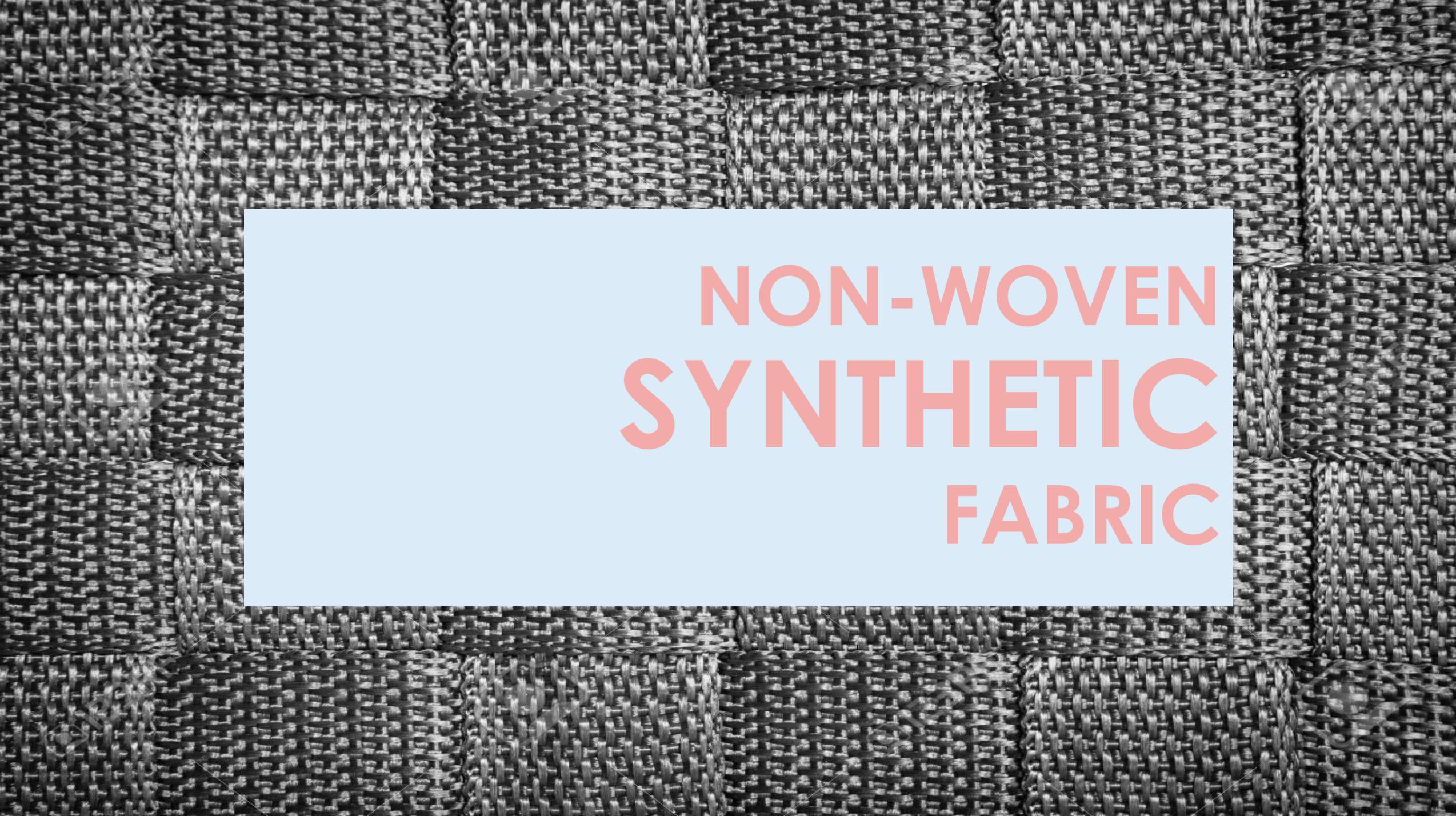


PALLETS

- Accumulation of idle pallets can occur in any occupancy.
- It is important to monitor the number of pallets and storage arrangement on an ongoing basis.
- Generally, it is advisable to store pallets outdoors, in a separate building(s) intended for such storage.

Inside Storage

- The intense heat generated by a fire in an idle pallet storage area could quickly weaken structural steel and lead to the collapse of a building.
- Steel columns that are surrounded by storage may be vulnerable depending on the amount of storage and fire protection available.
- Likewise, overhead steel framework will be exposed to the heat in a fire plume. **Section 12.12 of NFPA 13 and BS 12845** provides requirements for the sprinkler protection of idle pallets based on the pallet material (e.g. wood or plastic) and the storage arrangement.



**NON-WOVEN
SYNTHETIC
FABRIC**

SYNTHETIC UNWOVEN FABRIC

A nonwoven material consists of randomly arranged fibers bonded together by adhesives, hydro entanglement, thermobonding, or needle punch. The fibers may be natural, such as cotton or wood pulp; or synthetic, such as polyester, polypropylene, or polyethylene.

Although fiberglass insulation products and paper are actually nonwoven material products, tests have been conducted to determine their severity. As a result of these tests, protection requirements were derived for these products. Recently rolls of polypropylene batting and polyester fabric have been tested and determined to be a more severe fire protection problem.

SYNTHETIC UNWOVEN FABRIC

Hazards associated with fires involving synthetic unwoven fabric:

- High heat release rate are produce in the even of a fire;
- Fire walls need to have a fire resistance rating of at least 3 hr in these type of storage occupancies;
- Steel structures needs protection from fires especially main members;

So the need for sprinkler protection is highly recommended for storage occupancies that house these types of material.

POLYPROPYLENE OR POLYETHYLENE STORAGE BINS



POLYPROPYLENE OR POLYETHYLENE STORAGE BINS

- Synthetic polymers, are produced to conform to specific properties, and it may be difficult to distinguish between them.
- For example, polypropylene and polyethylene are very similar - styrene and styrene-acrylonitrile.
- These products are used in the formation of plastic storage containers.
- High density polyethylene (HDPE) is highly flammable, and it is therefore of great scientific interest to find a way to reduce its flammability. Chlorination of HDPE has been shown to have an effect on the flammability of the polymer.

Common Examples Of Polymers

Thermosets

Thermoplastics

Elastomers

Epoxies

ABS (acrylonitrile, butadiene and styrene)

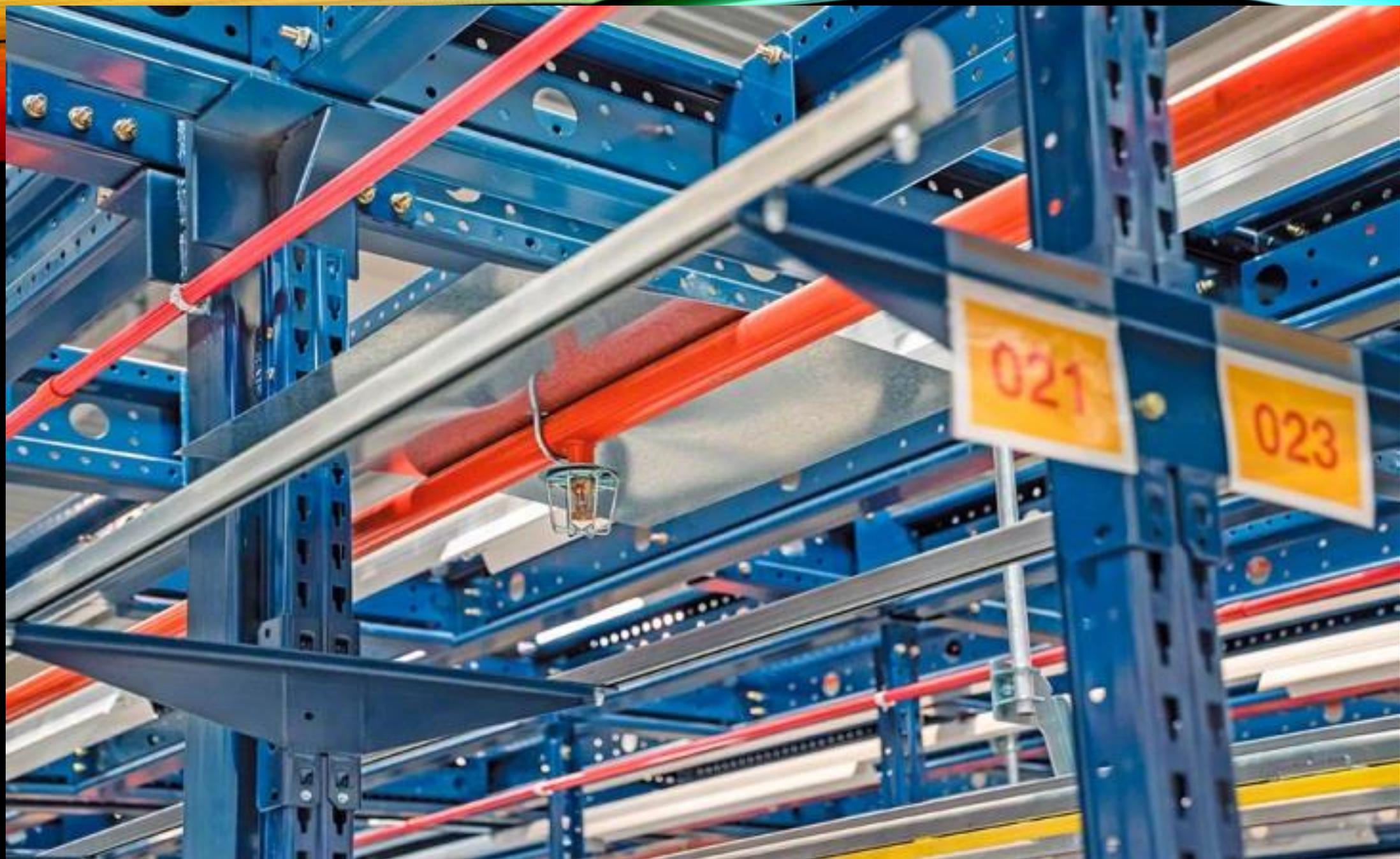
Butadiene

Rubber Tyres



RUBBER TYRES

- Research has shown that properly designed sprinkler systems can control a fire at a tyre storage facility;
- Regardless the quantity of tyre that are stored it is recommended that a sprinkler system is installed.
- A dual sprinkler system would be ideal for this type of hazard (Ceiling and In-Rack Sprinkler Protection).





THE END