

WOOD VS. PLASTIC

Factory Mutual has certain regulations for the storage of idle pallets. This report will give a detailed comparison of the typical properties of both wood and plastic, and relate that to the issues of storage of pallets.

The data used here is taken from Factory Mutual (FM) Loss Prevention regulations 8-24, National Fire Protection Association (NFPA) regulations 231-10, Underwriters Laboratories (UL) Horizontal Burn Test HB94, and conversations with personnel from all of the above mentioned companies.

COMPARATIVE DATA

| | WOODEN PALLETS | ECO-TECH PLASTIC PALLETS |
|--------------------------------|------------------------------------|---|
| Description | Any wooden pallet (Group 1)** | Plastic pallets manufactured with ECO-TECH material (Group 2)** |
| FM Approval: | None given | No testing done to date |
| Auto-Ignition Temp: © | starting @ 350°C *** | 410°C (ASTM d 1929) |
| Self-Extinguishing: | No | Yes |
| By Products from Fire (Fumes): | CO ₂ , H ₂ O | CO ₂ , H ₂ O |
| Smoldering: | Will occur | Will NOT occur |
| Heat Conductivity: | Low | Low |
| Spontaneous Combustion: | CAN occur | Will NOT occur |
| Flash Fires: | Can occur | Will NOT occur |
| Oxidizing from Caustics: | CAN occur | Will NOT occur with resins used |
| Pooling: | Will NOT occur | Will occur |
| Absorption of Flammables: | CAN occur | Will NOT occur |
| Melting Point: | | 280° Fahrenheit |

| | WOODEN PALLETS | ECO-TECH PLASTIC PALLETS |
|------------------------------|-----------------------|---------------------------------|
| Ash Travel (Fire spread): | 0 - 100 feet | None |
| Fire Proliferation: | High | High |
| Heat Convection: | High | Higher than wood |
| UL Testing: | | |
| Horizontal Burn (HB94) | Under testing | Passed (Approved) |

* To include both hardwoods and softwoods

** As per Factory Mutual 8-24 Page 5

*** Autoignition of wood (PWASET VOL. 30 JULY 2008 ISSN 1307-6884 pg 672)

Storage location is the primary concern to Factory Mutual and NFPA. The primary location suggested for any pallet, wooden or plastic, by Factory Mutual is outside storage. The next desired location is a detached low value building no less than 20 feet from important buildings. The third best location is a cut-off room on an exterior wall. The fourth location is a cut-off room on an interior wall. The fifth is a cut-off room anywhere within the facility. The last and least desirable location suggested is any location within the plant. The typical manufacturer will store pallets close to the point of manufacture. They will also store idle pallets as high as the ceiling height will allow. With this in mind, we submit the below data for your review.

Given a 12 foot stack of pallets, the following requirements are needed:

| Wooden (Group 1) | Plastic (Group 2) |
|---------------------------------------|-------------------|
| Sprinkler density of .60 GPM/Sq. Ft. | Same |
| Steel protection | Same |
| Cut-off room | Same |
| Same rated sprinkler & area of demand | Same |

This data taken directly from Factory Mutual idle pallet storage 8-24. It would seem that plastic pallets are at par with wooden pallets. The regulations also state that given an ESFR type sprinkler system, both wooden and plastic pallets can be stacked 25 feet high. This also puts wood and plastic at the same level of protection.

We must assume if plastic pallets were grouped with wooden pallets in some situations that this would be the case throughout the regulations, but it is not the case. Wood pallets (Group 1) are broken down into pallets stacks of six (6) feet, eight (8) feet and twelve (12) feet in height. Plastic pallets (Group 2) are only listed for twelve (12) foot stacks. This single grouping is erroneous and misleading.

Given a sprinkler system of .3 GPM per square feet, wooden pallets can be stored six to eight feet high. Plastic pallets are not addressed at .3 GPM in Factory Mutual ratings, but NFPA ratings call for a four foot stack. Both ratings do not require cut-off rooms. This is inconsistent with what was stated above.

We spoke with Factory Mutual personnel. Plastic pallets (Group 2) are all put in only one category. The polypropylene and polystyrene pallets are in the same group as PE and PET. Yet the statements made by Factory Mutual personnel regarding PP and PS is that they are harder to protect and perform worse in fire tests. Fire retardant and non-fire retardant materials are also not segregated. Each one of these variables play an important part in the protection/testing process. Yet given this mass grouping, the plastic pallet still require the same fire protection in two key areas. Twelve (12) foot stacks and twenty-five (25) foot plastic pallets are being placed on a higher liability list than wood due to lack of important data, or for the ease of classifying mass groups. The regulations in their own wisdom, however, will put them on equal footing in some cases.

The comparative data listed on page 3 provides solid data that plastic pallets do not ignite as easily and proliferation of fire is lessened with plastic. Factory Mutual employees have admitted that certain plastics (i.e., PE) are actually easier to protect than wood, but We feel that the regulations reflect a non-homogeneous group. Plastic is not just plastic, any more than a fire protection system is a fire protection system. We must work together to correct those misconceptions.

ECO-TECH, INC. stands ready to help meet the challenge.

Data provided in this report is factual. This report is an opinion given by Eco-Tech and is here as a matter of discussion. Eco-Tech is not providing this information to be used as a substitute to or in lue of any federal, state, or local laws. Furthermore, Eco-Tech does not approve or disapprove of any type of storage of pallets, plastic or wood. Only you and your insurance carrier can decide what is correct for your location.

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