

## Storage of Exposed Plastics on Racks

Over the years, there has been some confusion on how NFPA 13 addresses the protection of rack storage of exposed plastics with standard spray sprinklers. This article will attempt to clear up any confusion on the issue and is limited in scope to the discussion of protecting rack storage with standard spray sprinklers.

Plastics can be broken down into two different classifications of materials, expanded plastics and non-expanded plastics (also called unexpanded plastics, but this article will use the term “non-expanded to be consistent). The way that NFPA 13 treats rack storage of exposed expanded plastics is easy to describe. NFPA 13 contains no criteria for the protection of exposed expanded plastics stored on racks. If you are trying to protect exposed expanded plastics on racks, none of the criteria in NFPA 13 is applicable and you will need to find your sprinkler protection criteria elsewhere.

The rules for protecting exposed non-expanded plastic will take much more space to describe. In order to understand the development of these rules, we have to go back to before the rules for protecting rack storage were in NFPA 13, back before 1999 when the rules were in NFPA 231C, Standard for Rack Storage of Materials.

In the 1995 (and previous) editions of NFPA 231C, there were no rules for protecting exposed non-expanded plastics on racks. The user of the standard learned this by working their way down the plastics decision tree (Figure 8-1.1), which explained that all exposed plastics (including expanded and non-expanded) were outside the scope of the standard. See the decision tree in Figure 1 below.

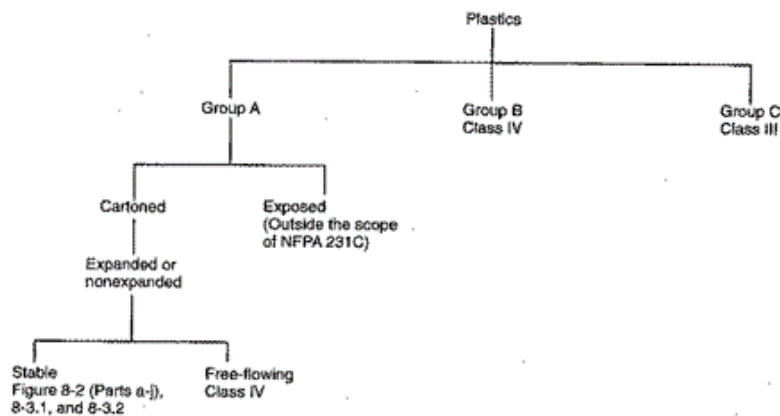


Figure 1 – Decision Tree from NFPA 231C – 1995

While writing the 1998 edition of NFPA 231C, the committee accepted some new protection schemes for protecting rack storage of exposed non-expanded

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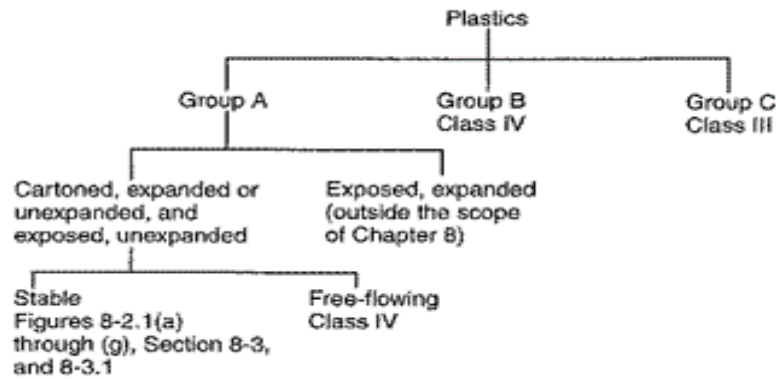
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plastics over 25 ft in height with lots of in-rack sprinklers [Figures 8.3.2.4(a) through (f)]. There were no other changes made to the plastic protection rules. Therefore, the only rules that could be used with exposed non-expanded plastics were the new figures. The old rules that only applied to plastics in cartons were still only good for protecting rack storage of plastic in cartons. But because the standard now included some limited rules for the protection of exposed non-expanded plastics, the decision tree had to change. The decision tree in the 1998 edition of NFPA 231C is shown below as Figure 2, which still recognizes that the protection of exposed expanded plastics is outside the scope of the standard, but references the user to section 8-2 or 8-3 for exposed non-expanded plastics on racks.



**Figure 2 – Decision Tree from NFPA 231C-1998**

The intent of the new decision tree was never to open up all of the rules of NFPA 231C for use in protecting exposed non-expanded plastics. The intent of this new decision tree was to reference the user to sections 8-2 and 8-3 and then have the user pick the protection that was appropriate for what they were trying to protect. If the user was trying to protect exposed non-expanded plastic on racks, then they needed to limit their use of sections 8-2 and 8-3 to the protection schemes that worked with exposed non-expanded plastics. At that time, the only schemes that worked for exposed non-expanded plastics were Figures 8-3.2.4(a) through (f), which were for storage over 25 ft in height. The rest of section 8-3, and all of section 8-2 were still only supposed to be used for storage of plastics in cartons on racks.

When the rules for protecting rack storage were taken into the 1999 edition of NFPA 13, they were the same as the 1998 edition of NFPA 231C. In fact, as far as the rules for protection of exposed non-expanded plastics are concerned, as well as the plastics decision tree, these rules did not change in the 2002, 2007 or 2010 editions of NFPA 13. The Plastics Decision Tree stayed the same as it is shown in Figure 2 above and the rules for protecting exposed non-expanded plastics were limited to the few figures in the portion of the standard for protection of plastics stored on racks over 25 ft that specifically referenced exposed non-expanded plastics.

During the development of the 2013 edition of NFPA 13, it became clear

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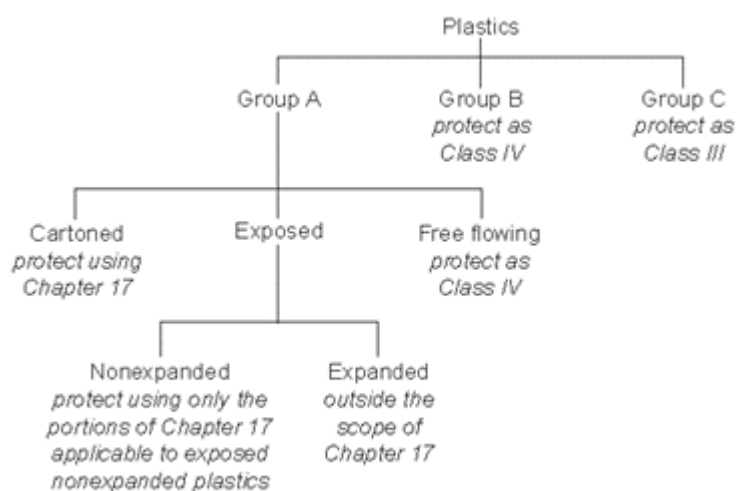


(through discussions with contractors and AHJ's around the country) that the Plastics Decision Tree was being misunderstood. Some people believed that because the Plastics Decision Tree referenced the user to all of the portions of NFPA 13 that dealt with protection of plastic storage on racks, that they could use any figure or table from that chapter to deal with exposed non-expanded plastics, even if that figure or table did not mention exposed non-expanded plastics in its title. This was an incorrect and dangerous assumption.

In the 1999, 2002, 2007 and 2010 edition of NFPA 13, the rules for protecting exposed non-expanded plastics are limited to the few figures that specifically mention that they are appropriate for protecting exposed non-expanded plastics. These figures are limited to protection over 25 ft in height. There is no recognized criteria in any of these editions of NFPA 13 for protecting exposed non-expanded plastics for rack storage up to (and including) 25 ft in height. If you are trying to protect exposed non-expanded plastics stored on racks up to 25 ft in height (or less), you need to find protection criteria from another source, or use the rules for protection of storage over 25 ft (since the storage over 25 ft is certainly worse than storage 25 ft or less, these rules would be sufficient).

In the 2013 edition of NFPA 13, there have been two significant improvements of the situation. First, the committee has added new protection criteria for rack storage of exposed non-expanded plastics up to 25 ft in height. The new criteria can be found in Figures 17.2.1.4(a) through (l).

The second improvement to NFPA 13 that was agreed to by the committee was a rewrite of the Plastics Decision Tree to make it clear that the protection schemes in Chapter 17 of NFPA 13 can only be used for exposed non-expanded plastics when they are specifically designated for exposed non-expanded plastics. The Plastics Decision Tree shown in Figure 3 was agreed to by the committee in Proposal 13-449 of the Report on Proposals (ROP) and was not modified by any comment in the Report on Comments (ROC), so it should have been printed in the 2013 edition. Unfortunately, it does not appear in the standard due to an error in processing the committee reports.



**Figure 3 – Plastics Decision Tree from NFPA 13 – 2013 ROP**

Hopefully the NFPA will correct this oversight with an errata that has the correct information, and hopefully, subsequent printings of the 2013 edition will be corrected. But until then, the user is reminded that regardless of the edition of NFPA 13 that they are using, the correct protection criteria to use for rack storage of exposed non-expanded plastics are only those figures in standard that specifically say that they are for the protection of exposed non-expanded plastics.

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