1. Revise Subsection 5.6.3.3 to read as follows:

5.6.3.3* Class III.
5.6.3.3.1 A Class III commodity shall be defined as a product fashioned from wood, paper, natural fibers, or Group C plastics with or without cartons, boxes, or crates and with or without pallets.

5.6.3.3.2* A Class III commodity shall be permitted to contain a limited amount (5 percent or less by weight of unexpanded plastic or 5 percent or less by volume of expanded plastic) of Group A or Group B plastics.

A.5.6.3.3.2 Where the commodity includes a single type of plastic, the five percent limit applies to the unexpanded or expanded type, but not both. For commodities with a mixture of expanded and unexpanded plastics, see 5.6.3.3.3 and the associated figures.

5.6.3.3.3 Class III commodities containing a mix of both Group A expanded and unexpanded plastics shall comply with Figure 5.6.3.4.2.3.3.1 where they are within cartons, boxes, or crates, or Figure 5.6.3.3.3.2 where they are exposed.
2. Revise Figure 5.6.3.4.2 to read as follows:

**Class III Commodity.** Commodities shall be permitted to contain a limited amount (6 percent by weight of unexpanded plastic or 5 percent by volume of expanded plastic or less) of Group A. Refer to 5.6.2 if a plastic pallet is used.

**Class IV Commodity.** Commodities shall be permitted to contain within itself or its packaging an appreciable amount (5 percent to 15 percent by weight of Group A unexpanded plastic, or 5 percent to 25 percent by volume of expanded Group A plastics) of Group A plastics as indicated in Figure 5.6.3.4.2. Refer to 5.6.2 if a plastic pallet is used.

**Group A.**

1. Cartoned commodities containing greater than 25 percent and up to 40 percent by volume of expanded Group A plastic shall be protected as cartoned unexpanded Group A plastic.

2. Cartoned commodities containing more than 40 percent by volume of expanded Group A plastic shall be protected as cartoned expanded Group A plastic.

3. Exposed commodities containing greater than 6 percent and up to 35 percent by volume of expanded Group A plastic shall be protected as exposed unexpanded Group A plastic.

4. Exposed commodities containing greater than 35 percent by volume of expanded Group A plastic should be protected as exposed expanded Group A plastic commodity.
3. Add a new Figure 5.6.3.3.2 to read as follows:

Figure 5.6.3.3.2 Exposed Commodities Containing a Mixture of Expanded and Unexpanded Group A Plastics

Percentage by Weight of Group A Unexpanded Plastic

- **III** - Class III Commodity. Refer to 5.6.2 if a plastic pallet is used.
- **IV** - Class IV Commodity. Refer to 5.6.2 if a plastic pallet is used.

Percentage by Volume of Group A Expanded Plastic
4. Revise Subsection 5.6.3.4 to read as follows:

5.6.3.4* Class IV.
5.6.3.4.1 A Class IV commodity shall be defined as a product, with or without pallets, that meets one of the following criteria:
1. Constructed partially or totally of Group B plastics
2. Consists of free-flowing Group A plastic materials
3. Cartoned, or within a wooden container, that contains within itself or its packaging an appreciable amount (greater than 5 percent and up to 15 percent by weight of Group A unexpanded plastic, or greater than 5 percent and up to 25 percent by volume of expanded Group A plastics) of Group A plastics.
4. Cartoned, or within a wooden container, that contains greater than 5 percent and up to 25 percent by volume of expanded Group A plastics.
5. Cartoned, or within a wooden container, that contains a mix of Group A expanded and unexpanded plastics and complies with Figure 5.6.3.3.3.1.
6. Exposed, that contains greater than 5 percent and up to 15 percent by weight of Group A unexpanded plastic.
7. Exposed, that contains a mix of Group A expanded and unexpanded plastics and complies with Figure 5.6.3.3.3.2.

5.6.3.4.2 Commodities containing a mix of both Group A expanded and unexpanded plastics shall comply with Figure 5.6.3.4.2.

5.6.3.4.3 Commodity containing a mix of both Group A expanded and unexpanded plastics shall comply with Figure 5.6.3.4.2.

5.6.3.4.3.2 The remaining materials shall be permitted to be metal noncombustible, wood, paper, natural or synthetic fibers, or Group B or Group C plastics.

5. Revise Subsection 5.6.4 to read as follows:

5.6.4* Classification of Plastics, Elastomers, and Rubber. Plastics, elastomers, and rubber shall be classified as Group A, Group B, or Group C.

5.6.4.1* Group A. The following materials shall be classified as Group A:
1. ABS (acrylonitrile-butadiene-styrene copolymer)
2. Acetal (polyformaldehyde)
3. Acrylic (polymethyl methacrylate)
4. Butyl rubber
5. Cellulosics (cellulose acetate, cellulose acetate butyrate, ethyl cellulose)
6. EPDM (ethylene-propylene rubber)
7. FRP (fiberglass-reinforced polyester)
8. Natural rubber
9. Nitrile-rubber (acrylonitrile-butadiene-rubber)
10. Nylon (nylon 6, nylon 66)
11. PET (thermoplastic polyester)
12. Polybutadiene
13. Polycarbonate
14. Polyester elastomer
15. Polyethylene
16. Polypropylene
17. Polystyrene
18. Polyurethane
(19) PVC (polyvinyl chloride – highly plasticized, with plasticizer content greater than 20 percent)(rarely found)
(20) PVF (polyvinyl fluoride)
(21) SAN (styrene acrylonitrile)
(22) SBR (styrene-butadiene rubber)

5.6.4.1.1* Group A plastics shall be further subdivided as either expanded or unexpanded.

5.6.4.1.1.1 If a cartoned commodity is more than 40 percent (by volume) expanded plastic, it shall be protected as a cartoned expanded plastic.
A Group A expanded plastic commodity shall be defined as a product, with or without pallets, that meets one of the following criteria:
(1) Cartoned, or within a wooden container, that contains greater than 40 percent by volume of Group A expanded plastic.
(2) Exposed, that contains greater than 25 percent by volume of Group A expanded plastic.

5.6.4.1.1.2 Exposed commodities containing greater than 25 percent by volume expanded plastic shall be protected as an exposed expanded plastic.
A Group A unexpanded plastic commodity shall be defined as a product, with or without pallets, that meets one of the following criteria:
(1) Cartoned, or within a wooden container, that contains greater than 15 percent by weight of Group A unexpanded plastic.
(2) Cartoned, or within a wooden container, that contains greater than 25 percent and up to 40 percent by volume of Group A expanded plastic.
(3) Cartoned, or within a wooden container, that contains a mix of Group A unexpanded and expanded plastics, in compliance with Figure 5.6.3.3.1.
(4) Exposed, that contains greater than 15 percent by weight of Group A unexpanded plastic.
(5) Exposed, that contains greater than 5 percent and up to 25 percent by volume of Group A expanded plastic.
(6) Exposed, that contains a mix of Group A unexpanded and expanded plastics, in compliance with Figure 5.6.3.3.2.

5.6.4.1.1.3 The remaining materials shall be permitted to be noncombustible, wood, paper, natural or synthetic fibers, or Group A, Group B, or Group C plastics.

5.6.4.2 Group B.
The following materials shall be classified as Group B:
(1) Chloroprene rubber
(2) Fluoroplastics (ECTFE – ethylene-chlorotrifluoro-ethylene copolymer; ETFE – ethylene-tetrafluoroethylene-copolymer; FEP – fluorinated ethylene-propylene copolymer)
(3) Silicone rubber

5.6.4.3 Group C.
The following materials shall be classified as Group C:
(1) Fluoroplastics (PCTFE – polychlorotrifluoroethylene; PTFE – polytetrafluoroethylene)
(2) Melamine (melamine formaldehyde)
(3) Phenolic
(4) PVC (polyvinyl chloride – flexible – PVC’s with plasticizer content up to 20 percent)
(5) PVDC (polyvinylidene chloride)
(6) PVDF (polyvinylidene fluoride)
Urea (urea formaldehyde)

6. Revise A.5.6 to read as follows:

**A.5.6** Specification of the type, amount, and arrangement of combustibles for any commodity classification is essentially an attempt to define the potential fire severity, based on its burning characteristics, so the fire can be successfully controlled by the prescribed sprinkler protection for the commodity class. In actual storage situations, however, many storage arrays do not fit precisely into one of the fundamental classifications; therefore, the user needs to make judgments after comparing each classification to the existing storage conditions. Storage arrays consist of thousands of products, which makes it impossible to specify all the acceptable variations for any class. As an alternative, a variety of common products are classified in this annex based on judgment, loss experience, and fire test results. Table A.5.6 provides examples of commodities not addressed by the classifications in Section 5.6. The commodities listed in Table A.5.6 are outside the scope of NFPA 13 protection. Table A.5.6.3 is an alphabetized list of commodities with corresponding classifications. Tables A.5.6.3.1, A.5.6.3.2, A.5.6.3.3, through Table A.5.6.3.4, and Table A.5.6.4.1 provide examples of commodities within a specific class.

7. Revise Table A.5.6.1.1 to read as follows:

**Table A.5.6.1.1 General Guide to Identifying the Commodity Class for Solid Combustibles**

<table>
<thead>
<tr>
<th>Characteristics of Unit Load</th>
<th>Commodity Class</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material Used to Construct Product</strong></td>
<td><strong>Packaging Material</strong></td>
</tr>
<tr>
<td>Noncombustible Product</td>
<td></td>
</tr>
<tr>
<td>Entirely noncombustible</td>
<td>None or single-layer corrugated cartons</td>
</tr>
<tr>
<td>Entirely noncombustible</td>
<td>None or single-layer corrugated cartons</td>
</tr>
<tr>
<td>Entirely noncombustible</td>
<td>Multiple-layered corrugated cartons, wooden crates, or wood boxes</td>
</tr>
<tr>
<td>Entirely noncombustible</td>
<td>Multiple-layered corrugated cartons, wooden crates, or wood boxes</td>
</tr>
<tr>
<td>Noncombustible with Group A plastic components</td>
<td>None or single-layer corrugated cartons</td>
</tr>
<tr>
<td>Entirely noncombustible or noncombustible with plastic components</td>
<td>Corrugated cartons, wooden crates, or wood boxes, with internal plastic packaging</td>
</tr>
<tr>
<td>Entirely noncombustible or noncombustible with plastic components</td>
<td>Any type</td>
</tr>
<tr>
<td>Wood, Paper, Natural Fibers, or Group C Plastics</td>
<td></td>
</tr>
<tr>
<td>Material Used to Construct Product</td>
<td>Packaging Material</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Entirely wood, paper, natural fibers, or Group C plastics, or a mix of these with noncombustible materials.</td>
<td>None, corrugated cartons, wooden crates, or wood boxes</td>
</tr>
<tr>
<td>Entirely wood, paper, natural fibers, or Group C plastics, or a mix of these with noncombustible materials.</td>
<td>Corrugated cartons, wooden crates, or wood boxes, with internal plastic packaging</td>
</tr>
<tr>
<td>Entirely wood, paper, natural fibers, or Group C plastics, or a mix of these with noncombustible materials.</td>
<td>None, corrugated cartons, wooden crates, or wood boxes</td>
</tr>
<tr>
<td>Entirely wood, paper, natural fibers, or Group C plastics, or a mix of these with noncombustible materials.</td>
<td>Corrugated cartons, wooden crates, or wood boxes, with internal plastic packaging</td>
</tr>
<tr>
<td>Wood, paper, natural fibers, or Group C plastics, with Group A plastic components</td>
<td>None, corrugated cartons, wooden crates, or wood boxes, with or without plastic packaging</td>
</tr>
<tr>
<td>Wood, paper, natural fibers, or Group C plastics, with or without Group A plastic components</td>
<td>Any type</td>
</tr>
</tbody>
</table>

**Group B Plastics**

<p>| Entirely Group B plastics, or a mix of these with noncombustible, wood, paper, natural fibers, or Group C plastics materials. | None, corrugated cartons, wooden crates, or wood boxes | None, metal, or wood | Class IV |
| Entirely Group B plastics, or a mix of these with noncombustible, wood, paper, natural fibers, or Group C plastics materials. | Corrugated cartons, wooden crates, or wood boxes | Plastic | Group A, Cartoned Unexpanded Class IV or cartoned unexpanded Group A plastic; see Section 5.6.2 |
| Entirely Group B plastics, or a mix of these with noncombustible, wood, paper, natural fibers, or Group C plastics materials. | None | Plastic | Group A, Cartoned Unexpanded Class IV or cartoned unexpanded Group A plastic; see Section 5.6.2 |
| Entirely Group B plastics, or a mix of these with noncombustible, wood, paper, natural fibers, or Group C plastics materials, or free flowing plastic materials | Corrugated cartons, wooden crates, or wood boxes, with plastic internal packaging | None, metal, or wood | See Figure 5.6.3.4.2-3.3.1          |
| Entirely Group B plastics, or a mix of these with noncombustible, wood, paper, natural fibers, or Group C plastics materials. | Corrugated cartons, wooden crates, or wood boxes, with plastic internal packaging | Plastic | See Figure 5.6.3.3.3.1 and Section 5.6.2 |</p>
<table>
<thead>
<tr>
<th>Material Used to Construct Product</th>
<th>Packaging Material</th>
<th>Pallet Material</th>
<th>Commodity Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group B plastics with Group A plastic components</td>
<td>None, corrugated cartons, wooden crates, or wood boxes, with or without plastic packaging</td>
<td>None, metal, or wood</td>
<td>See Figure 5.6.3.4.2</td>
</tr>
<tr>
<td>Entirely Group B plastics or free‐flowing plastic materials, or Group B plastics with Group A plastic components</td>
<td>Any type</td>
<td>Plastic</td>
<td>See 5.6.2 and Figure 5.6.3.4.2</td>
</tr>
<tr>
<td><strong>Group A Plastics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free‐flowing Group A plastic materials</td>
<td>Corrugated cartons, wooden crates, wood boxes, or bagged</td>
<td>None, metal, wood</td>
<td>Class IV</td>
</tr>
<tr>
<td>Entirely unexpanded Group A plastic</td>
<td>Corrugated cartons, wooden crates, wood boxes, or bagged</td>
<td>None, metal, wood, or plastic</td>
<td>Cartoned unexpanded Group A plastic</td>
</tr>
<tr>
<td>Entirely unexpanded Group A plastic</td>
<td>Corrugated cartons, wooden crates, wood boxes, with or without expanded Group A plastic packaging</td>
<td>None, metal, wood, or plastic</td>
<td>Cartoned expanded Group A plastic</td>
</tr>
<tr>
<td>Entirely expanded Group A plastic</td>
<td>Corrugated cartons, wooden crates, wood boxes, with or without expanded Group A internal plastic packaging</td>
<td>None, metal, wood, or plastic</td>
<td>Cartoned expanded Group A plastic</td>
</tr>
<tr>
<td>Entirely expanded Group A plastic</td>
<td>Corrugated cartons, wooden crates, wood boxes, with or without expanded Group A plastic packaging</td>
<td>None, metal, wood, or plastic</td>
<td>Cartoned expanded Group A plastic</td>
</tr>
<tr>
<td>Unexpanded Group A plastic with expanded Group A plastic components</td>
<td>Corrugated cartons, wooden crates, or wood boxes, with or without expanded Group A plastic packaging</td>
<td>None, metal, wood, or plastic</td>
<td>See Figure 5.6.3.4.2</td>
</tr>
<tr>
<td>Mix of Group A plastics, noncombustible, wood, paper, natural fibers, Group B or C plastics materials.</td>
<td>Corrugated cartons, wooden crates, or wood boxes, with or without internal plastic packaging</td>
<td>None, metal or wood</td>
<td>See Figure 5.6.3.3.3.1</td>
</tr>
<tr>
<td>Mix of Group A plastics, noncombustible, wood, paper, natural fibers, Group B or C plastics materials.</td>
<td>Corrugated cartons, wooden crates, or wood boxes</td>
<td>Plastic</td>
<td>See Figure 5.6.3.3.3.1 and Section 5.6.2</td>
</tr>
<tr>
<td>Mix of Group A plastics, noncombustible, wood, paper, natural fibers, Group B or C plastics materials.</td>
<td>None</td>
<td>None, metal or wood</td>
<td>See Figure 5.6.3.3.2</td>
</tr>
</tbody>
</table>
### Characteristics of Unit Load

<table>
<thead>
<tr>
<th>Material Used to Construct Product</th>
<th>Packaging Material</th>
<th>Pallet Material</th>
<th>Commodity Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mix of Group A plastics, noncombustible, wood, paper, natural fibers, Group B or C plastics materials.</td>
<td>None</td>
<td>Plastic</td>
<td>See Figure 5.6.3.3.2 and Section 5.6.2</td>
</tr>
</tbody>
</table>

### Substantiation:

Note that there are no technical changes associated to this TIA.

The language in the notes associated with the second draft Figure 5.6.3.4.2 resulted in an inconsistency between the guidelines for Class IV commodities and those for exposed unexpanded Group A plastics. In addition, there was concern that the guidelines provided in second draft Figure 5.6.3.4.2, which were only intended for cartoned commodities, could lead to an incorrect commodity classification if the user did not read or properly apply the notes that were associated with the figure.

To rectify this situation, a second figure was created that represents commodity classification when exposed materials are mixed with Group A plastics. In addition, the language from the second draft Figure 5.6.3.4.2 was removed from the figure and placed as text within the body of the standard. Lastly, additional language was added to the body of the standard to clarify commodity classification that would have had to be inferred previously as well as to provide consistent formatting throughout the section.

The second draft Figure 5.6.3.4.2 was moved into Section 5.6.3.3.3, where it is first referenced, and renumbered as Figure 5.6.3.3.3.1.

### Additional clarifications to sections:

**5.6.3.3.3** Action: Added “Class III” at the beginning of the sentence for consistency and provided guidance on which figure to use when Class III commodities are mixed with Group A plastics.

**Figure 5.6.3.3.3.1** Actions:

1) Renumbered the figure because it will now be in Section 5.6.3.3.3.1.
2) Added “Cartoned and wooden containers” to the title to clarify its application.
3) Added “Unexpanded” to “Group A” in the Figure’s graph because the Figure now only applies to Cartoned commodities.
4) Added “Group A Expanded” to the Figure’s graph beyond 40% by volume because the Figure now only applies to Cartoned commodities.
5) Removed wording from III and IV for simplicity since covered in text.
6) Removed Group A notes 1 and 2 from the Figure because they are addressed by the graph.
7) Removed Group A notes 3 and 4 from the Figure because they applied to exposed commodities.

**Figure 5.6.3.3.3.2** Actions: Added a Figure for exposed commodities containing a mix of plastics to provide explicit guidance for exposed commodities as well as to avoid confusion with the guidelines for cartoned commodities.

**5.6.3.4** Action: Provided clear guidance on what constitutes a Class IV commodity when Group A plastic is present, whether expanded or unexpanded as well as when the product is exposed or cartoned:
- Separated sentence (3) into two sentences (3 and 4) to break up the limitations for unexpanded and expanded plastics for cartoned commodities.
- Added sentences (5) and (7) to account for a mix of unexpanded and expanded plastics.
- Added sentence (6) to provide limitations on exposed commodities containing unexpanded plastic.

5.6.3.4.2 Action: Deleted existing Section 5.6.3.4.2 above because it is covered in the new Sections 5.6.3.4.1(5) and 5.6.3.4.1(7).

[Note: Figure 5.6.3.4.2 was moved, modified and renumbered as Figure 5.6.3.3.1]

5.6.3.4.3 Action: Modified and renumbered Section 5.6.3.4.3 above. Replaced “metal” with “noncombustible” to be all encompassing of all materials that do not burn. Removed “synthetic”, see action for Table A5.6.3, in TIA #2.

5.6.4.1.1.1 Action: Deleted the sentence describing cartoned expanded plastic because it is covered in Figure 5.6.3.3.1 and sentence (1) above (this was Note 2 for Group A Plastics from second draft Figure 5.6.3.4.2). Also, added clarification on Group A expanded plastic in sentence (2), by explicitly stating that >25% by volume of exposed expanded plastic results in Group A expanded plastic (this was Note 4 for Group A Plastics from second draft Figure 5.6.3.4.2).

5.6.4.1.1.2 Action: Deleted the sentence describing exposed expanded plastic because it is covered in sentence 5.6.4.1.1.1(2). Also, added clarification on Group A unexpanded plastic in sentences (1)-(6). Sentence (2) was Note 1 for Group A Plastics from second draft Figure 5.6.3.4.2 and sentence (5) was Note 3 for Group A Plastics in second draft Figure 5.6.3.4.2. There are no technical changes.

5.6.4.1.1.3 Action: Section 5.6.4.1.1.3 was added to be consistent with Section 5.6.3.4.2 for Class IV commodities.

A.5.6 Action: Included the list of Tables associated to Class I, II, III, IV, and Plastics to provide a link for the electronic version of the Standard. Also, indicated A.5.6.4.1 link does not work.

Table A.5.6.1.1 Action: Updated Table A5.6.1.1 for consistency with the text in the body of Section 5.6.

**Emergency Nature:** Based on the language accepted at the second draft meeting, a user could assign the incorrect commodity classification to a specific product. Specifically, a Group A Plastic could be categorized as a Class IV commodity incorrectly. This could lead to an insufficient amount of water being delivered to the fire which could have a catastrophic result.

*Anyone may submit a comment by the closing date indicated above. To submit a comment, please identify the number of the TIA and forward to the Secretary, Standards Council, 1 Batterymarch Park, Quincy, MA 02169-7471.*