



Standard Practice for Selection of Corrugated Fiberboard Materials and Box Construction Based on Performance Requirements¹

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1. Scope

1.1 This practice provides information on corrugated fiberboard for the prospective user who wants guidance in selecting attributes of materials and box construction based on performance requirements. These attributes should be part of specifications which establish levels of the qualities a shipping container shall have in order to be acceptable to the purchaser or user. The attributes and qualities should be testable, using standard methods that are recognized by both the buyer and seller. This practice will assist users in developing specifications for corrugated containers through an analysis of performance requirements and subsequent relationships to fiberboard materials and box construction attributes. This practice is intended to provide specific corrugated container performance standards as opposed to packaged product performance evaluation through distribution and handling environments, such as Practice [D4169](#).

1.2 The attributes and their levels should be based on the intended use of the box, including the handling and environment it will encounter. Many packaging regulations include detailed descriptions of the materials that may be used and style, closure, or other construction details of allowed shipping containers. These regulations are presented as minimum requirements; they may be exceeded for functional reasons, but there is no regulatory reason to do so. Rail and motor freight classifications applicable for surface common carrier transportation have established minimum requirements for certain attributes of corrugated packaging. These may or may not be appropriate for application in the complete distribution system, as they encompass only containerboard or combined corrugated board—not finished boxes—and are not intended to provide for the distribution system beyond the transportation segment.

1.2.1 The attribute levels contained herein are based on US practice and specifications. Some attributes such as flute dimensions and basis weights may be defined differently in other countries.

1.3 There are two distinctly different methods commonly used for specifying boxes. The most common approach is to specify materials, such as defining flute, edge crush value, Mullen burst value, and flat crush minimums, containerboard weights and thicknesses. An alternative approach is to define some measure of performance. Mullen burst values can be one of these measures if the user has determined that some minimum burst value is all that is required in their distribution system. The overall compression strength of the box is another, and this measure allows each supplier to achieve the required strength through their own unique combination of materials and processes. A third measure would be to pass some sort of rough handling performance protocol, with Practice [D4169](#) being one example. Unlike material specifications, where definitions of fluting, test methods of ECT, and difficulty of assessing individual components of the box structure exist, compression values of the finished box are easily tested and verified using a common test method (Test Method [D642](#)). The same can be said of box performance measured against a performance protocol. Using only material specifications to define a box does not guarantee the box will be well made. For example, the best possible material could be used for making a box, but if the score lines are too deep or too shallow, or if the manufacturer's joint is not secured correctly, the box will fail in distribution.

Conversely, box compression and rough handling performance protocols measures both material and manufacturing quality simultaneously. It is sometimes advantageous to use a combination of both these methods to help assure the outer liner will not easily scuff or break. Though suppliers will need to continue to use material specifications when making boxes, the user would benefit more from employing performance specifications to help guarantee similar box attributes from a variety of suppliers. It should be realized that no two suppliers, especially if they're located in different countries, will use the same materials and processes for making a box. Employing

¹ This practice is under the jurisdiction of ASTM Committee [D10](#) on Packaging and is the direct responsibility of Subcommittee [D10.27](#) on Paper and Paperboard Products.

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