This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: D6804 – 24a

Standard Guide for Hand Hole Design in Corrugated Boxes[1]

This standard is issued under the fixed designation D6804; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This standard provides guidelines for designing pre-cut apertures intended for use as hand holes in corrugated boxes during manual handling of boxed cargo.

1.2 *Limitations*—This standard offers guidance for package development and for subsequent testing of boxes to measure performance. It is not intended to provide specific information on the design of hand holes.

1.3 The values stated in inch-pound units are to be regarded as the standard. The SI units are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use..*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D996 Terminology of Packaging and Distribution Environments

D1974 Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes

D4332 Practice for Conditioning Containers, Packages, or Packaging Components for Testing

D5276 Test Method for Drop Test of Loaded Containers by Free Fall

D5445 Practice for Pictorial Markings for Handling of Goods

E4 Practices for Force Calibration and Verification of Testing Machines

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

2.2 *TAPPI Standards:*[3]

T400 Sampling and Accepting a Single lot of Paper, Paperboard, Containerboard, or Related Product

3. Terminology

3.1 *Definitions*—General definitions for packaging and distribution environments are found in Terminology D996.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *hand holes*—apertures, pre-cut in corrugated boxes by box manufacturers, as requested by box purchasers. These apertures facilitate manual handling during distribution and improve grip during handling.

4. Significance and Use

4.1 It may be desirable at times to provide hand holes in corrugated boxes. Package designers use hand holes to solve ergonomic and handling problems associated with large or awkward containers. This guide provides an aid for proper hand hole design and use.

4.1.1 Boxes for handling by a single person.

4.1.2 Boxes that are too large or awkward to be handled well by a single person (4.4.1).

4.2 *Ergonomics:*

4.2.1 In studying and applying ergonomic principles, of primary concern is the need to provide a safe work environment for material handlers who may be required to lift or transport packages. A safe work environment is difficult to define and varies with the package in question. Several ergonomic safety issues involve repetitive motions and spine loading in the lifting process. Other issues involve finger and foot protection.

4.2.2 In distribution centers or warehouses, low back disorders have been identified as areas of elevated risk. Low back

[1] This guide is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.27 on Fiberboard Shipping Containers, Containerboard and Related Structures and Materials.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from Technological Association of the Pulp and Paper Industry (TAPPI), 15 Technology Parkway South, Suite 115, Peachtree Corners, GA 30092, http://www.tappi.org.

*A Summary of Changes section appears at the end of this standard

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