1.0 PURPOSE
The purpose of this specification is to provide a uniform basis for the evaluation of corrugated fiberboard material, components, and boxes. This information is a supplement to the Vollrath Engineering drawing for each corrugated part when available.

2.0 SCOPE
This specification applies to all materials used for the manufacture of all corrugated fiberboard packaging components approved by The Vollrath Company. It represents minimum acceptable standards for quality and function for the master boxes and inner components constructed from corrugated. This specification is to be used in conjunction with the individual engineering drawing, QA Protocol, and test methods listed. In the case of a specific attributes or criteria not covered, local specifications and recognized industry standards will apply. Exceptions to this procedure will be documented in the Purchase Order Process. All exceptions to this procedure must be approved by Vollrath Purchasing.
3.0 REFERENCED DOCUMENTS

The following documents form a part of this specification to the extent specified herein.

ASTM D 642 Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads, American Society for Testing and Materials

ASTM D996 Standard Terminology of Packaging and Distribution Environments, American Society for Testing and Materials


ASTM D2658 Standard Test Method for Determining Interior Dimensions of Fiberboard Boxes (Box Gage Method), American Society for Testing and Materials

ASTM D4727 Standard Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes, American Society for Testing and Materials

ASTM D5118 Standard Practice for Fabrication of Fiberboard Shipping Boxes, American Society for Testing and Materials

ASTM D5264 Standard Practice for Abrasion Resistance for Printed Materials by the Sutherland Rub Tester, American Society for Testing and Materials


TAPPI T 410 Weight per Unit Area (Basis Weight or Substance), Technical Association of the Pulp and Paper Industry

TAPPI T 803 Puncture and Stiffness Test of Container Board, Technical Association of the Pulp and Paper Industry

TAPPI T 810 Bursting Strength of Corrugated and Solid Fiberboard, Technical Association of the Pulp and Paper Industry

TAPPI T 811 Edgewise Compressive Strength of Corrugated Fiberboard (short column test), Technical Association of the Pulp and Paper Industry

Fibre Box Handbook, Fibre Box Association, Rolling Meadows, IL 60008
5.0 CORRUGATED MATERIAL CONSTRUCTION

5.1. All material used for the manufacture of finished packaging must be approved by The Vollrath Company. Recyclable capabilities and the environment should be considered.

5.2. Changes to material/components cannot be made without first agreement with The Vollrath Company and relevant supplier. This shall include changes to material, design or printing specifications. Validation with Vollrath Company and relevant vendor is required.

5.3. The packaging supplier must not deliver out of specification material without prior agreement with The Vollrath Company and relevant supplier.

5.4. Corrugated fiberboard shall be specified in terms of combined board – either as single face, single wall, double wall, and triple wall. See figures below for reference.

**Single Face**
One medium is glued to one flat sheet of linerboard.

**Single Wall**
The medium is between two sheets of linerboard. Also known as Double Face.

**Double Wall**
Three sheets of linerboard with two mediums in between.

**Triple Wall**
Four sheets of linerboard with three mediums in between.
5.5. For parts specified by Mullen bursting strength, basis weight of the combined corrugated fiberboard shall conform to the requirements in TABLE A. Refer to TAPPI T 410, TAPPI T810 and TAPPI T 803.

<table>
<thead>
<tr>
<th>Maximum Weight of Box &amp; Contents (lbs.)</th>
<th>Maximum Outside Dimensions, Length, Width and Depth Added (inches)</th>
<th>Minimum Bursting Test, Single Wall, Double Wall or Solid Fiberboard (lbs. per sq. in.)</th>
<th>Minimum Puncture Test, Triple Wall Board (in. oz. per in. of tear)</th>
<th>Minimum Combined Weight of Facings, including Center Facing(s) of Double Wall &amp; Triple Wall Board or Minimum Combined Weights of Piles, Solid Fiberboard, Excluding Adhesives (lbs. per 1,000 sq. ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Wall Corrugated Fiberboard Boxes</td>
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<tr>
<td>20</td>
<td>40</td>
<td>125</td>
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<td>120</td>
<td>105</td>
<td>350</td>
<td>180</td>
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<tr>
<td>Double Wall Corrugated Fiberboard Boxes</td>
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<tr>
<td>180</td>
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<tr>
<td>Triple Wall Corrugated Fiberboard Boxes</td>
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<tr>
<td>Solid Fiberboard Boxes</td>
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<tr>
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<td>120</td>
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</tbody>
</table>
5.6. For parts specified by Edge Crush Test (ECT), the corrugated fiberboard construction shall conform to the requirements in TABLE B and verified by testing to TAPPI T811.

### Table B

<table>
<thead>
<tr>
<th>Maximum Weight of Box &amp; Contents (lbs.)</th>
<th>Maximum Outside Dimensions, Length, Width and Depth Added (inches)</th>
<th>Minimum Edge Crush Test (ECT) (lbs. per in. width)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Wall Corrugated Fiberboard Boxes</td>
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<tr>
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<td>NA</td>
</tr>
<tr>
<td>120</td>
<td>100</td>
<td>NA</td>
</tr>
</tbody>
</table>
5.7. Corrugated fiberboard is to be specified with a flute structure. It shall conform to the number of flutes per length specified in ASTM D4727, or as listed below:

- **F Flute = 125 Flutes (±4) per linear foot**
- **E Flute = 90 Flutes (±4) per linear foot**
- **C Flute = 39 Flutes (±3) per linear foot**
- **B Flute = 42 Flutes (±3) per linear foot**
- **A Flute = 33 Flutes (±3) per linear foot**

5.8. Flute direction shall be in the depth direction, or as specified in the individual part drawing.
5.9. White liners shall be certifiably elementally chlorine free or totally chlorine free.
5.10. Liners shall not delaminate from the fluted medium for a distance greater than 6 mm (.25 inch) from the edges of the combined corrugated board. Refer to ASTM D 4727.
5.11. Liners shall resist peeling when subjected to testing in accordance to ASTM D1029.

6.0 BOX CONSTRUCTION: SCORE, SLOT, FOLDING AND TRIM REQUIREMENTS
6.1. Box construction shall be per ASTM D5118/D 5118M unless otherwise noted herein.
6.2. Inside box dimensions are cited in the sequence of length, width and depth as illustrated below and in ASTM D5118/D 5118M. Inside dimensions can be verified using a steel rule tape – measuring the major panels, score to score. All dimensional tolerances shall be +/- 1.5 mm (0.063") or as specified in the individual part drawing.

6.3. A crease in any panel, deep enough to form a false score and cause the panel to collapse while forming the box, will be cause for rejection.

6.4. Slot depths shall be within 5 mm (0.19 inch) double wall and 3mm (.13 inch) for single wall from the center of the score line forming the flap, unless otherwise specified on the individual carton drawing.

6.5. Flap slots shall be centered to within 1.5 mm (0.063 inch) of the centerline of the aligning panel scores as recommended in the Fibre Box Handbook.

6.6. Knife-cut edges, trim and slots must be clean cut and free of debris. Attached scrap shall not account for more than one piece per one hundred (100) boxes.
6.7. Warping shall not exceed 6mm (.25 inch) for 305mm (12 inch) of material as seen below and recommended in the Fibre Box Handbook.

6.8. Flap scores of slotted style boxes shall be deep enough to allow folding with one hand without creating false scores.

6.9. The corrugated fiberboard shall show no continuous visual surface break, or cracking of the inner or outer facings per the bending requirements specified in ASTM D4727.

7.0 MANUFACTURERS’ JOINT FOR SLOTTED CONTAINERS

7.1. The manufacturers’ joint tab shall extend the full inside depth of the box at the joint score line and may be attached to either the length or width panel of the slotted box. The joint tab shall be crushed along its entire length. The joint tab may be specified to extend beyond the top and bottom score lines of the adjoining panel for added box strength. Extended tabs should only be used when they are attached to the length (largest) panel and fastened to the inside of the width (smallest) panel to assure proper flap alignment and evenness of the closed box.

7.2. Refer to the individual carton drawing for the preferred style of manufacture’s joint.

7.3. MANUFACTURE’S JOINT – GLUE ADHESION

7.3.1 The manufacturers’ joint tab shall extend the full inside depth of the box at the joint score line and attached as specified in the individual part drawing.

7.3.2 Glue tabs should not be coated or laminated on boxes with special coatings or full litho laminates to assure a good adhesive bond.

7.3.3 Manufactures joints shall consist of an adhesive bond that covers a minimum of 85% of the total joint tab area with a minimum of 75% fiber tear. Any adhesive failure will be cause for rejection.

7.3.4 Cartons must not exhibit external or internal adhesion due to excessive adhesive application.
8.0 SLOT GAP AT THE MANUFACTURES’ JOINT

8.1. The amount of gap at the manufactures’ joint measured at the flap scorelines shall not vary more than +/- one board thickness from the target gap, which is usually 9mm (.375 inch) or the width of the cut slots.

8.2. Variations in the width of each gap at the manufactures’ joint on the same box (skew or fishtail) shall not exceed +/- 3mm (.125 inch) when measured at the flap scorelines.

8.3. Gaps measured at the flap scorelines shall not be less than:

- 1.5mm (.063 inch) when the joint is taped or when the glued or stitched tab is affixed to the inside of the adjacent panel, or
- 3mm (.125 inch) when the tab is affixed to the outside of the adjacent panel.
- The gap at the manufactures’ joint measured at the ends of the flaps, shall be not less than 1.5mm (.063 inch).
- Variations in slot depth shall be no greater than 3mm (.125 inch) from the agreed upon average dimension – refer to figure below.
9.0 FLAP GAP FOR RSC AND HSC BOXES

9.1. The major flaps of a closed box shall not overlap and the gap between these flaps should not exceed the thickness of the corrugated board as recommended in the Fibre Box Handbook unless otherwise specified on the individual carton drawing.

10.0 MARKINGS & IDENTIFICATION REQUIREMENTS FOR SHIPPING CASES

10.1. All printing must be of acceptable commercial quality, clarity, in register and free from defects, including smudges, smears, feathering, fade-outs, extraneous ink and other marks.

10.2. Box Maker’s Certificate: When specified on the individual specification, the certification stamp shall indicate that the material meets the material requirements specified as it relates to Item 222 of the National Motor Freight Classification and Rule 41 of the Uniform Freight Classification. Certificate is to be printed on the major bottom flap in proximity and scaled proportionately to the Recycling symbols as listed in section 9.4. See below for reference.
10.3. **Part Number, Revision, and Date Codes:** All parts shall be marked or embossed with the part number, current revision and date of manufacture using standard shop block lettering, unless otherwise specified.

10.4. **Corrugated Recycling Symbols:** A number of countries and regions/states have specific requirements for recycling symbols and markings. To assure use of the proper recycling symbol(s) to meet specific regional requirements, the use of the “Corrugated Recycles” and PAP symbols (as shown below) are to be printed on the major bottom flap in proximity and scaled proportionately to the Box Marker’s Certificate or Statement of Guaranteed Box Compressive Strength.
Appendix A: Definitions
The following definitions were taken from the FIBRE BOX ASSOCIATION handbook.

**ADHESIVE:** Substance capable of adhering one surface to another. For fiberboard boxes, the substance used to hold piles of solid fiberboard together, to hold linerboard to the tips of flutes of corrugated medium, or to hold overlapping flaps together to form the joint or to close a box.

**BANDED UNIT:** A package or unitized/palletized load that has a band or bands (usually plastic) applied to it.

**BASIS WEIGHT/GRAMMAGE:** The measurement of mass per unit area is expressed in pounds per thousand square feet (lbs./1000 ft.² or lbs./msf) or grams per square meter (g/m²). When using certain specifications in the carrier classifications, the combined basis weights of the facings or the combined basis weights of all plies of solid fiberboard must be certified.

Basis weight is an attribute of containerboard, but the values may be determined from the combined corrugated board. When determining the basis weight from combined board, the take-up factor of the corrugated medium, which varies with flute size, and the weight of the adhesive must be considered.

**BENDING:** In the expression "proper bending qualities", the ability of containerboard or combined board to be folded along scorelines without rupture of the surface fibers to the point of seriously weakening the structure.

**BENDING RESISTANCE/FLEXURAL STIFFNESS:** Corrugated board’s ability to resist bending, along with its edge crush resistance, relates to the top-to-bottom compression strength and general performance of corrugated containers.

**BOARD:** Abbreviation for various paperboards. (See also: Boxboard, Chipboard, Containerboard, Fibreboard, Linerboard and Paperboard.)

**BOX:** A rigid container having closed faces and completely enclosing the contents. (See also: Fiberboard Box)

**BOX MANUFACTURE:** An establishment that has equipment to score, slot, print and join corrugated or solid fiberboard sheets into boxes, and that regularly uses that equipment in the production of the fiberboard boxes in commercial quantities.

**BOX MANUFACTURE’S CERTIFICATE (BMC):** A statement printed within a circular or rectangular border on a corrugated or solid fiberboard box guaranteeing that all applicable construction requirement of the carrier classifications have been observed and identifying the box manufacturer.

**BOX STYLES:** Distinctive configuration of a box design without regard to size. A name or number identifies styles in common use.

**BOXBOARD:** The types of paperboard used to manufacture folding cartons and setup (rigid) boxes.

**BUILT-UP:** Multiple layers of corrugated pads glued together to give a desired thickness; normally used for interior packing.

**BULK:** A shipping unit of two or more articles or boxes wrapped or fastened together by suitable means.

**BUNDLE:** A shipping unit of two or more articles wrapped and fastened together by a suitable means.
BURSTING STRENGTH/MULLEN: The force required to rupture linerboard or combined board, using the hydraulic pressure measured by a Mullen tester, related indirectly to the box’s ability to withstand external or internal forces, and to contain the contents during rough handling. This method cannot be used on triple wall combined board and is of limited reliability on double wall, as it is difficult to force the apparatus through the multiple facing simultaneously. When using certain specification in the carrier classifications, minimum burst strength must be certified.

CALIPER: The thickness (caliper) or the board affects flexural stiffness (bending resistance), which in turn affects box compression strength. Caliper multiplied by a constant is an approximate substitution for flexural stiffness in the modified and short form of the compression strength formulas. Caliper measurements before and after box manufacturing – indicating any loss of caliper- are also used as an indirect measure of manufacturing quality. Caliper of a material is usually expressed in thousandths of an inch (mils) or sometimes referred to as “points.”

CARTON (FOLDING CARTON): A folding box made from boxboard, used for consumer quantities of product. A carton is not recognized as a shipping container.

CASE: A box or receptacle, or a filled box. As used by the packaging machinery industry, a corrugated or solid fiberboard box.

CHIPBOARD: A paperboard generally made from recycled paper stock. Uses include backing sheets for padded writing paper, partitions within boxes and the center ply or plies of solid fiberboard.

CLASSIFICATION, FREIGHT: The rules and regulation governing the acceptance of freight in transportation, contained in publications issued by the truck (motor freight) and rail common carriers. The rules describe acceptable forms of packaging for each commodity and specify the minimum requirements for shipping containers. Failure to comply with the rules can result in refusals to carry the freight, penalty increases in freight charges and/or denial of claims for damage.

COMBINED BOARD: A fabricated sheet assembled from several components, such as corrugated or solid fiberboard.

COMPRESSION STRENGTH: Compression strength is a corrugated box’s resistance to uniformly applied external forces. Top-to-bottom compression strength is related to the load a constrainer may encounter when stacked. End-to-end or side-to-side compression may also be of interest for particular applications. While the finished box can be tested, certain tests of centerboard (ring crush and short span compression) and combined board (edge crush and flexural stiffness) can be used to predict the compression strength of the finished box.

CONTAINER: A receptacle used to contain or hold goods. In shipping, usually the outer protection used to package goods.

CONTAINERBOARD: The paperboard components (linerboard, corrugating material, filler chip) used to manufacture corrugated and solid fiberboard. The raw materials used to make containerboard may be virgin cellulose fiber, recycled fiber or a combination of both.
CORRUGATED BOARD OR CORRUGATED FIBERBOARD: The structure formed by gluing one or more sheets of fluted corrugated medium of one or more flat facings of linerboard. There are four common types:

- **SINGLE FACE:** Combination of one fluted corrugating medium glued to one flat facing of linerboard.
- **SINGLE WALL:** Two flat facings of linerboard, one glued to each side of a corrugated medium. Also known as Double Face.
- **DOUBLE WALL:** Three flat facings of linerboard, one glued to each side of two corrugated mediums.
- **TRIPLE WALL:** Four flat facings of linerboard, one glued to each side of three corrugated mediums.

CORRUGATING / CORRUGATED MEDIUM: The type of paperboard used in forming the fluted portion of the corrugated board.

CORRUGATION: (See Flute)

CORRUGATOR: A machine that unwinds two or more continuous sheets of containerboard from rolls, presses flutes into the sheet(s) of corrugating medium, applies adhesive to the tips of the flutes and affixes the sheets(s) of linerboard to form corrugated board. The continuous sheet of board may be slit to desired widths, cut of to desired lengths and scored in one direction.

CRUSH RESISTANCE/COMPRESSION STRENGTH: The force necessary to crush a small on-edge sample of containerboard may be used to predict the edge crush resistance (ECT value) of the combined board and the compression strength of the completed container. The industry recognizes two measuring techniques. **Ring Crush** values are most accurate for containerboard with basis weights between 42 and 69 lbs./msf. **Short Span Compression** test values are most accurate for containerboard with basis weights above 20 lbs./msf. The Short Span Compression test is commonly called STFI, the acronym (in Swedish) for the Swedish Pulp and Paper Research Institute that developed the testing apparatus.

DIE CUT: The act of cutting raw material (such as combined board) to a desired shape (such as a box blank) by using a die.

DIMENSIONS: The three measurements of a box, given in the sequence of length, width, depth. Inside dimensions are used to ensure proper fit around a product. Outside dimensions are used in the carrier classifications and in determining pallet patterns.

- **LENGTH:** The larger of the two dimensions of the open face of a box as it is set up to receive product (after closing the joint).
- **WIDTH:** The smaller of the two dimensions of the open face.
- **DEPTH:** The distance measured perpendicular to the length and width.

FACINGS: Sheets of linerboard used as the flat outer members of combined corrugated board. Sometimes called inside and outside liners.

FIBRE BOX OR FIBREBOARD BOX: A shipping container made of corrugated or solid fibreboard.

FIBREBOARD: A general term describing combined paperboard (corrugated or solid) used to manufacture containers. (See also Combined Board).

FLAPS: Extensions of the side walls that close a box.


FLUTE or CORRUGATION: The wave shapes pressed into corrugated medium. A, B, C, E and F are common flutes, along with a variety of much larger flutes and smaller flutes.
FLUTE (or CORRUGATION) DIRECTION: The normal direction of flutes is parallel to the depth of the box, so that they are vertical when the box is stacked for shipment. In end-opening and wrap-around box styles, the flute direction may be parallel to the length and width, resulting in a “horizontal corrugation box.”

FOUR-COLOR PROCESS/PROCESS PRINTING: Full-color images are created by four halftones, using the four subtractive primary colors, cyan, yellow, magenta, and black.

GLUE: In the carrier classifications, a synonym for “adhesive”.

GLUED (FIRMLY): Adherence of one surface to another with sufficient bonding that an attempt to separate the joined areas will result in mutilation of surface fibers.

INCLINE IMPACT DAMAGE RESISTANCE: to determine a container’s structural ability to protect heavy contents, the filled container is allowed to slide down an incline. Then the box’s various faces and edges strike a stop wall. The container and contents are inspected for damage. Generally, the test is conducted on containers weighing more that 100 lbs. (45kg.) as an alternative to the drop test.

INNER PACKING: Materials or parts used to support position or cushion an item within a shipping container, to support the corners or top of the container, or to fill voids.

ITEM 222: A rule in the National Motor Freight Classification of the motor common carriers containing requirements for corrugated and solid fibreboard boxes. Used for the specific rule, and sometimes for the series of related rules designated Items 222, 222-1, 222-2, 222-3, 222-4, 222-5, and 222-6.

JOINT (MANUFACTURER’S JOINT): The part of the box where the ends of the scored and slotted blank are joined together by taping, stitching or gluing.

KRAFT: Word of German origin strength; designates pulp, paper or paperboard produced from wood fibers by the sulfate process. Natural kraft has a characteristic light brown appearance.

KRAFT, FOURDRINIER: Containerboard, typically of multi-ply formation (although sometimes with a single ply), made from kraft pulp on a Fourdrinier machine.

LABEL: A separate slip or sheet of paper affixed to a surface for identification or description. For fiberboard boxes, includes:

- **FULL LABEL**: A printed sheet of paper laminated to and covering the entire surface of the box blank. Usually used to add fine-screen, four color illustrations that cannot be achieved with the direct printing on the porous paperboard surface.

- **SPOT LABEL**: A printed sheet covering a portion of the surface of the box blank. May cover a portion of one panel, a full panel or several panels of the box.

LAMINATOR: A machine which adheres multiple plies of paper or fibreboard. May be used to adhere full labels to a facing, or, for enhanced structural properties, multiple facings, corrugating mediums or sheets of combined board.

LINER: A creased fibreboard sheet inserted in a container and covering all side walls. Used to provide extra stacking strength or cushioning. Also used as a short hand for “linerboard” of “facing”.
LINERBOARD: Paperboard used for the flat outer facings of combined fibreboard; and the outer plies of solid fibreboard.

LINERBOARD, FULL BLEACHED: Single or two-layer, uncoated linerboard consisting of bleached fibers throughout.

LINERBOARD, WHITE RECYCLED: A two-layer, uncoated linerboard. The top layer is composed of recovered office paper and the bottom layer is unbleached fibers.

LINERBOARD, WHITE-TOP OR MOTTLED: A two-layer, uncoated linerboard. The top layer is composed of bleached fibers and the bottom layer is unbleached fibers.

LITHO or LITHOGRAPHY: A printing process using a plate that has been chemically treated so that the image to be printed is receptive to ink, while blank areas repel ink. Used primarily for fine reproduction, including labels for fiberboard boxes.

LOOSE: Articles not in a box, package or other container. (See also BULK)

MANUFACTURE'S JOINT: (See Joint)

MASTER PACK or MASTER BOX: A shipping container used to overwrap or contain a number of individual containers.

MEDIUM: (See Corrugated Medium)

MULLEN TEST: (See Burst Strength)

OFFSET: A printing technique in which the inked image is transferred from the plated to a clean cylinder, which in turn transfers the image to the sheet of paper or paperboard. The term is usually combined with the printing method, as in offset lithography.

OVERLAP: A design feature wherein the top and/or bottom flaps of a box do not butt, but extend one over the other. The amount of overlap is measured from flap edge to flap edge.

PAD: A corrugated or solid fibreboard sheet or sheet of another authorized material, used for extra protection or for separating tiers or layers of articles when packed for shipment.

PALLETIZING: Securing and loading containers on pallets for shipment as a single unit load, typically for handling by mechanical equipment.

PANEL: A “face” or “side” of a box.

PAPERBOARD: One of the two major product categories of the paper industry. Includes the broad classification of materials made of cellulose fibres, primarily wood pulp and recycled paper stock, on board machines. The majority types are containerboard and boxboard. (The other major product group of the paper industry is paper including printing and writing papers, packaging papers, newsprint, and tissue.

PARTITIONS: A set of corrugated or solid fibreboard or chipboard pieces that interlock when assembled to form a number of cells into which articles may be placed for shipment.

PLY: Any of the several layers of linerboard or solid fibreboard.

POINT: Term used to describe the thickness or caliper of paperboard, a point being one thousandth of an inch.
**PREPRINT:** A web (roll) of linerboard that has been printed and re-wound prior to the manufacture of combined board. Use requires special equipment on a corrugator to assure precise slit, score and cut-off operations.

**PUNCTURE RESISTANCE:** The puncture resistance of combined board indicates the ability of the finished container to withstand external and internal point pressure forces and to protect the product during rough handling. This method is used on heavy double wall and triple wall as an alternative to burst.

**RAIL RULE 41 or RULE 41:** A rule in the Uniform Freight Classifications of the rail carriers containing the requirements for corrugated and solid fiberboard boxes.

**RECYCLABLE:** Packaging materials that may be processed through a number of treatments or changes in order to be reused.

**SCORE or SCORELINE:** An impression or crease in corrugated or solid fibreboard made to position and facilitate folding.

**SEAM:** The junction created by any free edge of a container flap or panel where it abuts or rests on another portion of the container and to which it may be fastened by tape, stitches or adhesives in the process of closing the container. (See also Joint).

**SHEET:** A rectangle of combined board, trimmed or untrimmed, and sometimes scored across the corrugations where such operation is done on the corrugator. Also, a rectangle of any of the component layers of containerboard, or of paper or a web of paperboard as it is being unwound from the roll.

**SHIPPING CONTAINER:** A container which is sufficiently strong to be used in commerce for packing, storing and transporting commodities.

**SLIP SHEET:** A flat sheet of material used as a base upon goods may be assembled, stored and transported.

**SLIT:** A cut made in a fibreboard sheet without removal of material.

**SLIT-SCORE:** A cut made in a fibreboard sheet extending through only a portion of the thickness.

**SLOT:** A wide cut, or pair of closely spaced parallel cuts including removal of a narrow strip of materials made in a fiberboard sheet, usually to form flaps and permit folding without bulges caused by the thickness of the material. Common widths are 6mm (.25 inch) and 9mm (.375 inch).

**STANDARD TEST CONDITIONS:** Atmospheric conditions of temperature and humidity in which laboratories agree to conduct tests, eliminating those variables in comparing results.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Temperature</th>
<th>Relative Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>73 Degree +/- 2 F</td>
<td>50% RH +/- 2.5% RH</td>
</tr>
<tr>
<td>High Humidity</td>
<td>73 Degree +/- 2 F</td>
<td>85% RH +/- 2.5% RH</td>
</tr>
<tr>
<td>Cold Storage</td>
<td>40 Degree +/- 2 F</td>
<td>85% RH +/- 2.5% RH</td>
</tr>
<tr>
<td>Tropical</td>
<td>90 Degree +/- 2 F</td>
<td>90% RH +/- 3.0% RH</td>
</tr>
</tbody>
</table>

**STITCHING OR STAPLING:** Metal fasteners used to seal the joint of a boxes or to close the flaps. Staples are preformed, and the tines are closed as the pierce the box. Stitches are machine formed using wire drawn from a spool.

**TAPE:** A narrow strip of cloth, paper or plastic, sometimes having a filler or reinforcement, coated on one side with an adhesive, used to seal the joint or flaps of a fibreboard box or to close or reinforce a box.
TUBE: A sheet of combined board, scored and folded to a multi-sided form with open ends. It may be an element of box style or a unit of interior packing that provides protection and compression strength.

UNTIIZED LOAD: A load of a number of articles or container, bound together by means of tension strapping, plastic shrink or stretch films.

VIBRATION DAMAGE RESISTANCE: The shipping container’s ability to protect the contents from vibration damage is evaluated by subjecting it to various types of motion (rotary, linear, sinusoidal, or random wave forms). Inspection helps identify any problems such as resonance of the product or package, abrasion of the contents.

WARP: Wrap is a deviation from the original or true plane of the surface. Excessive warp may cause crushing of the corrugated medium during automated printing. Box blanks or sheets made from warped board may jam or may not feed properly in converting equipment or from the hopper of automatic packaging machinery.

WEB: A continuous sheet of paperboard of paper.

WEIGHT OF FACINGS: The sum of the weights per 1,000 square feet of all facings of combined board, excluding the weight of corrugated medium, corrugating adhesive and coatings or impregnants. Usually cited as the minimum combined weight of facings of combined board.

WRAP-AROUND BLANK: A scored and slotted sheet of corrugated fiberboard that is formed into a box by folding it around its contents. The user makes both the flap and joint closures.