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1. Scope

The objective of this document is to establish Schréder’s instructions and best practices and standardize the requirements and expectations for all packaging solutions designed for Schréder products and their accessories, to be implemented by third party suppliers of Schréder Group. These instructions and best practices aim to safeguard Schréder products from environmental impacts during storage, transportation and other handlings until their installation.

The complete packaging solution must be designed to accommodate the following transportation methods:
- Road Transport (truck).
- Ocean Freight
- Air Freight.

Unless otherwise specified by Schréder, general instructions for the palletizing shall be:
- Optimize palletizing for fully loaded trucks or 20ft and 40ft containers.
- Ensure that the palletizing height does not exceed 2.2m.
- Use over-stacking (pallet over pallet) when necessary.
2. Packaging
   
a. General Packaging Guidelines
   
All packaging components must be free of dirt, dust, oil, and other contaminants to ensure safe handling, storage, and transportation of the products. Schréder products shall be packaged efficiently to protect both the products and the personnel handling the packaging.

Product packaging shall provide adequate protection to ensure that the product will be delivered free of damages.

Continuous efforts will be made to design packaging in a way that uses as little material as possible. Whenever possible or where mandated by law, sustainable materials will be used (ex. paper instead of plastics). Specific attention shall be brought to using the entire pallet so that trucks and contains are utilized to their full capacity. These measures will participate to Schréder goal to reduce CO2 emissions.

b. Packaging Testing Procedure Methods

The Supplier shall ensure the following methods and tests have been applied to the packaging material – and where required by Schréder, such compliance shall be evidenced in writing:

   i. Product packaging shall be submitted to shock, vibration, compression, temperature, and weather extremes conditions tests that the product packaging could encounter through its supply chain cycle.
   
   ii. Unless otherwise agreed in writing with Schréder, Supplier shall apply the following test procedure: ISTA test standards, *(International Safe Transit Association – see link: ISTA Guidelines).*
   
   iii. Packaging prototypes must be validated and tested with physical samples prior to mass production.

   iv. Supplier(s) shall provide packaging test report on written request of Schréder evidencing that the packaging materials have been tested according with this article and passed according to the below criteria:

   1. For parcel (single unit) testing – 3 to 5 box samples needed for compression testing, drop vibration and impact.
   2. For palletized load testing - enough boxes to form a complete pallet according to palletization design.
   3. For products shipped nationally as single units via parcel, ISTA 1A shall be conducted.
   4. For products shipped internationally as single units via parcel, ISTA 2A shall be conducted.
   5. For products shipped nationally as unified load on a pallet, ISTA 1E shall be conducted.
   6. For products shipped internationally as unified load on a pallet, ISTA 3E shall be conducted.

   c. Packaging materials

The Supplier shall ensure the following instructions shall be complied with for all packaging materials supplied to Schréder:
i. Corrugated paperboard: Boxes, Inserts, Dividers, Buffers and corrugated sheets
   1. Corrugated material(s) shall be specified by its/their ECT (or BCT) and Burst values as the primary requirement.
   2. Supplier shall follow Schréder’s corporate marketing department instructions for the corrugated box artwork.
   3. Packaging recycling markings shall be applied in accordance with international packaging laws and regulations (example, but not restricted to: EU-Packaging and Packaging Waste Regulation).

ii. Product boxes
   1. A made-to-measure cardboard box shall developed for each luminaire/product. However, if the dimensions of various products are marginally different only and the box offers optimal palletisation, the same box may be used for different products in an effort to reduce complexity in the production, procurement and supply chain processes.
   2. For each new product, drawings and physical samples of the proposed design shall be communicated to Schréder beforehand and may only be used after written validation by Schréder.
   3. Boxes shall be made of corrugated paperboard in natural color. Corrugated material type, ECT (or BCT) and burst values shall be defined by Supplier according to product’s functional requirements (ex. product weight, dimensions, palletisation specification, transportation methods, etc.).

iii. Packaging Inserts
   1. Where required, insert(s) and/or other internal components (“Inserts”) will be designed and placed into the box to keep the product in a stable position, to avoid unwanted movement during transportation and/or to protect parts of the product from damage.
   2. Inserts should be constructed of corrugated fiberboard. Shape, flute type and material strength shall be defined based on product functional requirements (see above – product boxes).
d. **Wood materials (for pallets and crates)**

1. For international shipments and in order to comply with laws and regulations, all pallets and crates shipped internationally shall be heat treated following the ISPM15 requirements. Fumigation shall be avoided at all times.

2. Depending on the size and weight of the goods, pallets in standard sizes should be used. Pallets sizes adapted to box dimensions could be used where it provides better pallet utilization. In most of the cases 4-way EUR or UK pallets are suitable, but to optimize the truck or vessel load, custom pallet dimensions could be necessary.

3. Default material shall be wood. Upon written agreement of Schréder, other material as pressed wood and/or plywood may be used provided they can support and secure the product during transportation and handling.

4. Boxes shall be contained within the confines of pallet and there shall be no overhang (unless otherwise agreed by Schreder).

![UK and EU Pallet Dimensions](image)

---

**e. Plastic materials**

i. Bags, foils, foam inserts, bubble wrap, stretch wrap when used, shall be marked with the appropriate recycling logos, in accordance with laws and regulations. Also, when feasible, plastic materials should contain Post Consumer Recycled (PCR) content or replaced by 100% biobased/biodegradable materials. Oil based materials and/or additives are NOT allowed in biobased/biodegradable materials.

ii. EPS (expanded polystyrene foam) shall not be used. When foam inserts are required to be used to protect the product, then alternative monomer materials like EPE (Expanded Polyethylene) and cross-link PE (Polyethylene) foams shall be used.

iii. Bubble wrap should be avoided and alternative environmentally friendlier materials should be used.

iv. When ESD (Electrostatic Discharge) protection are required for a product, the appropriate ESD materials shall be used depending on the product's requirements and sensitivity.
f. Tape
i. All boxes shall be sealed to avoid packaging failures during transportation and storage. Pressure sensitive – preferably transparent - tapes (polypropylene), or reinforced water activated kraft paper gummed tapes shall be used. Tapes must be a minimum of 48mm wide and should apply with a 48mm overlap on the sides of the box.
ii. Supplier shall take in consideration the application with a handheld carton sealer or for semi-, full-automated industrial equipment when choosing the materials.

g. Packaging Labeling requirements
i. Supplier must ensure that all materials/packages are correctly labelled, in accordance with laws and regulations, and that the labels are properly printed and attached.
ii. Label Stock/Material
   1. This subsection applies to packaging labels (product and shipping labels are excluded from this subsection).
   2. Label stock for package labeling shall be constructed from a thermal transfer material (direct thermal labels are not acceptable), with a permanent adhesive backing. The print shall remain readable at all times.
   3. Only the Schreder logo mentioned below in this document will be printed on the label, unless otherwise specified in writing by Schreder.

h. Transportation Packaging materials
i. Corner boards and other reinforcements
   1. Corner boards and edge protectors shall be made of pressed cardboard, cut to proper length before wrapping the pallet and placed to corners and top edges.
   2. Pallet size flat cardboard should be placed between the pallet and the bottom box layers to distribute the load, where necessary to reinforce the load on the pallet.

ii. Straps/Banding
   1. PP or PE straps/banding shall be used - mostly under the stretch wrap layers - for secure and robust palletizing. Consider manual, semi-automated or automated strapping machines when applying the straps/banding.

iii. Stretch wrap
   1. All pallets shall be stretched wrapped prior to shipment to ensure load stability during transportation.
   2. Stretch film/wrap used during palletizing shall be transparent to allow visibility of all labels.
3. Printing and marking

Schréder branding elements, company fonts and other markings shall be printed on the box in black colour only.

The Product name should not be printed on the packaging unless otherwise specified. For example, due to contractual agreement(s) with the end customer. The Supplier will be informed in advance in these special circumstances.

- **Schréder branding**
  
  The Schréder logo must not be altered in any manner. It will be supplied to the packaging provider in either a .ai or .svg vector graphic format file.

- **Fonts**

  In exceptional cases when the Product name needs to be printed on the box, the Product name shall be printed in all capital letters, with the Work Sans Bold font (which can be downloaded for free from Google fonts: [https://fonts.google.com/specimen/Work+Sans](https://fonts.google.com/specimen/Work+Sans))

**Dimensioning and position of branding**

a. **Standard type box**

L and H (length and height) are the two parameters which define the size of the printing. Calculate Z according to below equation.

\[
Z = \frac{L + H}{4,3}
\]

\[
A = Z \times 0,86
\]
Resize the “Schréder - Experts in Lightability™” logo, while maintaining its proportions, in a way that the logo stretches until “Z” length.

Dimension “A” resulted from the proportion of the graphics or could be calculated with the equation above.

\[ X: \frac{A}{2} \]

\( X \) - is the distance from the left edge of the packaging until the beginning of the Schréder logo and is equal to the distance from the letter “r” in Schréder and the beginning of the name of the product.

\[ Y: \text{height of Schréder Experts in Lightability™ logo} \]

\[ S: \frac{Y}{2} \]

S - half of the height of the logo

\[ B: \frac{H}{2} \]

Centre the brand name “Schréder” height wise (H) of the packaging.

If the product name is printed on the box or various products could be packaged in the same box, the following rules are to be considered:

- Checkbox to be printed before the product name. The proper one will be ticked in production to indicate content.
  \[ C: \text{is the distance between “Schréder” and “Experts in Lightability™” (please see the example above of how to use it).} \]

- Font for the product name is Work Sans Bold (which can be downloaded for free from Google fonts: [https://fonts.google.com/specimen/Work+Sans](https://fonts.google.com/specimen/Work+Sans)).
  \[ D: S \times 0.85 \]
  \[ D - \text{height of small character} \]

b. Square type box

Follow the same guidelines as for the standard box.

\[ X: \frac{A}{2} \]

\( X \) - is the distance from the left edge of the packaging until the beginning of the Schréder logo. It is also equal to the distance from the bottom of the name “Schréder” until the bottom of the first product name.
Other markings

Further marking should be printed on the surfaces of the box, independently from its shape, such as:

- Transportation markings;
- Recycling markings;
- Packaging’s part number - to the short flap;
- Delivery label position outline – box size dependent, optional.

Transportation markings

Arrow up, Fragile glass and Umbrella are mandatory, stacking instruction recommended if stacking is possible. Minimal size 35x35mm, 15mm from top right edges.

Recycling markings

Both arrows are mandatory, raw material identifier (PAP 20) also. Minimal size 20x20mm, 15mm from bottom right edges.

Recycling markings can be printed, stamped, pin perforated or cut-out.

3. Minimal pictogram height: 15mm.
Packaging’s part number

To be printed with 15-20mm high letters, centralised, to at least one of the short top flaps. It allows easy identification in warehouse.

Delivery label position outline

Box size dependent, optional. If fits, to be printed at least on a short side, dimension 182x103mm.
4. Stacking and palletization

Supplier shall design and deliver the stacking / palletization scheme (in the form of a printable PDF document), based on the provided requirements mentioned above.

This scheme must contain:

- Design of single unit box with proper raw material (flute type), CtQ (Critical to Quality) specifications: dimension (internal box dimensions), ECT or BCT and Burst values and printing indications. See chapters above
- Proposal for one or more optional pallet dimension/s with the optimized truck load in focus
- Maximum stacking height is up to 2.2meters. Depends on box dimensions, single stack or double stack (pallet-over-pallet) must be considered.
- Stacking proposals for both cases, Column and Interlocking stacking
- Calculations: which shows the number of boxes per layer, number of layers, number of boxes per pallet.
- Weight of single box including product
- Sum weight of palletized goods
5. Appendix

Typical flute types (Source: ILKE ambalaj)

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<thead>
<tr>
<th>Wave Type</th>
<th>Profile</th>
<th>Wave High (mm.)</th>
<th>Wave Length (mm.)</th>
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<tbody>
<tr>
<td>E</td>
<td></td>
<td>1.0 – 1.8</td>
<td>3.0 – 3.5</td>
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</table>

Because of the high number of flutes in the metric, E wave gives excellent crush resistance and compression strength. It provides a high quality surface to print upon and is most commonly used in smaller cartons and die-cuts applications.

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<th>Wave High (mm.)</th>
<th>Wave Length (mm.)</th>
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<tbody>
<tr>
<td>B</td>
<td></td>
<td>2.2 – 3.0</td>
<td>5.5 – 8.5</td>
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</table>

The B wave is one of the most common type of fluting. Seen in all types of applications including die-cut and regular boxes it gives a good all-round performance. Due to the low thickness of the wall, the surface is very resistant to crushing due to the more frequent waves, despite the lack of resistance in the vertical load. It gives quite good results in printing.

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<tbody>
<tr>
<td>C</td>
<td></td>
<td>3.2 – 4.0</td>
<td>6.8 – 8.0</td>
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This type of flute is a good carrier and gives good results in printing. Although it has been fighting against the B flute for a long time, its use is increasing in our country and in the whole world.

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<tbody>
<tr>
<td>EB</td>
<td></td>
<td>3.2 – 4.5</td>
<td>E: 1.25 B 2.4</td>
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This type of wave is a combination of the popular B wave and the E waves is called the micro double wall. It is has 5 layers.

The results of the combination. E and B flute give an excellent performance level in both print finish and impact protection. The products with this specification are used for fragile, sensitive and not very rigid items.

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<th>Profile</th>
<th>Wave High (mm.)</th>
<th>Wave Length (mm.)</th>
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</thead>
<tbody>
<tr>
<td>BC</td>
<td></td>
<td>5.5 – 6.5</td>
<td>B:2.4 C:3.6</td>
</tr>
</tbody>
</table>

The double wall (5 layers) BC wave carton is one of the most consumed product in the packaging market.

The cost of the double wall is less expensive and cost friendly than the other packaging types and it is the preferred choice as it provides a suitable transportation method for the your product safety.