TECHNICAL SPECIFICATIONS
STANDARD PACKAGING

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Ind. ex

1. PURPOSE

The purpose of this packaging specification is to define the minimum requirements to ensure product preservation and, at the same time, efficiency, ease of use, and safety for operators. It is the supplier's responsibility to ensure that their parts arrive at ZAPI GROUP in good condition and ready for production.

The supplier provides the packaging specifications, which must be approved by ZAPI GROUP during PPAP approval or before series production.

2. APPLICABILITY

These specifications must be applied to all products delivered to a ZAPI GROUP plant or delivery points indicated by ZAPI GROUP (e.g., subcontractors or external logistics). Cases where special packaging is required will be handled with specific local requests.

3. DEFINITIONS

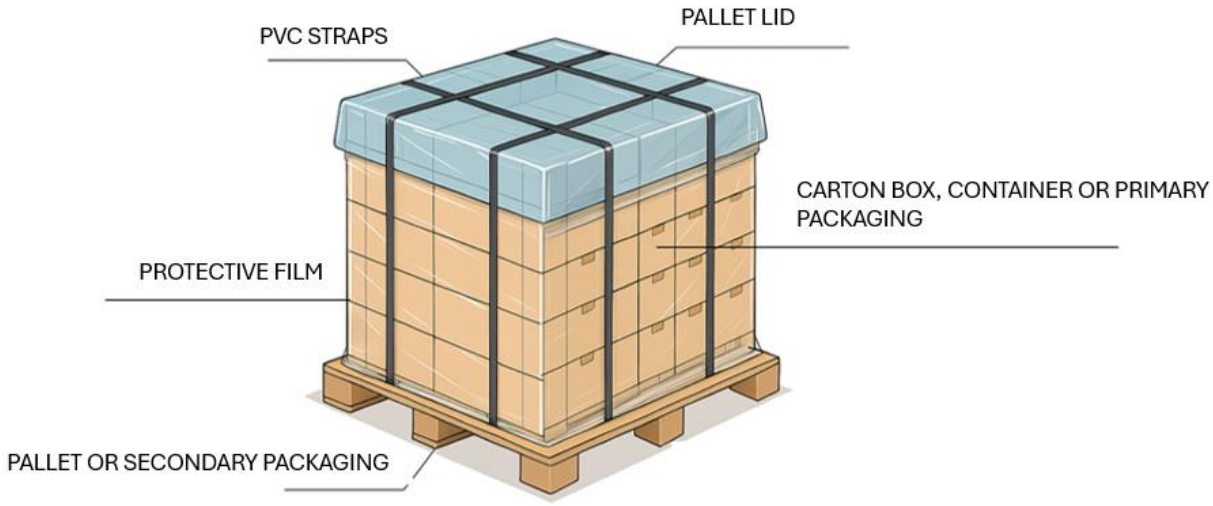

Figure 1

Figure 2

4. STANDARD PACKAGING

4.1 GENERAL

1. **Pallet Type**
   - The required type is Euro pallet or half Euro pallet (EPAL1 or EPAL6). Other types of pallets require approval.
2. **Box Weight**
   - Individual boxes must not exceed a gross weight of 15 kg, except in specific cases mentioned in the following paragraphs.
3. **Grouping of Codes**
   - **Single-code packaging**: In the same shipment, packaging should preferably be single-code, i.e., contain only one type of product per package.
   - **Code aggregation**: If it is not possible to use single-code packaging, the products must still be aggregated by code, avoiding distributing the same code across several different packages in the same shipment.
4. **Packaging Safety**
   - Packaging must not pose any safety risks to operators (exposed nails, metal bars, wood splinters, etc.).
5. **Component Protection**
   - Components must be protected with a suitable plastic bag, separation sponges, or similar. The use of polystyrene chips is not permitted.
6. **Protection from Transport Damage:**
   - If the dimensions require single packaging, a system must be implemented to prevent the item from moving during transport.
   - Small boxes must be palletized or packed inside a larger container, suitable for protecting them and preventing movement during transport.
   - Goods transported by sea in containers must be properly secured and reinforced to prevent movement of the load.
   - The use of wooden reinforcements, PVC strapping, and bands is required to ensure stackability during transport.
7. **Stackable Packaging**
   - Stackable packaging is preferable for space saving.
8. **Protection against Contaminants**
   - Please refer to section 4.3 Protection against Contaminants.

9. **Bolts**
   - Small boxes must always be used for bolts and nuts – further specifications are provided in section 4.5.

4.2 RETURNABLE PACKAGING

Returnable packaging refers to containers owned by Zapi Group or suppliers that are used multiple times to deliver components through the supply chain. Returnable containers can be made from various materials, including plastic, steel, wood, and even corrugated cardboard.

Returnable containers for shipments must be examined and approved prior to production by the relevant ZAPI Group facility.

4.3 CLEANING AND PROTECTION FROM CONTAMINANTS

Objective: To ensure that components received are free from physical, chemical, and biological contaminants that could compromise the functionality, safety, or quality of the final product:

- Supplier's Packaging Environment:
  - The supplier must ensure that packaging takes place in a clean and controlled environment.
  - Training of supplier personnel in cleaning and contamination prevention practices is recommended.
- Packaging must provide complete protection from all environmental contaminants, including dust, moisture, and any corrosive agents.
- All packaging and parts in contact with the components contained therein must be perfectly clean and completely free of any type of contaminant or residue.
- Protection must be effective under all environmental conditions during transport (temperature, atmospheric pressure, humidity, vibrations).
- Components must be free from corrosion and rust through appropriate preservation methods, such as volatile corrosion inhibitors (VCI).
- ESD boxes and lids must be free of water, oils, greases, resins, and any type of residue such as dust, processing debris, or metal particles before entering the Supplier's production areas and subsequent processing stages.
- The use of hygroscopic filling materials such as the following is strictly prohibited:
  - Wood shavings
  - Waste paper
  - Polystyrene chips
- Any protection applied to or in contact with the products must be approved by Zapi.

In the event of contamination, ZAPI will isolate the material pending notification and return it to the supplier in accordance with non-compliance management procedures.

5. PACKAGING SPECIFICATION

5.1 GENERAL PACKAGING SPECIFICATIONS

Only one code per container is allowed.

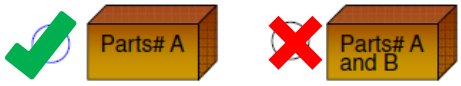

Figure 3

Do not place heavier parts on top of lighter ones.

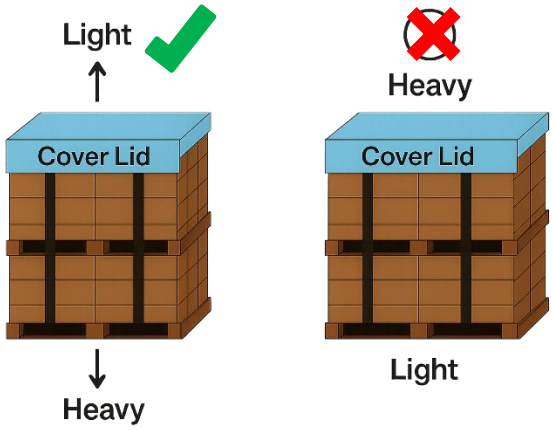

Figure 4

- Do not stack the pallet directly on the cardboard; use an appropriate cover.
- Pallets must be properly wrapped or strapped.
- Ensure that all labels are clearly visible on the sides of the primary and secondary packaging.

5.2 PACKAGING SPECIFICATIONS – PALLET or SECONDARY PACKAGING

Pallet Type	Overall Dimensions (including packaging) L x W x H mm	Maximum Gross Weight (including packaging)
EPAL1	1200 x 800 x 960 mm	Max 700 kg
EPAL6	600 x 800 x 960 mm	Max 350 kg

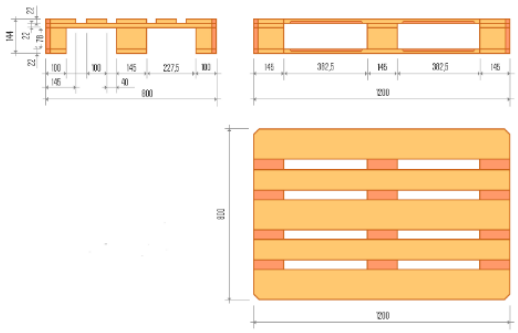

Figure 5 – EPAL1 Example

Type of outer packaging:

- The required type is Euro pallet or half Euro pallet (EPAL1 or EPAL6). Other types of pallets require approval.
  - EPAL1 https://www.epal-pallets.org/eu-en/load-carriers/epal-euro-pallet
  - EPAL6https://www.epal-pallets.org/eu-en/load-carriers/epal-6-half-pallet
- The requirements of import/export regulations regarding packaging conditions must always be complied with. (Example ISPM-15)
- Wooden crates with removable sides (for heavy metal components) with lids that allow for 1+1 stacking.
- Cardboard boxes with protective film for other parts. See the example images below.
- The use of wooden reinforcements, PVC strapping, and bands is required.

Figure 3

Figure 4

Other general information:

- Each pallet must be correctly identified with its contents using appropriate labels as described in the relevant section of this document (Section 6. Packaging Identification).
- The packaging must not pose any safety risks to operators (exposed nails, metal bars, wood splinters, etc.);
- Stackable packaging is preferable to save space.
- Containers for sea transport must be secured and reinforced to prevent movement of the load.
- The use of polystyrene chips is not permitted.

5.3 PACKAGING SPECIFICATIONS – BOXES OR PRIMARY PACKAGING

Maximum gross weight:

Individually handled boxes must not exceed a gross weight of 15 kg;

Overall dimensions (max):

- L x W x H 600 x 400 x 400 mm (including packaging)

Type of outer packaging: Double-wall corrugated cardboard boxes with reinforced corners to ensure greater resistance during transport.

Figure 5

Other general information:

- Each box must be correctly identified, as must its contents, using a specific identification label as described in the relevant section (6. Packaging Identification).
- Components must be protected from damage with a suitable plastic bag or separation sponges or similar.
- If the dimensions require single packaging, a system must be provided to prevent the item from moving during transport.
- Small boxes must be palletized or packed inside a larger container suitable for protecting them and preventing movement during transport.

5.4 PCB PACKAGING SPECIFICATIONS

PCB packaging must be prepared in accordance with the following requirements:

- Shrink wrap packaging
- Silica gel mandatory for each package (not required for IMS)
- HIC (Humidity Identification Card) mandatory for each box (not required for IMS)
- Maximum 20 panels per heat-shrink film.

5.5 (ESD) COMPONENT PACKAGING SPECIFICATIONS (Product Category: PCBA, ELECTRONIC PARTS)

All components requiring ESD treatment must be packaged in accordance with the following standards:

- IPC-J-STD-033 (Handling, Packing, and Use of Moisture Sensitive Devices)
- IEC 61340-5-1 / 61340-5-2 / ANSI/ESD S20.20 (Protection of Electronic Devices from Electrostatic Discharge Phenomena)
- EIA Standard 481 (Carrier Taping of Surface Mount Components for Automatic Handling)
- EIA Standard 783 (Orientation Standard for Multi-Connection Package)

5.5.1 PCBA PACKAGING SPECIFICATIONS

Maximum gross weight:

Individually handled boxes must not exceed a gross weight of 15 kg;

Maximum dimensions of ESD boxes:

L x W x H mm 600 x 400 x 360 mm (External Dimensions)

General PCBA Packaging Specifications:

- Each box or crate must be correctly identified with its contents and must have a single part number, except in authorized exceptional cases.
- When using cardboard boxes, part numbers must be placed in ESD envelopes or packaging.
- When using returnable ESD containers:
    - Each crate must have its own lid and be correctly identified **(see section Packaging Identification).**
    - Crates must be cleaned before being reused and returned to the production cycle.

Type of outer packaging:

- **ESD Box**

ESD boxes are the preferred standard packaging type for ZAPI. Each box must have its own lid (see image 1); boxes without lids are not permitted. ESD boxes and lids must be free of water, oil, grease, resin, and any type of residue such as dust, processing debris, or metal particles before entering the Supplier's production areas.

Figure 6

- **Carton Box**

This type of packaging is considered acceptable by ZAPI as a backup solution if ESD boxes are not available. Cardboard boxes must be single-use and shielding bags are mandatory (see figure 10).

Figure 7

Types of Internal Protection:

- **ESD Shaped Tray Plate**

This type of packaging is recommended to minimize the risk of mechanical damage during transport (see image 11).

Figure 8

- **Separators**

This type of packaging is recommended to minimize the risk of mechanical damage during transport (see Figure 12 and Figure 13).

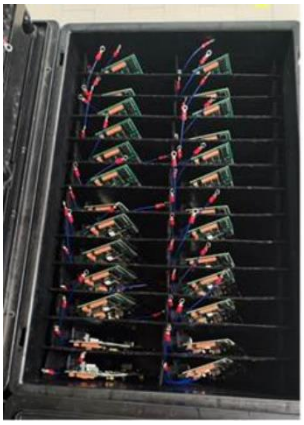

Figure 10

Figure 9

5.5.2 PACKAGING SPECIFICATIONS FOR ELECTRONIC COMPONENTS

Identification and Traceability:

Each level of packaging must be correctly identified with batch references, manufacturer's name or logo, date code, part number, barcode/square code, MSL level, and quantity of pieces.

Prevention of counterfeiting risks:

- Packaging must always be original as supplied by the manufacturer.
- Non-original packaging will be refused unless agreed in advance with ZAPI.

5.6 PACKAGING SPECIFICATIONS FOR SMALL PARTS (PRODUCT CATEGORY: SCREWS, BOLTS, WASHERS)

Maximum gross weight:

Individual boxes must not exceed a gross weight of 10 kg;

Maximum dimensions of single packaging:

L x W x H 160 x 90 x 100 mm (including packaging)

Type of outer packaging:

Cardboard box

Other general information:

- Each box must be correctly identified with its contents (ZAPI code).
- Components must arrive free of corrosion and rust through the use of appropriate preservation methods (any type of protection applied to the surface of the products must be approved by Zapi), such as volatile corrosion inhibitors (VCI).
- Multiple packages must be palletized or packed inside a suitable container to protect them and prevent movement during transport.

6. PACKAGING IDENTIFICATION

This guideline describes the ZAPI Group's labeling requirements (GTL Global Transport Label) and contains the technical specifications necessary to implement the GTL.

The guideline specifies the label, label positioning, field, and content of barcodes or data matrices in accordance with VDA 4994.

The use of the GTL format serves to clearly identify pallets or boxes, optimize processes in the goods receiving area (without the need for relabeling), and continuously track goods throughout the entire supply chain (traceability), including production lines.

6.1 LABELING SPECIFICATIONS:

For pallets, the horizontal A5 format must be used. It can be designed as an insert label (if a suitable frame/support is available) or as a self-adhesive label. Depending on the type, the following specifications must be observed

Label types:

- **Master Label for Homogeneous Pallets**: The pallet contains individual boxes that all have the same part number. The individual boxes have separate individual labels: a single label indicates the label on the box, i.e., the innermost packaging unit containing the parts.
- **MIX Label for Mixed Pallets (mixed label):** The pallet contains individual boxes that do NOT all contain the same part number. The individual boxes are equipped with separate individual labels.
- **Single label for simplified box:** The box contains only components with the same part number but which are not packed in individual boxes.

Master label (the figure below can be used as an example)

Used in the case of unmixed packages, i.e., single code (i.e., homogeneous loading units). The product packaging unit contains a single label.

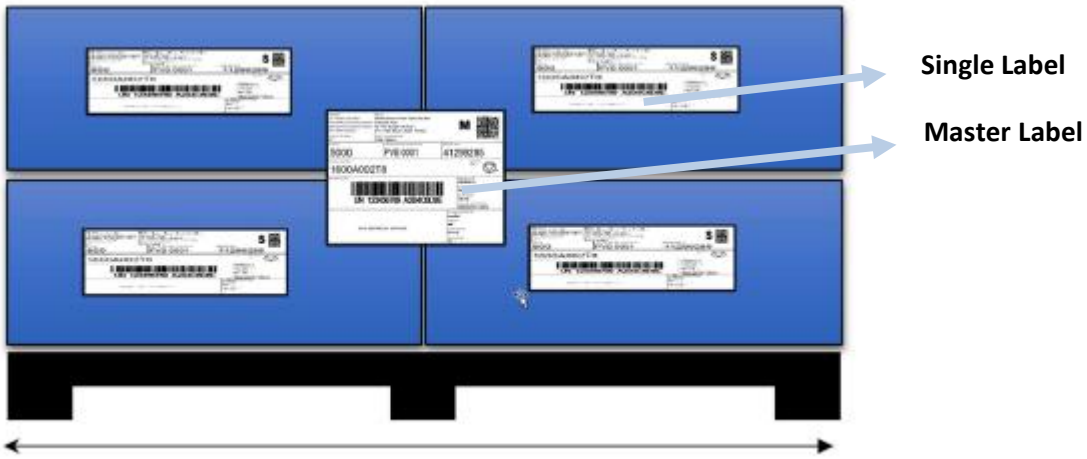

Figure 11

Mix Label: (the figure below can be used as an example) In the case of mixed packages (i.e., non-homogeneous loading units).

The product packaging unit contains a single label.

Figure 12

Single Label: (the figure below can be used as an example)

In the case of homogeneous single-code packages (e.g., boxes).

Figure 13

The following image illustrates how labels should be applied to pallets and boxes.

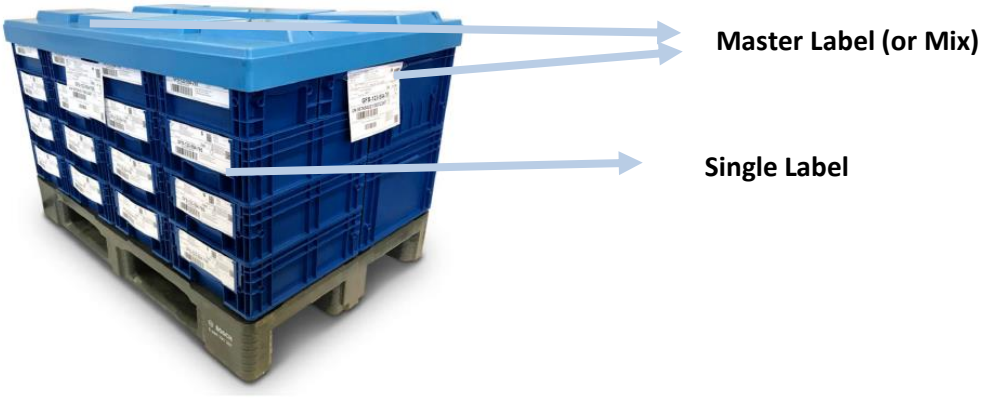

Figure 14

6.2 LABEL FORMAT AND CONTENT:

The label format complies with the VDA 4994 standard.

Master Label Layout:

- Always to be applied in the case of single part number pallets.
- The label must be printed on A5 paper.

To be applied visibly to the outside of the pallet.

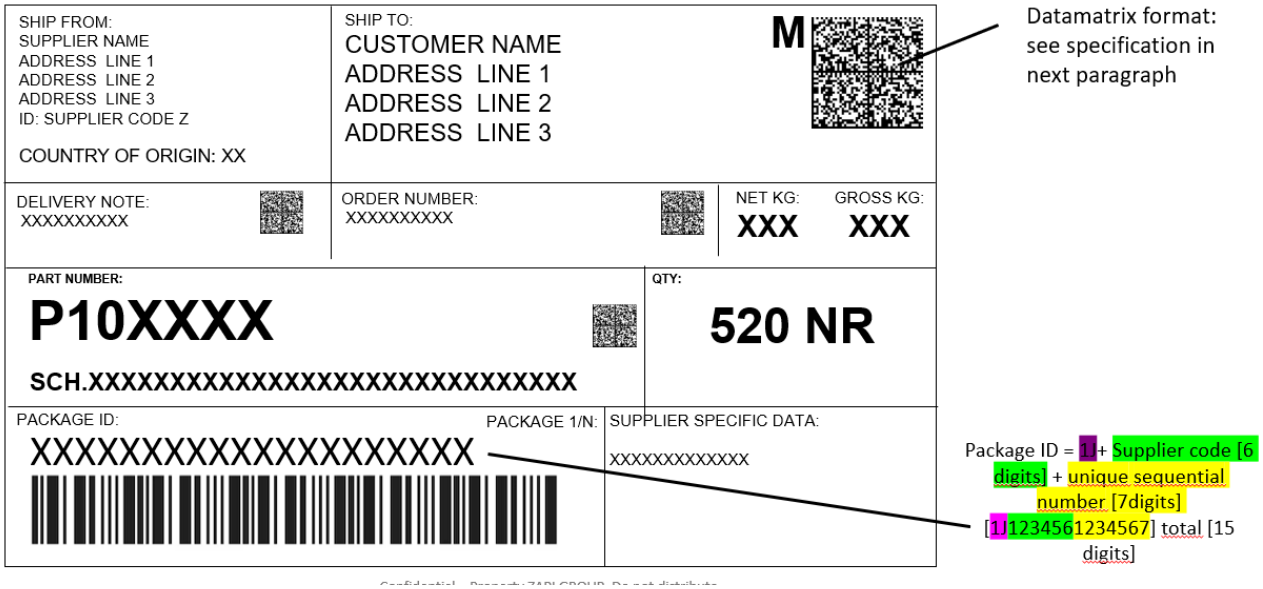

Figure 15

Mix

Label Layout:

Always to be applied in the case of multi-part-number pallets. The label must be printed on A5 paper. To be affixed visibly to the outside of the pallet.

Figure 16

Single Label Layout:

Always apply in the case of single part number boxes.

The label can be printed on A5 or half-letter format paper.

To be applied visibly on the outside of the box

Can be printed in two different formats:

A5 format

Figure 17

Letterbox format

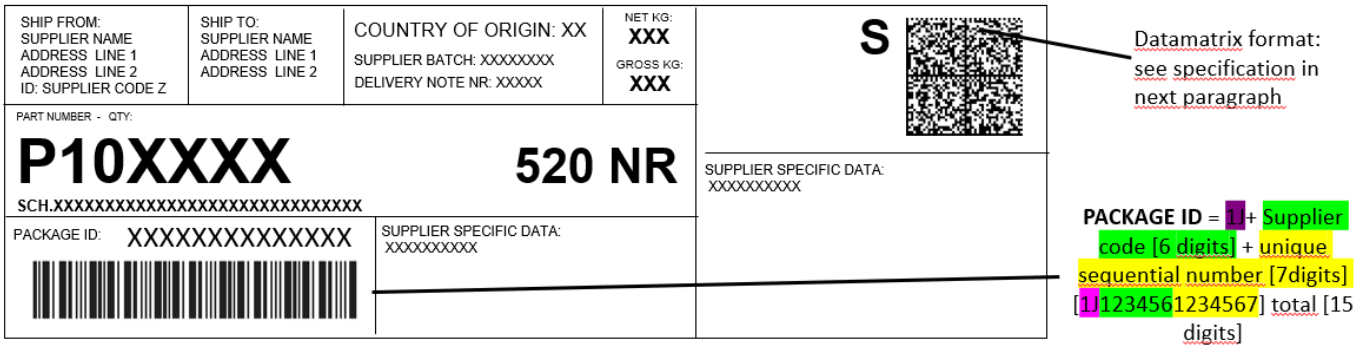

Figure 18

6.3 PACKAGE ID FORMAT SPECIFICATIONS:

The Package ID or Pallet or Box identifier uses a specific syntax described below to ensure that each individual crate can be uniquely identified.

ZAPI Supplier Code is a 6-digit numeric code assigned by ZAPI to identify suppliers.

Package ID Single Label 1J:

Package ID = 1J + ZAPI Supplier code [6 digits] + unique sequential number [7 digits] [1J1234561234567] total [15 digits]

Package ID Mix Label 5J:

Package ID = 5J + ZAPI Supplier code [6 digits] + unique sequential number [7 digits] [5J1234561234567] total [15 digits]

Package ID Master Label 6J:

Package ID = 6J + ZAPI Supplier code [6 digits] + unique sequential number [7 digits] [6J1234561234567] total [15 digits]

6.4 DATAMATRIX FORMAT SPECIFICATIONS:

This section describes the format and content specifications of the main datamatrix on the GTL label.

Figure 19

Data Fields:

The list of possible values present in the datamatrix is shown with the relative data identifiers, indicating where they are required in the case of Master, Mixed, or Single labels.

Sequence of data fields	Data Identifier	Master	Mixed	Single	Content	Remarks
Identification of specification	12P	X	X	X	Mandatory	Constant 12PGTL3
Package ID	1J, 5J o 6J	X (6J)	X (5J)	X (1J)	Mandatory	In case of Master label 6J, MIX Label 5J, Single Label
Delivery note (Supplier)	2S	X	X	OPT	Mandatory	
Supplier No. Zapi Group	V	X		X	Mandatory	6 Digit Zapi Supplier Number
Part ZAPI Group	P	X		X	Mandatory	Without hyphen and blanks
Quantity	Q	X		X	Mandatory	99999
Unit of measure	3Q	X		X	Mandatory	e.g. NR (nr of Pieces) or KG or G
Gross weight in KG	7Q	X	X	X	Mandatory	e.g. 20 for 20KG
Country of Origin	4C	X		X	Mandatory	2 Digits (ex: IT)
Used by / expiry date	14D	X		X	Optional	Format DDMMYY (e.g. 01012026)
Production date	16D	X		X	Optional	Format DDMMYY (e.g. 01012026)
Supplier batch	1T	X		X	Optional	
Part number manufacturer	1P	X		X	Optional	

Separators:

ASCII	Hex	Decimal	Description
[)>	5B, 29, 3E	91, 41, 62	Compliance Indicator
RS	1E	30	Format Trailer Character
06	30, 36	48, 54	Format identifier for 'ASCII Dis'
GS	1D	29	Data Field Separator
EOT	04	4	Message Trailer

Example of complete string:

[)>[RS]06[GS]12PGTL3[GS]1J1234561234567[GS]2S0987654321[GS]VABC123[GS]4CIT[GS]P987654310[GS]Q50[GS]3QNR [GS] 7Q20[RS][EOT]

Example Specific Fields:

12PGTL3 represents the specific data identifier GTL3.

1J1234561234567 represents the Package ID (15 digits).

2S0987654321 represents the delivery note number (Delivery note Nr.). (OPTIONAL)

VABC123 represents the supplier code.

4CIT represents the country of origin (Country of Origin [2 digits]).

P9876543210 represents the ZAPI part number (ZAPI Part Number).

Q50 represents the quantity in the box (Box Quantity).

3QNR represents the unit of measure (UM [2 Digits - NR]).

7Q20 Gross Weight in KG (GROSS WEIGHT)

6.5 SUPPLIER SPECIFIC DATA

In the specific area called "Supplier Specific Data," all information specific to the type of supply can be reported, such as the information required by the UL specification.

Other information useful for the supplier's internal process can also be entered in this field.

If more space is needed in the supplier specific data field, the label layout can be optimized to integrate this information, provided that the content, both in terms of information and data matrix, remains unchanged.

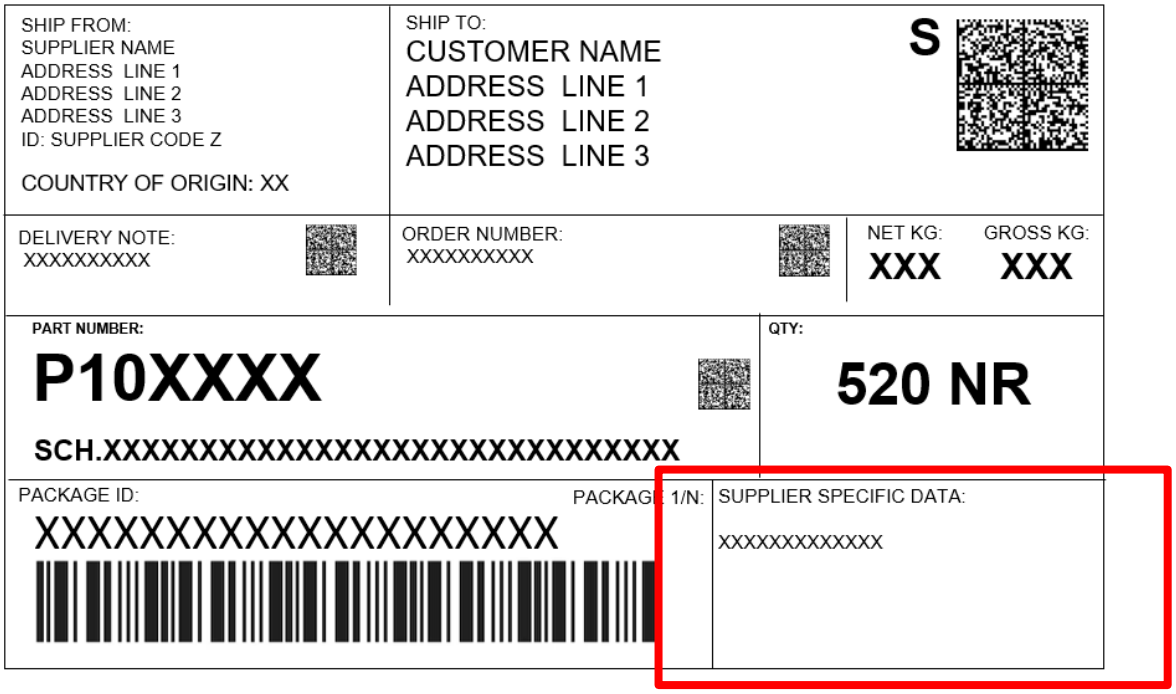

Figure 20