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Packaging Specification

HTEx/TEEx

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1 Introduction

1.1 Abstract

This document is an internal standard of E+E Elektronik Ges.m.b.H and is a guideline to ensure:

- the required packaging quality for E+E Elektronik Ges.m.b.H products
- conformity to E+E Elektronik Ges.m.b.H CI (Corporate Identity)
- necessary component protection for transport, storage and processing
- conformity to international / national standards and regulations

1.2 Range of Applications

This specification is in accordance with the general technical component specifications and applies to all E+E Elektronik digital humidity and temperature (E+E Elektronik Ges.m.b.H) sensor elements.

1.3 Revision History

Date	Version	Page(s)	Changes
June 2022	1.0	1-12	Initial release
July 2022	1.1	1-12	Small changes

Table 1: Revision history

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2 Packaging Solutions and Requirements

In this chapter, a detailed solution is given of how E+E Elektronik GmbH is packaging Tape and Reel (T&R) products.

2.1 Material Restrictions

The packaging materials comply with **RoHS & REACH** regulations. The usage of **PVC** for packaging purposes of digital humidity and temperature sensors is not allowed.

2.2 Tape & Reel Packaging

For packaging of E+E digital humidity and temperature sensors, Tape & Reel packaging is used. The reels are ESD compliant and black in colour. In addition, the reels are marked according to section 3.2.1.

2.2.1 Reel Type

The reel used by E+E Elektronik Ges.m.b.H has a diameter of 13" (330.2 mm). The use of other reels, if specifically required by a customer, needs the prior approval of E+E Elektronik Ges.m.b.H.

Leader 520 mm (20.5"), Trailer 1240 mm (48.8")

Figure 1: Reel

2.2.2 Tape Orientation

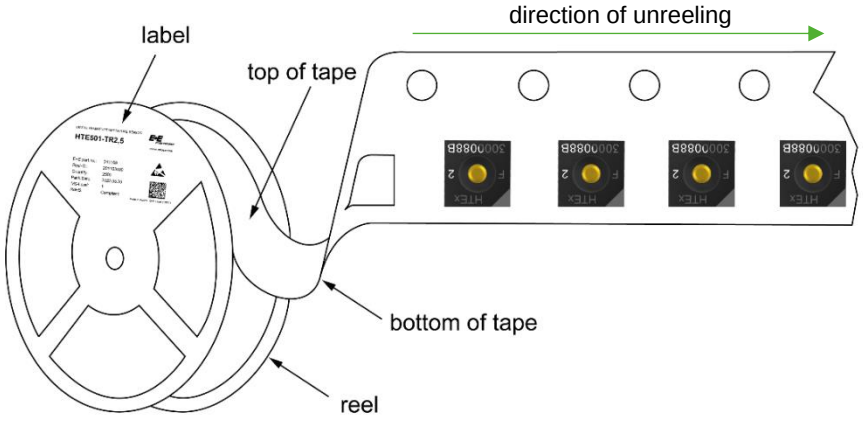

Figure 2: Tape orientation

2.2.3 Tape Layout

Dimensions T&R in mm:

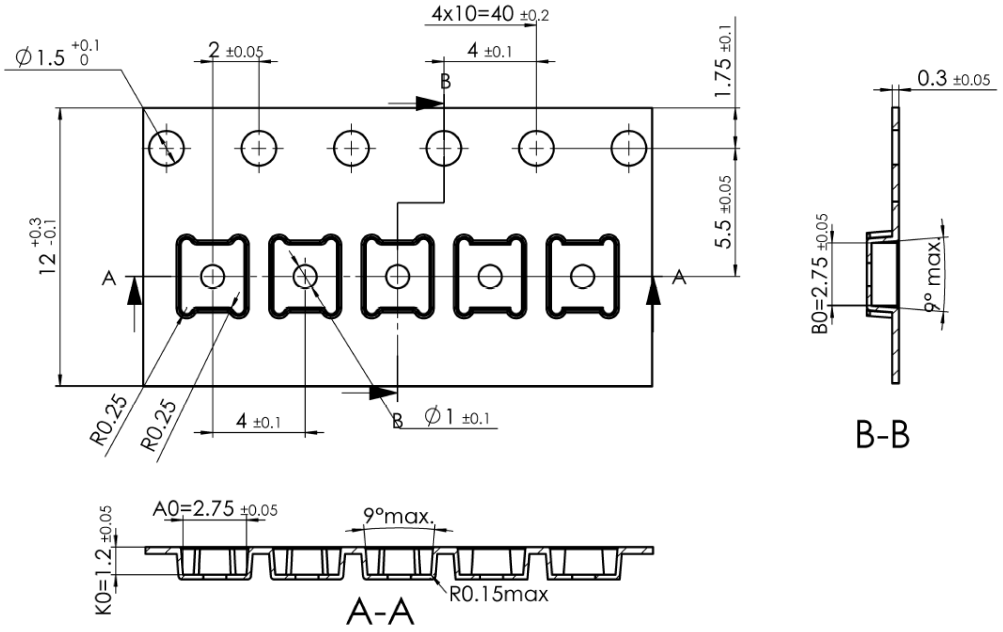

Figure 3: Tape layout

2.3 ESD Packaging Requirements

Digital Humidity and Temperature sensors require ESD compliant packaging:

- The packaging must comply with **DIN EN 61340-5-3**
- The packaging materials are surface or volume conductive
- Only materials with a surface resistance between 104 Ω and 1011 Ω are permitted

All ESD sensitive products are packed in dissipative reels and are placed in a bag with a shielding protection against electrostatic discharge <50nJ.

The marking of ESD compliant bags is done as shown in Figure 4 with the specific letter for the resistance of the material:

„D“ = **Dissipative** (e.g. Cover / Carrier Tape / Reel)
(Electrostatically dissipative, R ≥ 1x104 bis < 1x1011 Ω = ≥ 10kΩ
Bis < 100 GΩ) (IEC61340-5-3)

„S“ = **Shielding** (e.g. Bag’s)
(protection against electrostatic discharge <50 nJ)
(IEC 61340-4-8)

Figure 4: ESD Symbol

The ***** is the identification of the main function and has to be replaced with the specific letter:

S - Shielding against electrostatic discharge

C - Electrostatic conductive, for ≥103 Ω and <106 Ω

D - Electrostatic dissipative, for ≥106 Ω and ≤1011 Ω

Figure 5: ESD bag

The welded ESD bag is then placed in an air cushion bag. The end of the bag is only folded over, not closed by adhesive tape.

Figure 6: Air cushion bag

2.4 Box

For transportation of the Tape & Reels a cardboard box with the dimensions of **340x340x41 mm** is used.

Figure 7: Open and closed box

2.5 Packaging of MSL Classified Devices

2.5.1 MSL-Classification

MSL is the Moisture Sensitive Level of the component. Moisture sensitive components must be handled in accordance with **JEDEC J-STD033** and **JEDEC J-STD020**. The MSL-Level is divided in six levels, each describing a different sensitivity for moisture of a component. The lowest sensitivity is described with the Level 1 and the highest with Level 6. Depending on the moisture sensitivity of a component, it is necessary to use the appropriate packaging. This is necessary to protect the component from negative effects and defects during processing.

E+E Elektronik GmbH differentiates for packing between MSL=1 and MSL>1. In the case of the digital product family HTEx and TEEx, packaging is done according to **MSL=1**.

In the following Figure 8, the packaging of components according to the MSL is described. It specifies the type of parts packaging required for each type of MSL packaging.

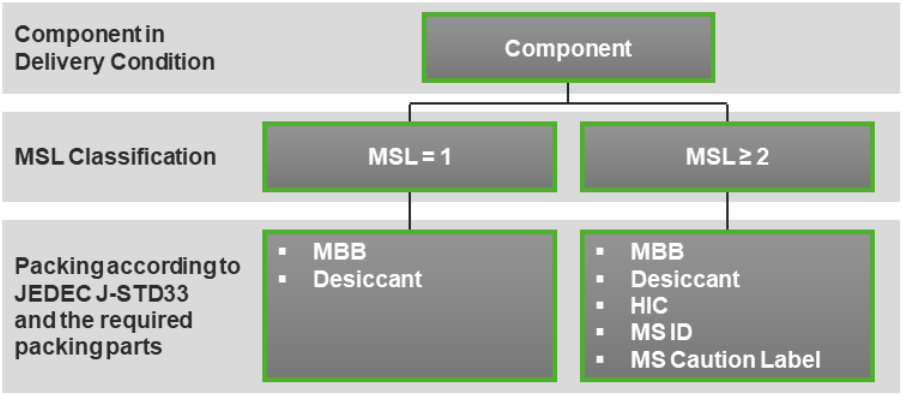

Figure 8: Packaging of components according MSL

2.5.2 Dry-Packing

According to **JEDEC J-STD033** the components are packed into sealed Moisture Barrier Bags with a desiccant inside. For dry packing according to MSL=1, in addition to the packed goods, two characteristic components are needed: an ESD compliant Moisture Barrier Bag (MBB) and a desiccant.

All used packing parts are RoHS & REACH compliant.

2.5.3 Moisture Barrier Bag (MBB)

The ESD compliant MBB (see Figure 5) must be heat sealable. Sealing must be done without a full vacuum, otherwise there will be no atmosphere inside the bag in which the desiccant can act. Some air must therefore remain in the bag.

2.5.4 Desiccant

Each reel is packed together with a desiccant unit containing 6.5 g of desiccant clay 1B. This desiccant unit complies with DIN 55473.

Figure 9: Desiccant

2.5.5 Humidity Indicator Card

In case of non-compliance with MSL level 1 (MSL=1), a moisture indicator card (HIC) must also be included with the packaging. It must comply with the standards of JEDEC J-STD033 and is enclosed in the MBB before welding. The HIC is shown in Figure 10. It should also be noted that the HIC must be stored in a dry environment prior to use. If the HIC has been under the influence of moisture and the color has already changed by 10%, it should not be used for packaging of MSL components. It must therefore be ensured that the HIC is not affected and suitable for usage.

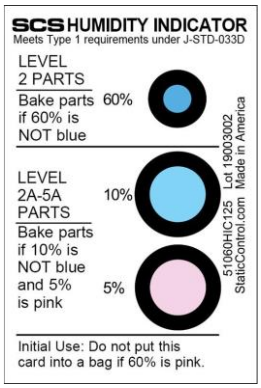

Figure 10: Humidity Indicator Card

2.6 Materials used with MSL=1 for Shipping Package

- Cardboard box
- ESD compliant Moisture Barrier Bag
- Air Cushion Bag
- Desiccant
- Labeling

3 Marking and Labeling

3.1 Component Marking

Components are marked at Pin 1 on the top side of the component and the marking must be visible by visual inspection.

The Pin 1 marking is pointing away from the Reel transport hole as shown in Figure 11:

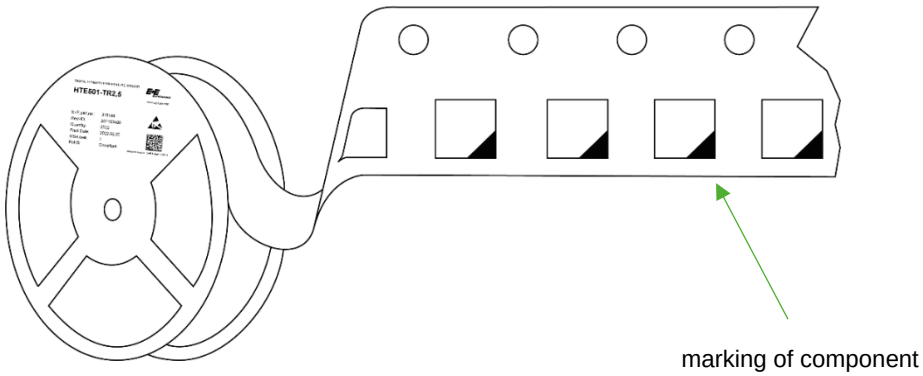

Figure 11: Component marking

3.2 Labeling

The E+E Label has a size of **76x51 mm**. The label includes the part number, the Reel-ID, the Quantity, the packaging date, and the MS-Level. The label includes the ordering code as well (e.g. HTE501-TR2,5), the product description, the E+E logo and the ESD identification. Moreover a QR code is also placed on the label for easy access to the data.

Three labels are printed and placed on three different places (see the following sub chapters).

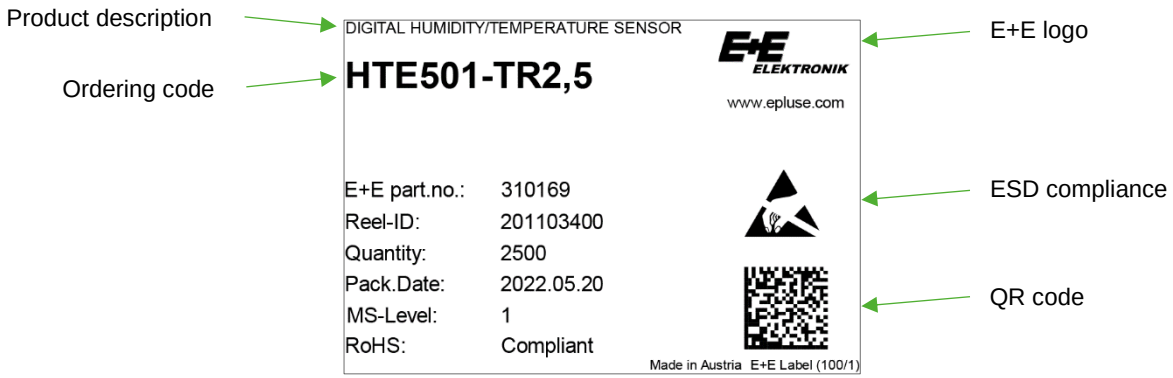

Figure 12: Label

3.2.1 Reel Marking with Label

The first label is placed on the reel. It is always attached to the opposite side of the reel transport holes as shown in Figure 13.

Figure 13: Reel marking

3.2.2 Moisture Barrier Bag Marking

The second label is placed on the ESD compliant MBB bag after sealing under nitrogen.

Figure 14: MBB marking

3.2.3 Box Marking

As shown in Figure 15, the third and last label is placed in the top left corner of the box.

Figure 15: Box marking

3.3 Cut Tape

For quantities smaller than 2 500 parts, cut tape is used. Here the packaging and labeling is similar. The main difference is that the carrier tape is not wrapped around a reel in this case, as the tape needs to be cut from a larger piece. The carrier tape containing the desired number of packages is wrapped around itself and placed in a static shielding bag, along with a desiccant. The sealed bag is then placed inside a box with dimensions of **190x185 mm**.

Figure 16: Cut tape packaging