Requirements on Marking of Goods and Accompanying Information for Purchased Production Parts

(MAT-Label, Version 2.6)
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I.  Change History

Version 2.4  First official release

Version 2.5  2.4 errata version. Formal corrections in the chapters “List of Abbreviations” and “Related Documents”. New sample pictures. Request to place a code on shipping note removed (moved to company-specific specification).

Version 2.6  Redactional update. New samples in Annex A.

II.  List of Figures:

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III. List of Abbreviations:

DC – Automatic data capture
ANSI – American National Standards Institute
BC128 – Bar Code according to ISO/IEC 15417 (Abbrev. = BC 128)
BOM – Bill of material
CCD – Charge-coupled device
DIN – Deutsches Institut für Normung e.V. (German Institute for standardization)
DMC – Data Matrix Code
DUNS – Data Universal Numbering System
EC – European Commission
ECC – Error Correction Code
ECL – Error Correction Level (same as ECC)
ESDS – Electrostatic Sensitive Devices
GTL – Global Transport Label
IEC – International Electro Technical Commission
IV. Related Documents see Annex B

V. List of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumables</td>
<td>Material of the BOM (bill of material) which is used in the product or process beside the electrical and mechanical components like solder paste, glue, lacquer, sealing material</td>
</tr>
<tr>
<td>Consignment Advise</td>
<td>Document which verifies the instruction to advise the consignment</td>
</tr>
<tr>
<td>Transport Authorization</td>
<td>Document which verifies the authorization to transport the consignment.</td>
</tr>
<tr>
<td>Unit load</td>
<td>Transport unit which consists of smallest package units</td>
</tr>
</tbody>
</table>
1 Purpose and Scope:

The automotive industry places increasing demands on traceability along the whole supply chain. To ensure this traceability, material flow and information flow from suppliers to customers have to be aligned.

This can be achieved by a unique material label on the smallest package unit containing a clearly defined set of traceability information. Up to now, there is no common industry standard for such a label.

The MAT-Label is a complement to existing labels such as VDA 4902, Odette and GTL. These existing logistics labels are taken into account and referenced.

2 Validity and Transition Period

The following document is valid for the companies BECOM Electronics GmbH, Robert Bosch GMBH - Automotive Electronics, Continental Automotive, cms electronics gmbh, Hella KGaA Hueck & Co., Siemens AG (I DT MC), and Zollner Elektronik AG and replaces former versions.

It can also be applied by other companies. Upon further notice existing company specific labeling specifications are valid.

3 Release process for the Data Matrix Code (DMC) on MAT-Label

If the MAT-Label (package label of a supplier) was approved by a customer and the approval is based on the requirements listed in the following, then the approval is also valid for all other plants of the customer which request a MAT-Label.

The label has to be used immediately for all receiving plants which request the label as soon as they have been approved.

One sample has to be sent from each logistic center of the supplier to the releasing plant of the customer. The approval can be differentiated in a general and a plant specific release.

The general approval is valid for all customer plants which will use a MAT-Label for packaging identification. Plant specific data contents have to be verified by each individual plant (e.g. data field "Add. Part Info", respective Supplier ID).

The data content of customer defined fields can be different from plant to plant.

The original approval of the MAT-Label has to be kept carefully and presented upon request.

---

1 MAT-Label as single label is always referring to the smallest packaging unit.
2 Customer refers to the respective company applying this standard, e.g. BECOM Electronics GmbH, Robert Bosch GMBH - Automotive Electronics, Continental Automotive, cms electronics gmbh, Hella KGaA Hueck & Co., Siemens AG (I DT MC) and Zollner Elektronik AG or other.
4 Marking of a Unit Load

4.1 Part Packaging (smallest packaging unit)

The smallest package does not contain any additional sub-packaging usually. The MAT-Label (single label) has to be placed on each smallest packaging unit.

![Example of a MAT-Label](image1)

**Figure: 1 Example of a MAT-Label**

![MAT-Label for KLT (returnable container) as single label (not to scale, original 210 x 74 mm)](image2)

**Figure: 2 MAT-Label for KLT (returnable container) as single label (not to scale, original 210 x 74 mm)**

4.2 Marking of Dry Pack Packaging

In case of a “Dry Pack” the protective packaging or the protective bag enclose the smallest package unit. Each Dry Pack packaging has to get one MAT-Label.

![Reel in Dry Pack](image3)

**Figure: 3 Reel in Dry Pack**

Per Dry Pack, only one unit (e.g. reel) inside the protective packaging is allowed.
Other definitions pertaining to part packaging have to be coordinated with the particular receiving plant depending on the Customer Part Number / drawing number.

For Dry Packs the MAT-Label has to be peel-able (removable) in one piece without partial damage.

If the MAT-Label has already been applied to the reel inside of the Dry Pack then the type of label has to be permanent on reel and Dry Pack (e.g. contract manufacturing). Both MAT-Labels have to be identical including its Package-ID.

### 4.3 Marking of a Unit Load as the smallest Packaging Unit

If the unit load (shipping container) should at the same time represent the smallest package unit, then the approval of the particular receiving plant has to be requested in general depending on the Customer Part Number / drawing number.

If the approval is given, then a MAT-Label in single version will become necessary, too. Because this unit load stands for the defined “smallest” packaging unit (even it is a large one).

The layout of the MAT-Label has to be selected in such a way that the Customer Part Number and amount can also clearly be read from distance.

If large fonts on MAT-Label are not feasible, an additional ODETTE-Label (also VDA or GALIA) will become necessary. In this case, the MAT-Label has to be applied on the ODETTE-Label.

### 5 Additional Requirements:

The following marking for RoHS compliance can also become necessary in addition.

If the part complies with current valid RoHS compliance a RoHS-Logo shall be printed on the MAT-Label.

![RoHS 2011/65/EU](image)

Figure: 4 Example for a symbol for RoHS compliance

If the printing of the RoHS symbol is not possible the marking with letters like “RoHS” is allowed alternatively.
Samples for RoHS symbology:

Either:  

or:

6 MAT-Label Requirements:

This chapter describes the universally valid aspects of the MAT-Label:

- Label size and layout (recommendation for the print-out style sheet)
- Attachment on the smallest package unit / attachment location
- Information Content
- Plain text and machine-readable codes
- Data syntax and print parameters

6.1 Size and Layout:

The MAT-Label consists of black printing on white label. Examples of valid layouts are defined and listed in the Appendix A. The size of the MAT-Label can be chosen by the supplier considering the size of the smallest package unit. Recommendations are shown in Appendix A.

- Compare the planned size of the MAT-Label with the smallest free space on the part packaging (smallest packaging unit), to avoid using too large labels.
- To ensure to have enough free space for the code, its quiet zone and for the plain text, create a layout with maximum filled data fields.
- The recommendations in Appendix A shall be the basis template for the own created layout.

For customer fields consider the maximum field length as specified. For own (supplier) fields, consider the maximum field length within your company now and in future.

*Example*: If the Manufacturer Part Number has maximum 10 characters in any cases, than it is not mandatory to reserve place for 35 characters.
• A border line around the label is not allowed. The pictures (better: the border lines) in Appendix A are showing the outline of the label only.

• Sufficient free area around the printing (not to close to the edges) has to be maintained. Consider to possible paper handling and printer tolerances.

• The MAT-Label samples in Appendix A are shown with real data. Spaces between data fields can occur, because the data does not occupy the maximum field length.

• The customer part number and the quantity have to be highlighted against the other information by using larger or bold type.

• All data fields have to be adjusted in that way, that there is enough space among each field for the maximum defined data length (in particular 1. Batch-No. and 2. Batch-No.).

6.2 Attachment, Attachment Position

The supplier has to make sure, that the MAT-Label is easily and completely readable, does not cover up any other supplier-created data and is safely positioned on the packaging and against damages during transportation and opening at customer.

• The attachment with wire is not allowed.

• The MAT-Label has to be attached permanently on the smallest package unit where applicable and peel-able on Dry Packs, see Chapter 4.2.

• Reusable Containers (Durable Systems)
  The MAT-Label shall not be attached permanently and over the entire surface. The attachment of labels with bonding dots is permissible. The label and its attachment (bonding dots) have to be removable without residue.

7 Information Content

The following table lists the data fields which the supplier has to provide on the MAT-Label. It defines the format, length and the data identifier. The data fields are explained in detail afterwards.

The Data Matrix Code on the MAT-Label has to contain all data fields including its data identifier in the order represented by the column number.

It is strictly distinguished between the manufacturer, who actually produces the part and the supplier, who delivers the part to the customer.

Please note that the data content of respective fields e.g. customer part number can be different from plant to plant.
## Marking of Goods and Accompanying Information

### MAT-Label Specification, Version 2.6

**June 2014**

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Data Field</th>
<th>Definition / Description</th>
<th>Data Identifier</th>
<th>Length</th>
<th>Format</th>
<th>Examples</th>
<th>Machine-readable Code</th>
<th>Printed Text on the label</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Data Matrix Code ECC200</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Label Information</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Label Version</td>
<td>The revision level is a fixed entry and serves the recognition of the label or its version.</td>
<td>12S</td>
<td>4</td>
<td>N</td>
<td>0002 (fixed data)</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>2</td>
<td>Customer Part Number *</td>
<td>Part number of the customer.</td>
<td>P</td>
<td>Max. 18</td>
<td>A/N</td>
<td>718.187-04 A2C5321641900</td>
<td>yes</td>
<td>yes (highlighted)</td>
</tr>
<tr>
<td>3</td>
<td>Manufacturer Part Number</td>
<td>Internal manufacturer part number.</td>
<td>1P</td>
<td>Max. 35</td>
<td>A/N</td>
<td>SL105C103MAA-S</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>Ordering Code 4</td>
<td>Code for the part which non-ambiguously can be used for ordering it. Compared to the &quot;Manufacturer Part Number&quot;, the Ordering Code may contain more information, e.g. Software Version in case of Microcontrollers or package form.</td>
<td>31P</td>
<td>Max. 35</td>
<td>A/N</td>
<td>SC441427CFNR2 A2C53216419/02</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>5</td>
<td>Part Description (Part Name)</td>
<td>Clear-text description of the part (or part name), so that persons who are not familiar with the manufacturer's naming convention can understand what kind of component this is</td>
<td>-</td>
<td>Max. 30</td>
<td>A/N</td>
<td>10 nF / 50 V / Ker W204KLA</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>6</td>
<td>Manufacturer Number</td>
<td>Explicit identification for the manufacturer, e.g. DUNS-Nr. or mutual agreed manufacturer number.</td>
<td>12V</td>
<td>Max. 13</td>
<td>A/N</td>
<td>123456789</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>7</td>
<td>Manufacturer Location</td>
<td>Naming the manufacturing location / locations</td>
<td>10V</td>
<td>Max. 20</td>
<td>A/N</td>
<td>DEU-BERLIN CHN-BEIJING</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>8</td>
<td>Revision Level / Index 4</td>
<td>Revision status of the part.</td>
<td>2P</td>
<td>Max. 14</td>
<td>A/N</td>
<td>AA 01</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>9</td>
<td>Additional Part Information</td>
<td>Used differently by each plant, flexible filled, e.g. brightness of the LEDs.</td>
<td>20P</td>
<td>Max. 30</td>
<td>A/N</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>More Part Information</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Date of Manufacturing</td>
<td>Date of manufacturing is related to the last manufacturing process</td>
<td>6D</td>
<td>8</td>
<td>YYYYMMDD</td>
<td>20080330</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>11</td>
<td>Expiration Date</td>
<td>The Expiration Date of the part (defined by the manufacturer (depending on production date).</td>
<td>14D</td>
<td>8</td>
<td>YYYYMMDD</td>
<td>20081031</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>12</td>
<td>RoHS</td>
<td>Indicator for RoHS compliance N: no RoHS Y: RoHS 0: not applicable</td>
<td>30P</td>
<td>1</td>
<td>A/N (upper case)</td>
<td>Y</td>
<td>yes</td>
<td>Logo</td>
</tr>
</tbody>
</table>

N = numerical, A/N = alphanumerical, D = day, M = month, Y = year

* Capital letter formatted analogue to the order

3 Capital letter formatted analogue to the order
### Marking of Goods and Accompanying Information

**MAT-Label Specification, Version 2.6**  
June 2014

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Data Field</th>
<th>Definition / Description</th>
<th>Data Identifier</th>
<th>Length</th>
<th>Format ²</th>
<th>Examples</th>
<th>Machine-Readable Code Data Matrix Code ECC200</th>
<th>Printed Text on the label</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>MS-Level</td>
<td>Moisture Sensitivity Level according to IPC/JEDEC J-STD-020.</td>
<td>Z</td>
<td>Max. 2</td>
<td>A/N, &quot;N&quot; if not applicable</td>
<td>5</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Purchase Order Number ⁴</td>
<td>Order number assigned by customer to identify a purchasing transaction.</td>
<td>K</td>
<td>Max. 18</td>
<td>A/N</td>
<td>753013</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>15</td>
<td>Shipping Note Number</td>
<td>Shipping Note Number of the shipping note and MAT-Label must be the same.</td>
<td>16K</td>
<td>Max. 12</td>
<td>A/N</td>
<td>54003333</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>16</td>
<td>Supplier Name (no real data field)</td>
<td>The Supplier Name.</td>
<td>-</td>
<td>Max. 30</td>
<td></td>
<td>no</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Supplier-ID (vendor number) ⁵</td>
<td>The vendor number (of the customer) for the supplier. It has to be taken over from the order.</td>
<td>V</td>
<td>Max. 10</td>
<td>A/N</td>
<td>884566</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>18</td>
<td>Package-ID</td>
<td>The explicit, unique number per single package. It has to be unique per supplier-id (vendor number) and package. It is always related to the smallest package unit. If possible, chronologically related to the production process (e.g. reel-ID).</td>
<td>3S</td>
<td>13</td>
<td>Capital letter only</td>
<td>S123456789012 (first Byte reserved for specifying single or master)</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>19</td>
<td>Quantity</td>
<td>Quantity of the smallest package unit.</td>
<td>Q</td>
<td>Max. 18</td>
<td>12ISO3</td>
<td>1000NAR000 (printed: 1000) 10KGM020 (printed: 10.02)</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>20</td>
<td>Batch Counter</td>
<td>Batch Counter identifies the number of batches (1 or max. 2 batches per reel possible).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Batch-No. #1</td>
<td>With this number the supplier has to be able to retroactively provide information about the batch (e.g. volume, production, delivery). A batch identification should be based on same manufacturing conditions. If a manufacturing condition changes, the batch number should be changed, too.</td>
<td>1T</td>
<td>Max. 17</td>
<td>A/N</td>
<td>750160429</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>22</td>
<td>Batch-No. #2</td>
<td>Batch number for the second batch - if applicable.</td>
<td>2T</td>
<td>Max. 17</td>
<td>A/N</td>
<td>750160430</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>23</td>
<td>Supplier Data</td>
<td>Supplier own information that may be used by the supplier.</td>
<td>1Z</td>
<td>Max. 30</td>
<td>A/N</td>
<td>yes</td>
<td>no</td>
<td></td>
</tr>
</tbody>
</table>

³ N = numerical, A/N = alphanumerical, D = day, M = month, Y = year
⁴ Capital letter formatted analogue to the order
Description to data fields:

7.1 **Label Version**

The label version is a fixed entry and serves as the recognition of the label and its version. The current label version described in this specification is 2 and the fixed entry of this data field is “0002”.

7.2 **Customer Part Number**

Part number of the customer; the format and design of the customer part number has to be analog to the order.

The customer part number and the quantity have to be highlighted in bold font.

7.3 **Manufacturer Part Number**

Parts number under which the manufacturer identifies the part and which is used for the release of the part by the customer.

7.4 **Ordering Code**

The ordering code is a mutually agreed code for the part which unambiguously can be used for ordering it. Compared to the "Manufacturer Part Number", the Ordering Code may contain more information, e.g. SC441427CFNR2, software version in case of microcontrollers, kind of packaging etc.

7.5 **Part Description**

Description of the ordered part (or part name) using plain text.

7.6 **Manufacturer Number**

Explicit identification of the manufacturer by DUNS-No or mutually agreed between customer and supplier. It is described in customer appended papers.

7.7 **Manufacturing Location**

Identification of the manufacturing location (preferred the location of the final test of the component) as mutually defined between supplier and respective customer.

Example: DEU-BERLIN  
         DEU-BERLIN1   (in case of only one location in town)  
         DEU-BERLIN2   (in case of two locations in town)

The field with a maximum of 20 digits consists of 3 Characters Country-Code analogue ISO3166-1 ALPHA-3 [3 digits] + “-“ [1 digit] + Plant-Location [required digits] + Plant-Number [0 or 1 digits (if more than 1 plant)]
7.8 Revision Level / Index
Revision level (material revision) of the part, if requested by customer.

7.9 Additional Part Information
This field can be flexibly used for additional information about the part, e.g. for the brightness (binning class) of LEDs. The content of this field has to be mutually agreed between manufacturer (supplier) and the receiving customer plant.

7.10 Date of manufacturing
The date of manufacturing (also called ‘Date Code’) as defined by the last manufacturing process.

Definition / Date Format:
YYYYMMDD

Example: 20140312  Dots (separators) are not allowed as code content.

7.11 Expiration Date
The Expiration Date of the part is defined by the manufacturer (depending on the production date).

This is the date until this part has to be processed by the customer (stored under the specified conditions).

Definition / Date Format:
YYYYMMDD

Example: 20151231  Dots (separators) are not allowed as code content.

7.12 RoHS
In the 2D-Code, a “Y” means compliance to the current RoHS directives and an “N” means non-compliance.

If RoHS is not applicable, the field entry is "0" (zero).

In case the parts are RoHS compliant, the RoHS symbol has to be printed onto the MAT-Label. If this is not possible, the print of “RoHS” in letters (without symbol or logo) is allowed.

7.13 MS-Level
It is the moisture sensitivity level for parts according to industrial standard IPC/JEDEC J-STD-020. If the part is moisture-sensitive, then the MS-Level has to be entered according to the listed levels in the industrial standard IPC/JEDEC J-STD-020 (see also chapter 4.2).
Moisture Sensitive Level according to JEDEC-J-STD standard:

<table>
<thead>
<tr>
<th>Moisture Sensitivity Level</th>
<th>Floor Life (out of bag) at factory ambient ≤30 °C/60% RH or as stated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unlimited at ≤30 °C/85% RH</td>
</tr>
<tr>
<td>2</td>
<td>1 year</td>
</tr>
<tr>
<td>2a</td>
<td>4 weeks</td>
</tr>
<tr>
<td>3</td>
<td>168 hours</td>
</tr>
<tr>
<td>4</td>
<td>72 hours</td>
</tr>
<tr>
<td>5</td>
<td>48 hours</td>
</tr>
<tr>
<td>5a</td>
<td>24 hours</td>
</tr>
<tr>
<td>6</td>
<td>Mandatory bake before use. After bake, must be reflowed within the time limit specified on the label.</td>
</tr>
</tbody>
</table>

**N** Not moisture-sensitive according JEDEC-J-STD standard

### 7.14 Purchase Order Number

The purchase order number is assigned by the customer to identify a purchasing transaction. It has to be identical to the one on the Shipping Note.

### 7.15 Shipping Note Number (Delivery Note Number)

Shipping Note Number identifies the shipping. It has to be identical to the one on the Shipping Note. Other names for a Shipping Note are delivery note, packing list, pack list, dispatch note, etc.

### 7.16 Supplier Name

The supplier name will only be printed as plain text and is not part of the 2D-Code.

### 7.17 Supplier-ID

The Supplier-ID is the vendor number under which the customer identifies the supplier. The Supplier-ID has to be taken-over from the order.

### 7.18 Package-ID

The Package-ID is the unique number per smallest package unit of each supplier characterized by Supplier-ID. The Package-ID has to be defined by the supplier and has to be unique world-wide per Supplier-ID. The Package-ID will be used for costumer purposes only to distinguish the package units.

The MAT-Label applies for the smallest package unit (single label) according to definition. Therefore the first Character has to be an “S”.

If the MAT-Label is required by customer as master label, the first character has to be an “M”.

Example for a Package-ID:

```
S123456789012
```

S= Single; M= Master

Per package unit unique number and/or letter combination
The concatenated data fields Supplier-ID and Package-ID represent the unique trace code at customer for the smallest package unit.

Examples in defined sequence:

\[ G_5 V884566G_5 3SS123456789012G_5 \]
\[ @V884566@3SS123456789012@ \]

### 7.19 Quantity

The quantity is the number of parts or the amount contained in the package unit.

The format in the 2D-Code is 12ISO3, i.e. maximum 12 significant places and exactly 3 decimal places.

For the significant digits do not use leading zeros. For the decimal places, use always exactly 3 decimal places and fill up with zeros for the case that there are less than 3 decimal places given in the amount.

ISO denotes the identifier for the measuring unit (e.g. pieces, liters, etc.) according to the recommendation No. 20 of WP.4 of the UN/ECE which is generally accepted for the use in Electronic Data Interchange (EDI) and supported e.g. by SAP.

The format used for the printed plain text should be 12,3 and given in the plain text measuring unit instead of the ISO Code. Separators (periods) can be added to make it easier to recognize thousands places.

Separators (dots, periods) are not permitted in the encoded quantity (quantity in code).

If different formats for 2D-Code and printed information is technically not possible, then the quantity has to be printed in the same way as it is contained in the 2D-Code.

Excerpt from the UN/ECE Recommendation 20:

<table>
<thead>
<tr>
<th>Measured Quantity</th>
<th>Measuring Unit</th>
<th>ISO Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Articles</td>
<td>Pieces</td>
<td>NAR</td>
</tr>
<tr>
<td>Mass</td>
<td>Kg</td>
<td>KGM</td>
</tr>
<tr>
<td>Mass</td>
<td>Metric Ton</td>
<td>TNE</td>
</tr>
<tr>
<td>Mass</td>
<td>Grams</td>
<td>GRM</td>
</tr>
<tr>
<td>Volume</td>
<td>Liters</td>
<td>LTR</td>
</tr>
<tr>
<td>Volume</td>
<td>Cubic meters</td>
<td>MTQ</td>
</tr>
<tr>
<td>Length</td>
<td>Meters</td>
<td>MTR</td>
</tr>
<tr>
<td>Length</td>
<td>Km</td>
<td>KMT</td>
</tr>
</tbody>
</table>
Examples:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Printed plain text</th>
<th>In Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Kg</td>
<td>12 Kg</td>
<td>12KGM000</td>
</tr>
<tr>
<td>12.03 Kg</td>
<td>12.03 Kg</td>
<td>12KGM030</td>
</tr>
<tr>
<td>3000</td>
<td>3000</td>
<td>3000NAR000</td>
</tr>
</tbody>
</table>

### 7.20 Batch-Counter

The Batch-Counter is the total number of batches in the smallest packaging unit. Maximum two different batches are allowed in one smallest package unit.

Examples:

Package unit includes only one Batch (e.g. Batch-Number: 0105086).

<table>
<thead>
<tr>
<th>Field name:</th>
<th>Data (content):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batch-Counter</td>
<td>1</td>
</tr>
<tr>
<td>1. Batch-No.</td>
<td>0105086</td>
</tr>
<tr>
<td>2. Batch-No.</td>
<td>(empty)</td>
</tr>
</tbody>
</table>

Package unit includes two Batches (e.g. Batch-Number 0105086 and 0105087).

<table>
<thead>
<tr>
<th>Field name:</th>
<th>Data (content):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batch-Counter</td>
<td>2</td>
</tr>
<tr>
<td>1. Batch-No.</td>
<td>0105086</td>
</tr>
<tr>
<td>2. Batch-No.</td>
<td>0105087</td>
</tr>
</tbody>
</table>

### 7.21 Batch-No. #1

The data field Batch-No. #1 contains an identification code for the production batch of the part (batch number, lot number, trace code, date code ...).

With this number the supplier has to be able to retroactively provide all traceability information about the production batch (e.g. volume, production, delivery, half-finished goods used in the production, production machine(s), operator ...).
Batch identification should be based on same manufacturing conditions. If the conditions (machine, half-finished goods, operator ...) change, the batch number should also change. Collective batches are not allowed.

7.22 Batch-No. #2

The data field Batch-No. #2 contains an identification code for the second production batch of the part (batch number, lot number ...) if it exists in packaging unit.

In case of two batches inside the packaging unit, the value in field Batch-No. #2 must not equal to the value in field Batch-No. #1.

If a second batch exist in packaging unit, as results the value in field Batch-Counter = 2

7.23 Supplier Data

This data field may freely be used by the supplier.

8 Requirements on the 2D- and (if requested) on the 1D-Codes:

8.1 Print Parameters for the Data Matrix Code

- Code Type: DMC (acc. ISO/IEC 16022)
- Failure Correction: ECC 200
- Module width: min 0,25 mm (3 Dot / Mod)
- Code size: maximum of 80 x 80 modules
- Rest zone (quite zone): min. 4 modules (1 mm for 0,25 mm module width)
- Print density: 300 dpi (preferred)

8.2 Additional Barcode on MAT-Label:

Additional Barcodes on the label in the format BC128 might be necessary to be compatible to existing equipment in the plants of the customer.

Therefore the customers describe this requirement with samples in appended papers.

8.3 Label Material Properties

8.3.1 Non-removable label

- Face Material: white, reverse coated, mat
- Adhesive: Permanent adhesive adjusted to the material of the smallest package unit
- Recycling regulations have to be obeyed
8.3.2 Peel-able label

- Face Material: white, reverse coated, mat
- Adhesive: Removable adhesive adjusted to the material of the smallest package unit, residue free
- Recycling regulations have to be obeyed

8.4 Data Contents and Data Syntax based on ISO/IEC 15434

8.5 Syntax

According to ISO/IEC 15434 the data matrix code is structured into data fields separated with separators. Make sure that 06 is used as format indicator (part of the format header).

The symbols $R^S$, $G^S$ and $EOT$ are in accordance to ASCII/ISO 646.

$R^S$ is as hexadecimal value 1E, in decimal 30
$G^S$ is as hexadecimal value 1D, in decimal 29
$EOT$ is as hexadecimal value 04, in decimal 04

Due to technical compatibility Bosch Automotive Electronics, Hella, Siemens I DT MC and cms electronics are requesting the character “@” (without quotes) as format header and trailer, data element separator and message trailer ($R^S$, $G^S$ and $EOT$).

Continental Automotive, Zollner and Becom allow this also as an exemption.

No blanks or line feeds are permissible between the data fields.

8.6 Data Content and Data Identifier

The content of each data field is described by a data identifier. Within each data field, the data identifier precedes the data.

If mutual agreed, blanks are only permissible in the data fields, if they are part of the information content or if they were provided to the supplier as stated in the order.

The previous table (table from page 11 onwards) lists the data, data length, format and data identifiers that have to be encrypted in the code. All fields are mandatory fields.

If all data fields are maximal filled, in total 399 characters are possible in string, including all data identifiers and message header, trailer and data element separators.

All Data Identifiers have to be listed, also in case of an empty data field. Their sequence is defined by table in chapter 7 from page 11 onwards.

Character “@” as content in a data field is prohibited.
8.7 Description to the requested data syntax

The next sheet illustrates the syntax.

8.7.1 Syntax with $R$, $G$, and $E_{OT}$:

Message and Format-Header, Data Element Separator, Format- and Message-Trailer is in yellow.

Data Identifiers are in green.

Data fields are white.

Data are in bold font.

The syntax looks like:

(string is in one line, below existing line feeds only for illustration in this document)

With data it looks like (data sample):

8.7.2 Syntax with $@$ instead of $R$, $G$, and $E_{OT}$:

With data it looks like (data sample):
### 8.8 Description to syntax and to the data content:

<table>
<thead>
<tr>
<th>Message Header</th>
<th></th>
<th>Yes</th>
<th>Yes</th>
<th>Syntax based on ISO/IEC15454 with using Data Identifiers for identification of data fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Element Separator</td>
<td>,</td>
<td>@</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>1</td>
<td>2</td>
<td>Yes</td>
<td>Data Field shows type of message</td>
</tr>
<tr>
<td>Label Version</td>
<td>0002</td>
<td>0002</td>
<td>Yes</td>
<td>That is a fix value. Following message is based on MAT-Label specification Version 2.x</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>3</td>
<td>5</td>
<td>Yes</td>
<td>Data Field for part number assigned by customer</td>
</tr>
<tr>
<td>Continental Part Number</td>
<td>00196508640</td>
<td>00196508640</td>
<td>Yes</td>
<td>Continental Part number is 00196508640, based on Continental Automotive</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>6</td>
<td>1</td>
<td>Yes</td>
<td>Data Field for part number assigned by manufacturer of the part.</td>
</tr>
<tr>
<td>Manufacturers part no.</td>
<td>E015100003</td>
<td>E015100003</td>
<td>Yes</td>
<td>Manufacturer part number is E015100003</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>11</td>
<td>12</td>
<td>Yes</td>
<td>Data Field for Ordering Code</td>
</tr>
<tr>
<td>Ordering Code</td>
<td>00195100003</td>
<td>00195100003</td>
<td>Yes</td>
<td>Ordering Code is 00195100003</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>12</td>
<td>15</td>
<td>Yes</td>
<td>Data Field for manufacturer location</td>
</tr>
<tr>
<td>Manufacturers Location</td>
<td>JP-TOKYO</td>
<td>JP-TOKYO</td>
<td>Yes</td>
<td>Location in Japan, Tokyo</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>19</td>
<td>19</td>
<td>Yes</td>
<td>Data Field for material revision</td>
</tr>
<tr>
<td>Material Revision</td>
<td></td>
<td></td>
<td></td>
<td>No material revision used in order in this case, if a material revision is requested, it shall be stated in this field</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>20</td>
<td>20</td>
<td>Yes</td>
<td>Data Field for additional part information</td>
</tr>
<tr>
<td>Additional Part Info</td>
<td></td>
<td></td>
<td></td>
<td>Depends in use for LED or in exception. No additional part information. Add. info is in use for LED or in other exceptional cases. Basically it is empty.</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>21</td>
<td>21</td>
<td>Yes</td>
<td>Data Field for date of manufacturing</td>
</tr>
<tr>
<td>Date of manufacturing</td>
<td>20120923</td>
<td>20120923</td>
<td>Yes</td>
<td>Date of manufacturing in March 2012</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>22</td>
<td>22</td>
<td>Yes</td>
<td>Data Field for expiration date</td>
</tr>
<tr>
<td>Expiration date</td>
<td>20130923</td>
<td>20130923</td>
<td>Yes</td>
<td>Component will be expired on March 23rd, 2013</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>25</td>
<td>25</td>
<td>Yes</td>
<td>Data Field for compliance check for RoHS compliance</td>
</tr>
<tr>
<td>RoHScompliance</td>
<td>N</td>
<td>N</td>
<td>Yes</td>
<td>Possible content is Y, N or O (zero). Component does not comply to RoHS directive</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>27</td>
<td>27</td>
<td>Yes</td>
<td>Data Field for moisture sensitive level according to IPC/IEEC-I-STD-020.x</td>
</tr>
<tr>
<td>Moisture level</td>
<td>1a</td>
<td>1a</td>
<td>Yes</td>
<td>Moisture level is 1, 2, 3, 4, 5, 6, 7, 8 or 9. Moisture level is based on IPC/IEEC standards</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>29</td>
<td>29</td>
<td>Yes</td>
<td>Data Field for purchase order number assigned by Continental</td>
</tr>
<tr>
<td>Continental Purchase</td>
<td>6100004089</td>
<td>6100004089</td>
<td>Yes</td>
<td>Exception rule: 0 (zero) is allowed. Purchase order number assigned by Continental 6100004089. Number of SAP delivery schedule</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>30</td>
<td>30</td>
<td>Yes</td>
<td>Data Field for shipping note number assigned by supplier</td>
</tr>
<tr>
<td>Shipping note reference</td>
<td>2553394</td>
<td>2553394</td>
<td>Yes</td>
<td>Exception rule: 0 (zero) is allowed. Suppliers shipping note reference is 2553394</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>33</td>
<td>33</td>
<td>Yes</td>
<td>Data Field for vendor number assigned by customer</td>
</tr>
<tr>
<td>Continental/Vendor No.</td>
<td>3107234</td>
<td>3107234</td>
<td>Yes</td>
<td>First part of MAT-ID (B366-ID) Cur supplier/vendor number 3107234</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>35</td>
<td>35</td>
<td>Yes</td>
<td>Data Field for unique package-ID on smallest packaging unit</td>
</tr>
<tr>
<td>Unique Package-ID</td>
<td>5000001069425</td>
<td>5000001069425</td>
<td>Yes</td>
<td>Second part of MAT-ID (RAW-ID) Raw material with unique id 5000001069425 behind vendor number. 31072345000000000B425 is the unique MAT-ID</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>37</td>
<td>37</td>
<td>Yes</td>
<td>Data Field for the quantity (number of parts in the packaging unit)</td>
</tr>
<tr>
<td>Quantity</td>
<td>1200000000</td>
<td>1200000000</td>
<td>Yes</td>
<td>See specification page 46. There are 1200000000 (NAR + Number of articles) in this packaging unit</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>39</td>
<td>39</td>
<td>Yes</td>
<td>Data Field for the number of batches inside this packaging unit</td>
</tr>
<tr>
<td>Batch-ID (Batch Counter)</td>
<td>1</td>
<td>1</td>
<td>Yes</td>
<td>There is only one batch inside this packaging unit</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>41</td>
<td>41</td>
<td>Yes</td>
<td>Data Field for the first batch number assigned by manufacturer</td>
</tr>
<tr>
<td>Batch Number</td>
<td>12648096 C</td>
<td>12648096 C</td>
<td>Yes</td>
<td>1. Batch Number (107) of manufacturer for inclusions is 12648096 C</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>43</td>
<td>43</td>
<td>Yes</td>
<td>Data Field for the second batch number assigned by manufacturer</td>
</tr>
<tr>
<td>Batch Number</td>
<td>12748096 C</td>
<td>12748096 C</td>
<td>Yes</td>
<td>2. Batch Number (207) of manufacturer for inclusions is 12748096 C</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>45</td>
<td>45</td>
<td>Yes</td>
<td>Data Field for free supplier entries, assigned by supplier</td>
</tr>
<tr>
<td>Supplier Data</td>
<td>CN-N1</td>
<td>CN-N1</td>
<td>Yes</td>
<td>Can be empty. Supplier can use this field or not. Supplier has stored the ID CN-N1 for internal usage. Will be stored by us, but is not an information for us.</td>
</tr>
<tr>
<td>Data Element Separator</td>
<td></td>
<td>,</td>
<td>Yes</td>
<td>New Data Field</td>
</tr>
<tr>
<td>Data identifier</td>
<td>47</td>
<td>47</td>
<td>Yes</td>
<td>Data Field for free supplier entries, assigned by supplier</td>
</tr>
<tr>
<td>Formal Trailer</td>
<td>CN-N1</td>
<td>CN-N1</td>
<td>Yes</td>
<td>Format envelope ends. No new format envelope.</td>
</tr>
</tbody>
</table>
VI. **Appendix A: Example of MAT-Labels**

Proposals for field description:

- Part No. = Customer Part Number
- Man. Part No = Manufacturer Part Number
- Quantity = Quantity
- Add.Info = Additional Part Information
- Man.Date or Date of Man. = Date of Manufacturing
- Exp. Date = Expiration Date
- Suppl. = Supplier Name
- 1. Batch = Batch-No. #1
- 2. Batch = Batch-No. #2
- MSL or MS-Level = Moisture Sensitive Level
- Index = Material Revision (Part-Index)
- Purchase = Purchase Order Number
- ShippingNote = Shipping Note Number (Shipping Reference)
- Part Name = Part Description
- Ord.Code = Ordering Code
- Man.Loc. = Manufacturer Location

Standard label layout (all mandatory data fields printed). Size depends on package type and package size). Size definition, see chapter 6.1.

---

**Example # 1**

<table>
<thead>
<tr>
<th>Part No.: 00196508A0</th>
<th>Quantity: 1200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index: 5a</td>
<td>MS-Level: 5a</td>
</tr>
<tr>
<td>Add.Info:</td>
<td>Date Code: 20120323, Expiry Date: 20130323</td>
</tr>
<tr>
<td></td>
<td>2. Batch:</td>
</tr>
<tr>
<td>Part Name: Pressure Sensor</td>
<td>Supplier-ID: E0151CIT00003</td>
</tr>
<tr>
<td>Shipping Note: 3551354</td>
<td>Purchase: 6100004089</td>
</tr>
<tr>
<td>Ord. Code: 310734</td>
<td>Package-ID: S000001069425</td>
</tr>
<tr>
<td>Man. Part-No.: E0151CIT00003</td>
<td></td>
</tr>
<tr>
<td>Supplier-Data: CN-N1</td>
<td>Supplier: Sample &amp; Co.</td>
</tr>
</tbody>
</table>

---

**Small Label (with less data fields printed)**

<table>
<thead>
<tr>
<th>Part No.: 00196508A0</th>
<th>Quantity: 1200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index:</td>
<td>MS-Level: 5a</td>
</tr>
<tr>
<td>1. Batch: 126A006C</td>
<td>2. Batch:</td>
</tr>
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<td>Supplier-ID: 310734</td>
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<td>Expiry Date: 20130323</td>
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Example # 2
### VII. Appendix B: Related Documents

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<thead>
<tr>
<th>Standard</th>
<th>Description</th>
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<tbody>
<tr>
<td>ANSI MH10.8.2</td>
<td>Data Identifier and Application Identifier Standard</td>
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<tr>
<td>2011/65/EU</td>
<td>Restriction of the use of certain hazardous substances in electrical and electronic equipment; EU-RoHS; (non automotive related)</td>
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<tr>
<td>ISO 780</td>
<td>Packaging – Pictorial Marking for Handling of goods</td>
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<tr>
<td>ISO 3166-1</td>
<td>Codes for the representation of names of countries and their subdivisions - Part 1: Country codes (Alpha 3 Character Country-Code)</td>
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<tr>
<td>ISO/IEC 15417</td>
<td>Information technology - Automatic identification and data capture techniques - Code 128 bar code symbology specification</td>
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<td>ISO/IEC 15434</td>
<td>Information technology -- Automatic identification and data capture techniques -- Syntax for high-capacity ADC media</td>
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<td>ISO/IEC 16022</td>
<td>Information technology -- Automatic identification and data capture techniques -- Data Matrix bar code symbology specification</td>
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<td>UN/ECE Rec. 20</td>
<td>Recommendation No.20 of WP.4: Codes for units of measure used in international trade</td>
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<td>VDA 4902</td>
<td>Warenanhänger (barcode-fähig)</td>
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<tr>
<td>VDA 4922</td>
<td>Speditions-Auftrag</td>
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### Appendix C: MAT-Label Team

<table>
<thead>
<tr>
<th>Company</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>BECOM Electronics GmbH</td>
<td>Johann Katona</td>
</tr>
<tr>
<td>BECOM Electronics GmbH</td>
<td>Christian Bernhart</td>
</tr>
<tr>
<td>Robert Bosch GMBH Automotive Electronics</td>
<td>Ms. Serya Baris</td>
</tr>
<tr>
<td>Robert Bosch GMBH Automotive Electronics</td>
<td>Harold Ebeling</td>
</tr>
<tr>
<td>Continental Automotive GmbH</td>
<td>Konstantin Feldmeier</td>
</tr>
<tr>
<td>Continental Automotive GmbH</td>
<td>Michael Tost</td>
</tr>
<tr>
<td>cms electronics gmbh</td>
<td>Raimund Antonitsch</td>
</tr>
<tr>
<td>cms electronics gmbh</td>
<td>Markus Quendler</td>
</tr>
<tr>
<td>Hella KGaA Hueck &amp; Co.</td>
<td>Horst Keppmann</td>
</tr>
<tr>
<td>Hella KGaA Hueck &amp; Co.</td>
<td>Guido Rensmann</td>
</tr>
<tr>
<td>Siemens AG Motion Control Systems</td>
<td>Herbert Jung</td>
</tr>
<tr>
<td>Siemens AG Motion Control Systems</td>
<td>Uwe Heilmann</td>
</tr>
<tr>
<td>Siemens AG Motion Control Systems</td>
<td>Dr. Daniel Craiovan</td>
</tr>
<tr>
<td>Zollner Elektronik AG</td>
<td>Ernst Kastenholz</td>
</tr>
<tr>
<td>Zollner Elektronik AG</td>
<td>Christian Röhrl</td>
</tr>
<tr>
<td>Zollner Elektronik AG</td>
<td>Ms. Katharina Fischer</td>
</tr>
<tr>
<td>Zollner Elektronik AG</td>
<td>Daniel Preiss</td>
</tr>
<tr>
<td>Zollner Elektronik AG</td>
<td>Ms. Ramona Fischhold</td>
</tr>
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