MAHLE

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IMPLEMENTATION GUIDELINE GLOBAL TRANSPORT LABEL (GTL) AT MAHLE

Version: 1.2 / STAND: AUGUST 2017

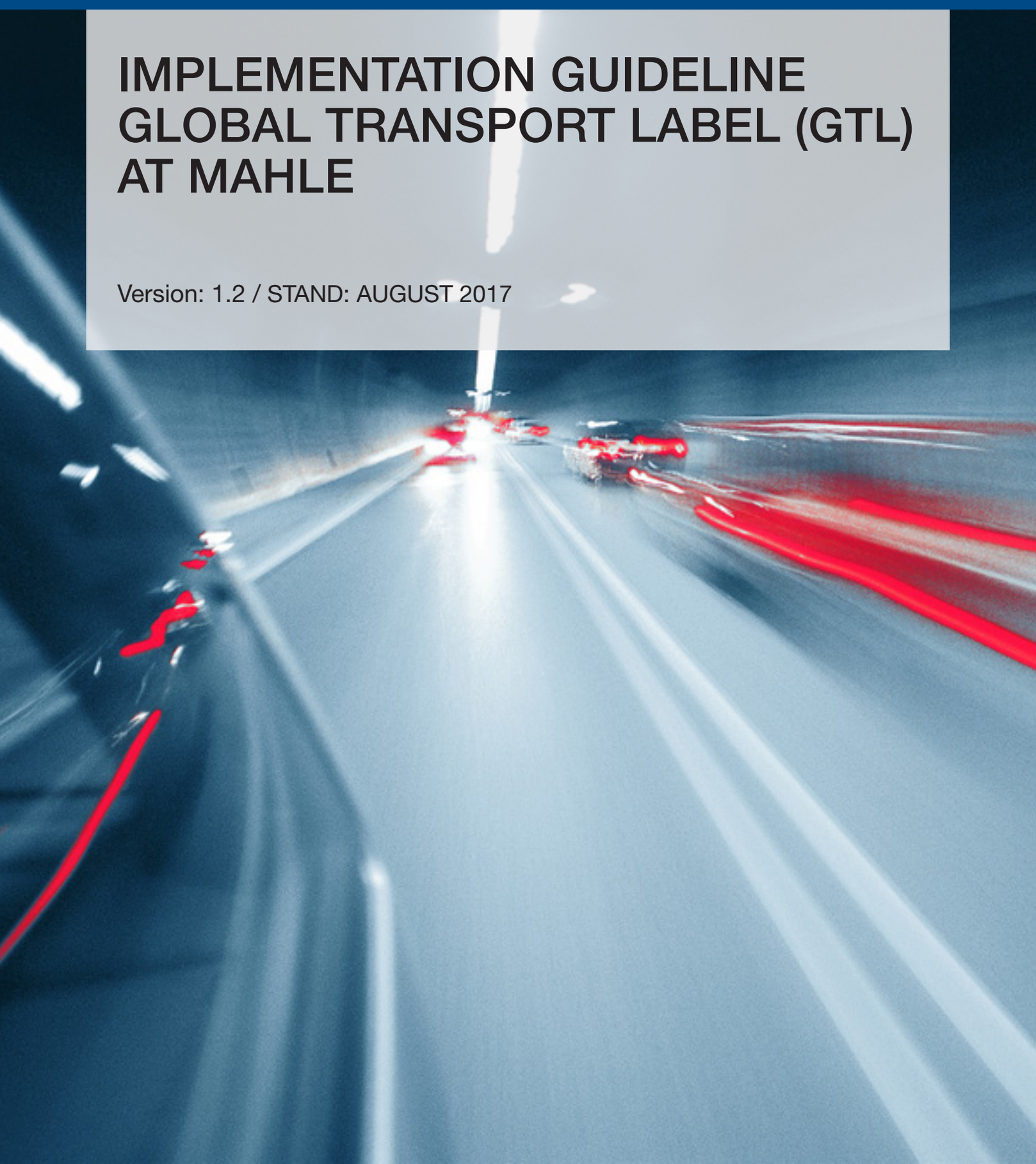

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TABLE OF CONTENT

MAHLE

Driven by performance

ILLUSTRATION DIRECTORY

LIST OF TABLES

LIST OF ABBREVIATIONS

ASCII	American Standard Code for Information Interchange
AIAG	Automotive Industry Action Group
ASN	Advanced Shipping Notification
BBD	Best Before Date
BLC	Big Load Carrier
EDI	Electronic Data Interchange
Fig.	Figure
GTL	Global Transport Label
IEC	International Electrotechnical Commission
ISO	International Association for Standardization
JAMA	Japan Automobile Manufacturers Association
JAPIA	Japan Auto Parts Industries Association
AIAG	Automotive Industry Action Group
Odette	Organisation for Data Exchange by Tele Transmission in Europe (however, this full form is no longer used as the areas of focus have changed)
PDF	Portable Data File
SLC	Small Load Carrier
Tab.	Table
VDA	Verband der Automobilindustrie (German Association of the Automotive Industry)
WebEDI	Webbased Electronic Data Interchange

1. HISTORY

VERSION	DATUM	CHANGES / HISTORY
1.1	05/23/2016	Guideline created
1.2	08/28/2017	Adaption of guideline to VDA guideline 4994

Tab. 1: History of the guideline

2. APPLICABILITY OF THE GUIDELINE

The guideline is applicable to the following MAHLE plants:

- MAHLE Filtersysteme GmbH Lorch
- MAHLE Filter Systems UK Ltd. Telford
- MAHLE Filtersysteme GmbH Brattendorf
- MAHLE Filtersysteme GmbH Öhringen
- MAHLE Filtersysteme GmbH Wustermark
- MAHLE Filtersysteme France SAS Seboncourt
- MAHLE Componente de Motor SRL Timisoara
- MAHLE Filtre Sistemleri A. S. Gebze
- MAHLE Filtersysteme Austria GmbH St. Michael
- MAHLE Filtersysteme Austria GmbH Wolfsberg
- MAHLE Filtersysteme Austria GmbH Mattighofen

3. INTRODUCTION TO THE GLOBAL TRANSPORT LABEL

3.1 Global standard

Clear, systematic labeling of products and transport units allows easy identification. Packaging units must always be labeled with uniform, standardized, and barcode-readable transport labels.
Representatives from Europe (Odette), Japan (JAMA/JAPIA), and North America (AIAG) have jointly developed a “Global Transport Label” standard that can be used worldwide for supplier and cus¬tomer relationships.

For this standard the new VDA guideline 4994 “Recommendation for utilization of the Global Transport Label (GTL)” has been pub¬lished in March 2016.

MAHLE has complied with this standard in the design of its trans¬port label, which suppliers must use for labeling goods. This will be described in greater detail in the following chapters.
In the chapters, where special regulations for MAHLE are needed, there is a reference to the appropriate chapter in the VDA guideline 4994. All other regulations of the VDA4994 are valid for MAHLE unmodified.

Generally the regulations of the VDA guideline according to layout, e.g. font size, written form and distances apply.
Goods recipient and goods deliverer can arrange deviations bilateral if they are reasonable or technically needed from a process view.
The 2D code that is mentioned in the VDA recommendation is a data matrix code according to ISO/IEC specification 16022:2006. For simplification reasons this codes is named in the MAHLE guideline data matrix or data matrix code.

Labeling all containers with the GTL is essential for MAHLEs new optimized, streamlined goods receiving process.

3.2 MILO – MAHLE Inbound Logistics Optimization

MAHLE has developed a new, streamlined process along the supply chain from the supplier to the customer, in order to reduce material processing times, identify defects at an early stage, and thus preemptively avoid short-term bottlenecks.

The supplier receives scheduling agreement schedules or stock levels and requirements via EDI or WebEDI in defined cycles. In return, the supplier sends the delivery note data back to MAHLE via EDI or WebEDI when the goods are issued. This Advanced Shipping Notification (ASN) includes packaging data and the license plates (package serial numbers or handling unit numbers). Registering the goods promptly avoids unnecessary communication between MAHLE's procurement teams and the supplier, while also achieving better capacity utilization in the goods receiving.

The containers must be labeled by the supplier using labels in the format required by MAHLE. The main feature of the label is the license plate in barcode form. When the goods are unloaded, the barcode of the license plate on the container's master label is scanned using a tablet. If the license plate has previously been shipped via the ASN, the system will recognize the container. An unloading check is carried out. This makes it possible to immediately detect containers for which no notification has been sent.

Thanks to an app that clearly displays the packaging specification, incorrectly packed goods can be identified very early on, avoiding a great deal of effort in the warehouse at a later stage. Other divergences from the process (e.g., incorrect bills of delivery, damaged packaging) can also be recorded directly in the goods receiving using the tablet, and documented immediately with photographs.

The containers associated with a delivery note are booked into the system after all pallets from the same goods receiving have been scanned. The booking process requires the generation of a MAHLE internal number for each license plate. This number only exists in the background but plays a crucial role in all storage and removal processes in the MAHLE warehouse. Accordingly, the supplier label remains in use throughout the process and the containers are not relabeled. The accuracy and quality of the label is therefore extremely important. Consistent use of the license plate guarantees the traceability of the finished product back to the supplier.

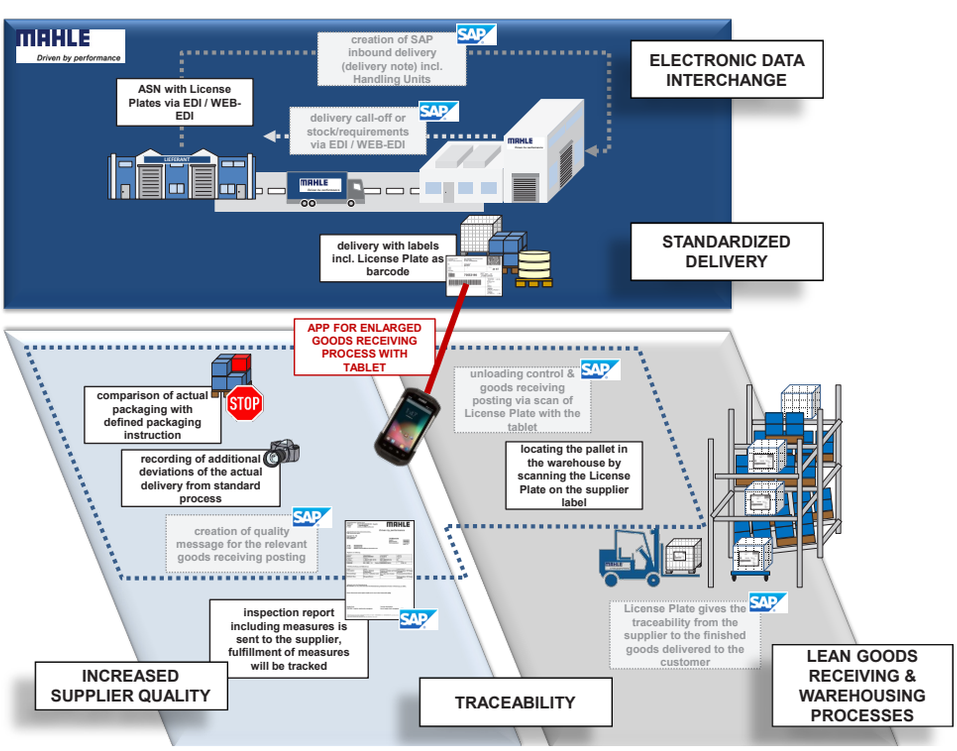

Fig. 1: MILO – MAHLE Inbound Logistics Optimization

4. SIZE, LAYOUT AND APPLICATION OF LABELS

4.1 GTL characteristics

There are three different forms of the GTL::

- Master Label for homogeneous loading unit
- Single Label for simplified loading unit or inner packaging
- Single Label in KLT format for inner packaging

Single Labels for simplified loading unit or inner packaging are used for containers with no subunits (e.g., cage pallets).
For containers with two-layer packaging, with the same material found in each small load carrier (e.g., pallets of SLCs), the pallet is given a master label for homogeneous loading unit, while each small load carrier (SLC, carton, etc.) is given a single Label in KLT format for inner packaging.

In the case of mixed pallets, each SLC is given its own single Label in KLT format and additionally there needs to be a master label for homogeneous loading units for each part number on the pallet. Agreements to the contrary must be coordinated with the MAHLE plant receiving the delivery and the central logistics department.

The labels differ in size as described in Fig. 3 and in the information that appears on them as outlined below.

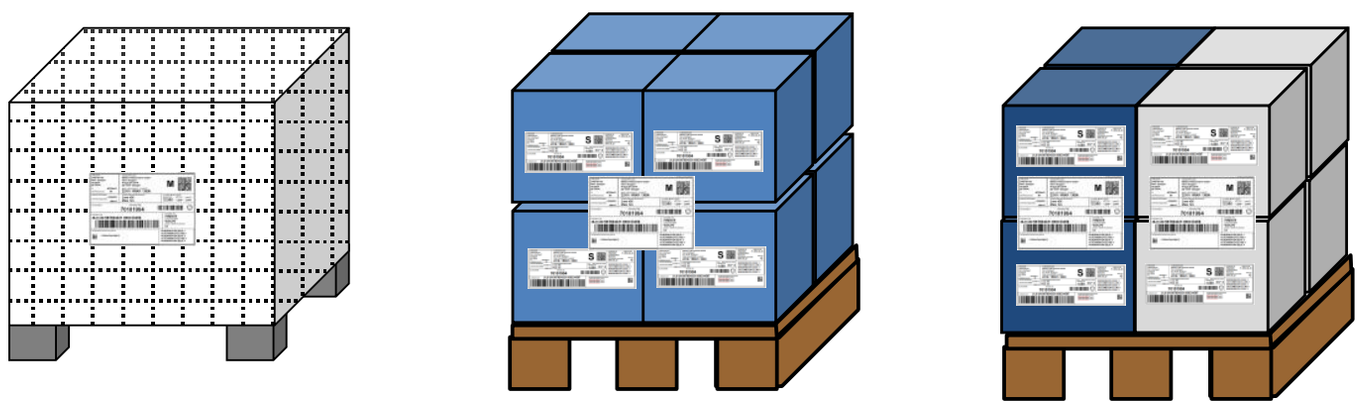

Fig. 2: Difference between master GTL and single GTL

4.2 Dimensions

The regulations of the VDA recommendation 4994 apply.

This means that the format should be DIN A5 landscape (210 mm x 148 mm). The label for small load carriers (SLC) is half the height of the DIN A5 label.

The container label can be a tag or a sticker.
The quality of the transport label should be such that it remains visually and machine-readable at all times, despite environmental influences and transport damage at the place of delivery.
The labels must have a paper quality of >=140g/m².

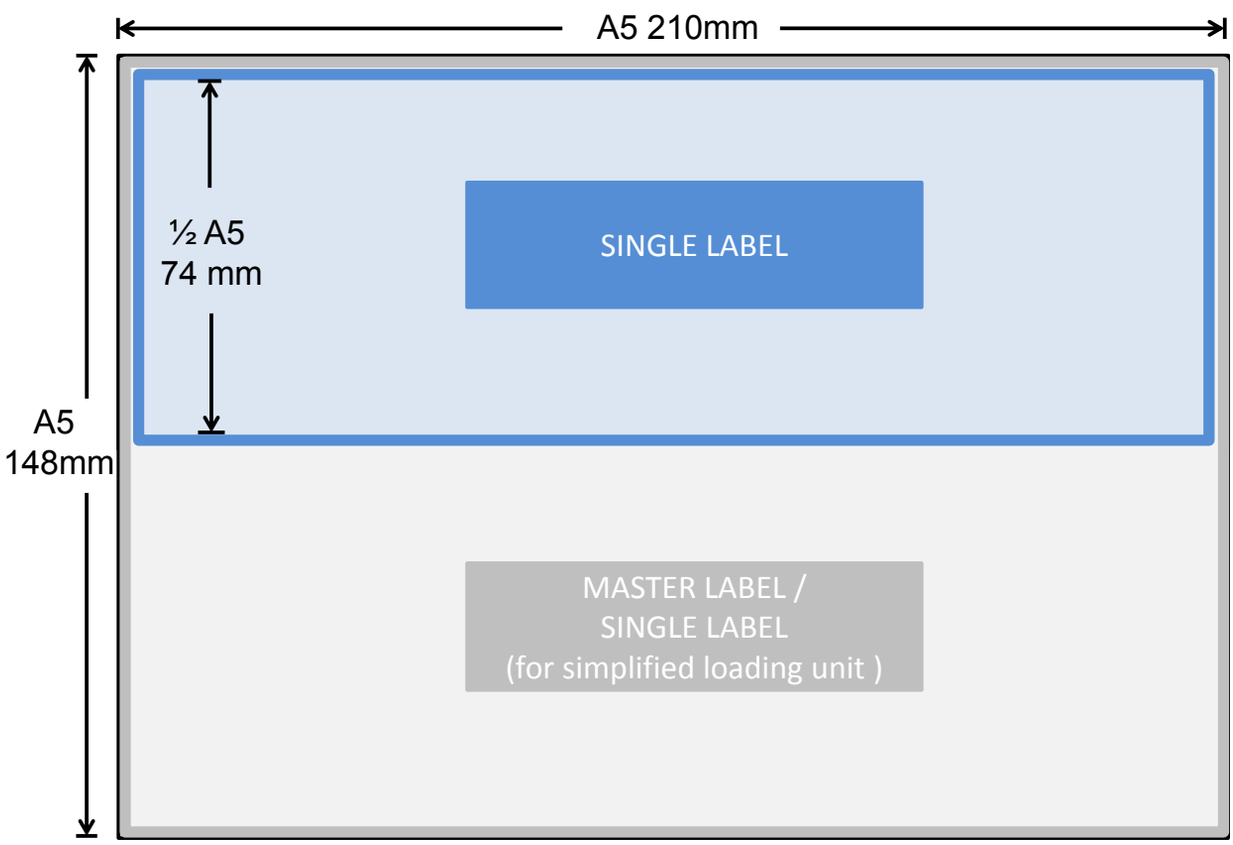

Fig. 3: Dimensions of transport label according to VDA-Norm 4994

4.3 Data fields on labels

The regulations of the VDA recommendation 4994 apply.

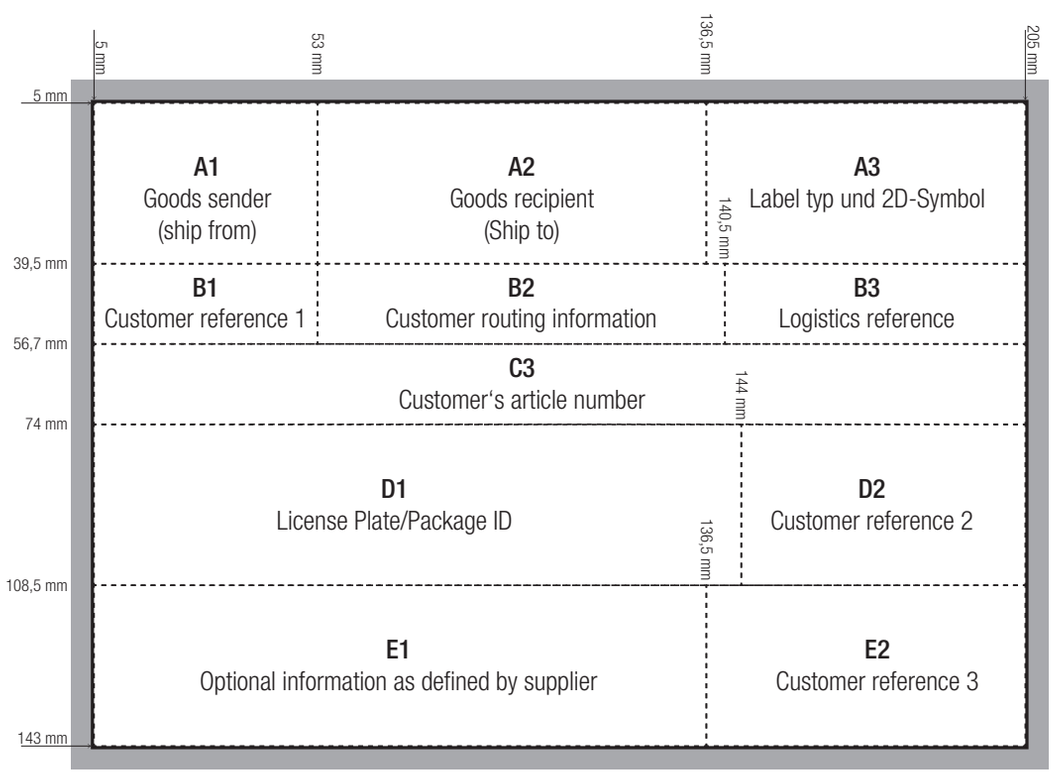

Fig. 4: Dimensions and layout of data fields - label format A5

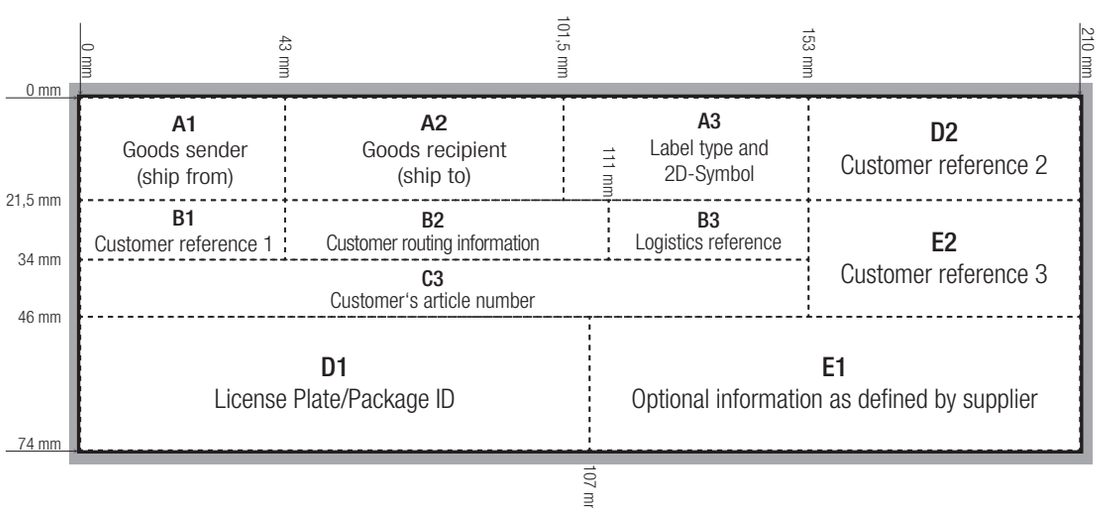

Fig. 5: Dimensions and layout of data fields - label format KLT

4.4 Technical Requirements

The regulations of the VDA recommendation 4994 according to paper and print quality apply.

4.5 Labels for transport packaging units (TPU)

The regulations of the VDA recommendation 4994 apply according to master label of a homogeneous loading unit and single label for simplified loading unit or inner packaging. Mixed labels for mixed loading units are currently not used at MAHLE filter systems GmbH.

Regulations according to the attachment of the label can be found in the currently valid logistics guideline of the MAHLE filter systems GmbH.

4.6 Labels for small load carriers (KLTs)

The regulations of the VDA recommendation 4994 apply.

4.7 Label on trays and special loading units with low hight

The usage of the new MAT label (VDA 4992) is possible. Generally, labels that differ from A5 or KLT format need to be agreed with the receiving plant.

5. DESCRIPTION OF DATA FIELDS

Generally, the regulations of the VDA recommendation 4994 apply. Customer information, like e.g. vendor code, unloading point, material number aso., needs to be taken out of the currently valid call-off. In case of names and addresses, sensible abbreviations need to be chosen, so that the maximum length specified in the VDA recommendation 4994 can be fulfilled. The language is German or English depending of the receiving plant. In case of german speaking plants English can be taken as language in coordination with the receiving plant.

- **A1 - Goods despatcher**
  The regulations of the VDA recommendation 4994 apply.

- **A2 - Goods recipient**
  The regulations of the VDA recommendation 4994 apply.

- **A3 - Label type and 2D barcode symbol**
  The regulations of the VDA recommendation 4994 apply. As MAHLE is currently not using mixed labels the type code „MIX“ is not needed.

- **B1 - Customer reference 1**
  The delivery note number to print is created by the despatcher, the vendor code is to be taken out of the valid call-off.

- **B2 - Customer routing information**
  This field is to be filled with the information of the target location in the MAHLE receiving plant as far as it has been transferred either in the call-off or in advance by the MAHLE plant.

- **B3 Logistics reference**
  The regulations of the VDA recommendation 4994 apply.

- **C – Customer‘s part number**
  Generally, the regulations of the VDA recommendation 4994 apply.
  The part number needs to be taken unchanged out of the valid call-off. The customer description of the part number needs to be printed additionally if required by the relevant MAHLE plant. Furthermore, the part number needs to be printed as a barcode on the right hand side of the article number as far as the MAHLE plant is requesting it.
  For all suppliers of the MAHLE filter systems plant in Wustermark (plant number 2233) this barcode is mandatory.

- **D1 - Package ID / License Plate**
  The regulations of the VDA recommendation 4994 apply.

- **D2 – Customer reference 2**
  The regulations of the VDA recommendation 4994 apply. The packaging type needs to be the MAHLE part number of the main packaging material (e.g. euro pallet, carton aso.). The part/hardware/software status is in case of parts with a drawing the drawing version of the part included in the delivery. If there is no drawing (e.g. in case of standard parts) the status shall be the date of the last change. If there hasn´t been any change, the date of the first delivery of this part shall be used. Deviations need to be coordinated with the plant.

- **E1 – Optional information as defined by supplier**
  The regulations of the VDA recommendation 4994 apply. Furthermore as an alternative to a DMC, a barcode with type 93 can be used.

- **E2 Customer reference 3**
  Currently (status July 2017) MAHLE is not sending customer specific references as PCI+16 or PCI+3 in the call-off.
  The VDA requirements anyway also apply here. In the case, that customer specific references will be transferred, they need to be printed in here.

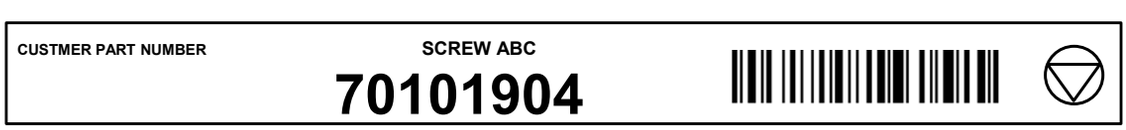

Fig. 6: C – Customer Part Number

Completely filled the labels could look like that

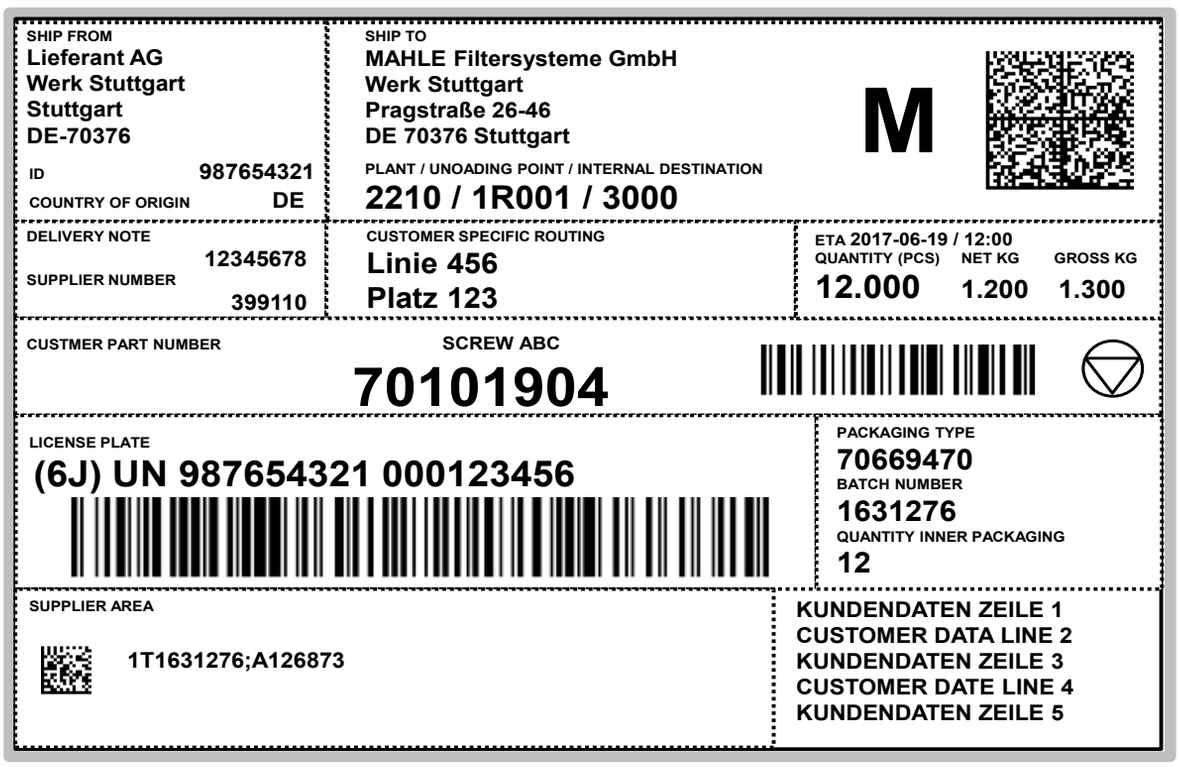

Fig. 7: A5 Master Label for homogeneous loading unit

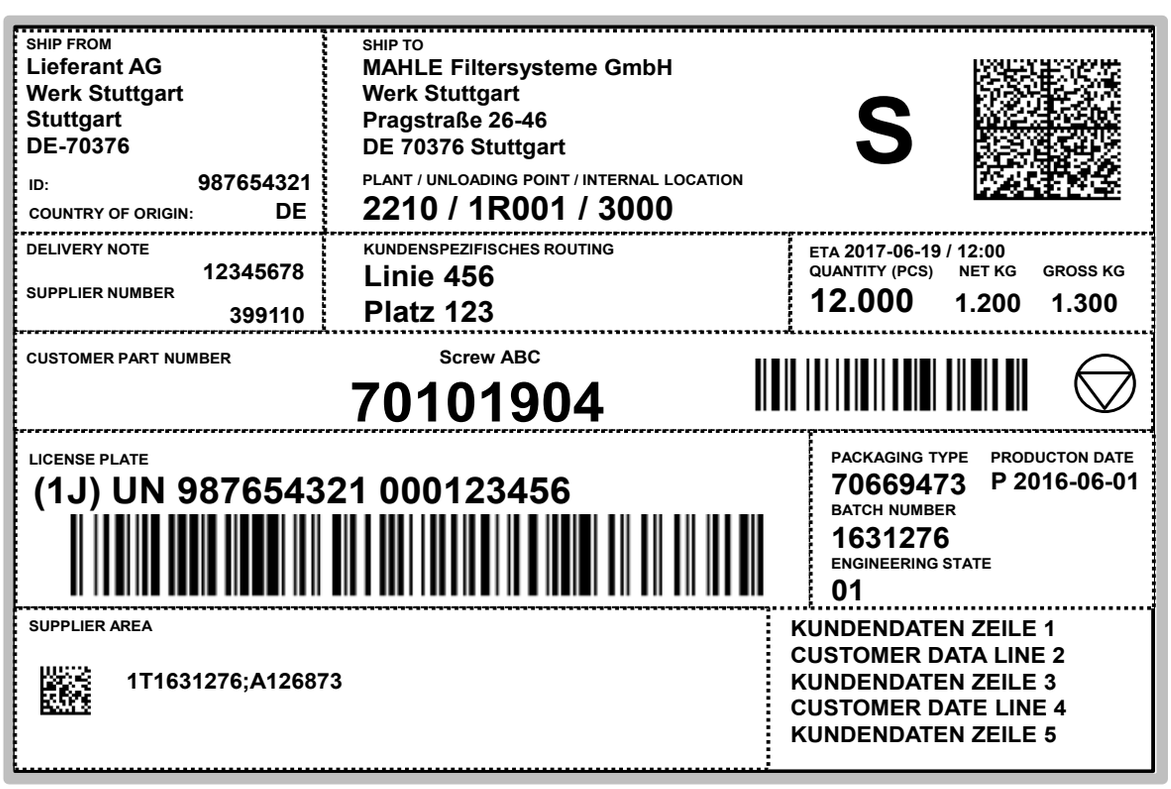

Fig. 8: A5 Single Label for simplified loading unit or inner packaging

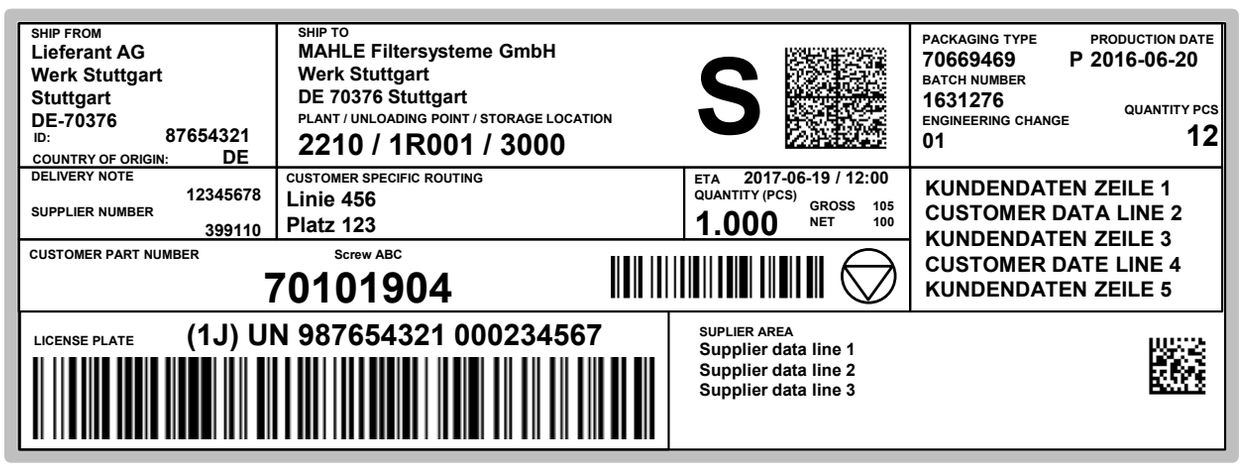

Fig. 9: Single Label in KLT format for inner packaging

6. IIDENTIFICATION OF PACKAGES AND LOADING UNITS

Generally, the regulations of the VDA recommendation 4994 apply.

The license plate / Package ID is the decisive element. It is a package serial number that is made up as follows:

Qualifier
+ UN
+ globally unique DUNS Nr (9-digit number filled in).
+ sequential package serial number (9-digit number, with leading zeros filled in)

Example: 1J UN 987654321 000000001

The package serial number is not allowed to repeat within one year.

The qualifiers can be divided into the following two cases:
- Single-layer packaging: Big load carrier has the qualifier 1J
- Two-layer packaging: Big load carrier has the qualifier 6J
  Small load carriers have the qualifier 1J

If small load carriers with several different material numbers are transported on one big load carrier, the individual small load carriers are, by default, to be labeled with a KLT label with qualifier 1J and additionally for each material number a master label with qualifier 6J needs to be put on the big load carrier

Deviations from this system must be agreed with the relevant plant and the central logistics planning.

The quality of the transport label should be such that it remains visually and machine-readable at all times, despite environmental influences and transport damages at the place of delivery.

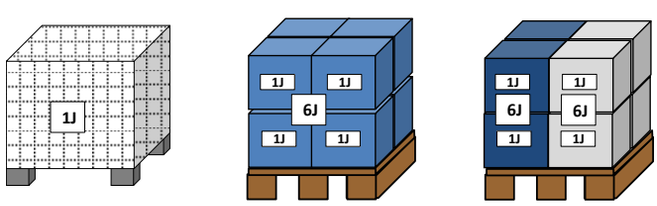

Fig. 10: Overview of license plate qualifiers

7. BARCODE, 2D CODE AND OPTIONAL RFID TAG

The quality of the barcodes directly affects the scan rate and the performance of the automatic data acquisition. The dimensions of the codes are of fundamental importance for the speed and first pass read rate.

7.1 1D-Barcode

Linear barcodes must be designed using the Code 128 symbology and comply with the ISO/IEC 15417 standard.
In this symbology, bars and spaces are designated as elements. The narrowest element defines the X-dimension of the barcode. If the narrowest element is 0.25 mm wide, element width 1 would be 0.25 mm, width 2 0.50 mm, width 3 0.75 mm aso.

The regulations of the VDA recommendation 4994 apply.

For the barcode of the license plate (in chapter 6 described in detail) the x dimension needs to be between 0,51 mm and 0,64 mm. Additionally the barcodes need to have a min. height of 17mm for Master Label for homogeneous loading unit and Single Label for simplified loading unit or inner packaging and a height of min. 15mm for Single Label in KLT format for inner packaging. The recommendation is a barcode height of 20mm.

7.2 2 Data Matrix Symbol

7.2.1 Symbol size

The regulations of the VDA recommendation 4994 apply.

7.2.2 Character sets

The regulations of the VDA recommendation 4994 apply.

7.2.3 Message structure according to ISO 15434

The regulations of the VDA recommendation 4994 apply.

7.2.4 User data for coding in DataMatrix

A general rule is that all user data mentioned in table 5 of the VDA recommendation 4994 needs to be included in the DMC as far as it is transferred in the ASN. Currently, MAHLE is not yet requiring an ASN in the format VDA4987, therefore the field estimated time of arrival is to be filled with the delivery date out of the call-off.

The general regulation of VDA recommendation 4994 for the status (mandatory/required, optional and depending) is also valid if no ASN is sent in format VDA4987.

Important is that the packaging type is always the relevant and valid MAHLE packaging number.

7.3 RFID tags used in conjunction with smart labels

Currently there are no SMART labels used in the MAHLE standard delivery process. Independent from that the regulations of the VDA recommendation 4994 apply in case of a future usage of RFID tags.

7.3.1 Function of passive RFID transponders

The regulations of the VDA recommendation 4994 apply.

7.3.2 Air interface and frequency range

The regulations of the VDA recommendation 4994 apply.

7.3.3 Structure and size of memory banks

The regulations of the VDA recommendation 4994 apply.

7.3.4 Example of code according to ISO 17367

The regulations of the VDA recommendation 4994 apply.

8. DELIVERY SCENARIOS AND REQUIREMENTS REGARDING THE INFORMATION ON THE LABELS

For MAHLE the standard is generally the case 3 described in chapter 8 of the VDA recommendation 4994. That means that as a matter of principle all fields of the label need to be filled. The cases 1 and 2 are generally allowed, if this is agreed between the supplier and the MAHLE receiving plant. Batch numbers and best-before-dates need to be printed on the labels in any way where this information is available.

Special case:
Under special circumstances loading units of inner packaging can be dropped. These cases are defined by the receiving MAHLE plant and to be agreed with the supplier.

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Contact:

MAHLE Filtersysteme GmbH
Supplier Management Logistics
Heike Söhner
Pragstraße 26-46
70376 Stuttgart, Deutschland

Phone: +49 711 501-20275
E-Mail: suppliermanagement.logistics.bu2@mahle.com
Internet: www.mahle.com