A joint Odette/ECG Publication

VIN Labels in the Vehicle Distribution Process

Ref FV26 Version 1.0 Published December 2022

ECG

ECG, the Association of European Vehicle Logistics, has been the voice of the Finished Vehicle Logistics industry in Europe since 1997. ECG represents the interests of over 100 member companies, from family-owned SMEs to multi-nationals, and is the major champion of the European vehicle logistics sector. ECG represents all transport modes at EU level – road, rail, maritime and fluvial. ECG Members provide transport, distribution, storage, preparation and post-production services to manufacturers, importers, car rental companies and vehicle leasing operators across the EU as well as in Norway, Switzerland, the United Kingdom, Turkey and beyond. They own or operate more than 360 car-carrying ships, 15,100 purpose-built railway wagons, 22 river barges and more than 23,000 road transporters.

As a major employer, the finished vehicle logistics sector plays an important role in contributing to the economic success of the European Union. ECG members have an aggregate turnover of around €21.3bn and their economic impact on companies associated with the sector is estimated at €56bn. More than 93,000 Europeans are employed directly by the vehicle logistics industry and an additional 224,000 are indirectly employed in this sector.

ODETTE

Odette is a not-for-profit pan-European collaboration and services platform for the entire automotive supply chain. Since 1984, Odette has brought together supply chain professionals and technology experts to create standards, develop best practice recommendations and provide services which support the digitalisation of logistics management, supply chain communications and the exchange of engineering data throughout the automotive industry.

The members of Odette are the national European automotive associations, which represent over 5000 companies in the major European automotive producing countries.

Odette is a founder member of the Joint Automotive Industry Forum (JAIF), which brings together the regional supply chain organisations in Europe, North America and Japan to develop automotive supply chain standards for the benefit of the global automotive industry.

Odette also has strong links with international standardisation bodies including ISO, UN/ECE and CEN.

This document has the following objectives:

- Define a standard location and fixing method for the vehicle identification label
- Recommend a size and layout for the vehicle identification label
- Define a minimum content for the vehicle identification label
- Recommend a bar-coding standard
- Provide recommendations for the quality of the vehicle identification label.

CONTENTS

1. INTRODUCTION

Logistics Service Providers (LSPs) involved in the finished vehicle distribution process face the problem that there is no harmonised or uniform standard for an Original Equipment Manufacturer (OEM) Distribution Label nor for its location on (or in) the vehicle. Labels are currently placed in different locations, either inside or outside the car, and have different formats: sometimes including a barcode with the 17-digit Vehicle Identification Number (VIN), sometimes including only the last part of the VIN and sometimes with extra characters appearing before or after the 17-digit VIN.

This leads to inefficiencies in the process:

- Handling operators often take some time to find and scan the label.
- Handling operators are sometimes required to read labels in dangerous positions
- IT systems often need to be modified to cope with the variations of content of the label.

It is clear that, in order to facilitate timely and accurate scanning of a vehicle, there needs to be a common standard in place for all vehicle manufacturers to work to.

The pictures below illustrate some examples of current labels and their placement.

2. SCOPE

The scope of this document concerns passenger cars and LCVs of all vehicle manufacturers handled by LSPs in Europe.

It does not, however, cover vehicles which enter the finished vehicle distribution process with full body covers which create specific challenges related to the positioning and reading of distribution labels.

Vehicles distributed with full body covers will, therefore, be the subject of a separate study.

3. DESCRIPTION OF THE FINISHED VEHICLE DISTRIBUTION PROCESS

The vast majority of transport processes from the vehicle manufacturer to the customer are multi-stage and, very often, multi-modal. Multi-stage means that in many cases the vehicles are transported via a number of vehicle compounds or other transport nodes, and by a number of different Logistics Service Providers (LSPs). Multi-modal means that different types of transport are used in these supply chains (railways, trucks, ships, river barges are used by the industry in normal operations).

GATE IN - TRUCK & RAIL

When a truck arrives at the compound, the driver receives the information where they must park the units; the terminal operators scan the distribution label.

When a train arrives, a location is defined for each unit on the train, it is possible that several units will go to the same location, and cars will be driven directly to their predefined locations.

GATE IN - VESSEL

When a vessel arrives, the handling operators move the units. Typically, a terminal operator scans the distribution label at the vessel ramp and the unit is then driven to FPR (First Point of Rest). The position to park the unit is decided prior to the arrival of the vessel.

GATE OUT - TRUCK & RAIL

The truck driver receives a list of units to pick up. The units are collected, loaded on the truck, and scanned prior to departure from the terminal.

Units are pre-assigned for a specific train. The handling operators pick up and deliver the units directly to the train.

GATE OUT - VESSEL

All units to be loaded are pre-defined by the terminal operator. The units are driven to the vessel. The terminal operator scans the distribution label at the ramp and confirms the loading when the units are on board.

INVENTORY CHECKS

Inventory checks of the parking areas are performed at regular intervals. Operators generally walk the individual parking areas and verify that each parking space is occupied. In addition to storing the vehicles, the service providers also see to the provision, in specifically equipped vehicle terminals, of technical services, e.g. de-waxing, exterior and interior cleaning, paintwork and conversions.

4. PROJECT METHODOLOGY

The project took a previous ECG publication - **VIN labels in Vehicle Distribution Processes –** published in July 2020, as its basis. This previous publication made a number of recommendations based on physical tests of reading VIN labels in several Finished Vehicle Logistics (FVL) compounds and terminals and was itself partly based on a previous Odette publication – **RFID in Vehicle Distribution Processes (LR02)**.

The latest project was undertaken in an attempt to convert the previous ECG publication into a more formalised standard for the design and content of a VIN label.

In the first instance several meetings were held with various ECG member companies, representing different types of service providers in the vehicle distribution chain, in order to get their views on the design and content of the VIN labels, as they are the users who are required to read and scan the labels from multiple vehicle manufacturers in their day-to-day operations.

The results from the meetings with the LSPs were then presented to several European vehicle manufacturers to obtain their comments on the proposals.

From these joint meetings with vehicle manufacturers and LSPs, two points arose that were seemingly at odds with the orthodoxy espoused in the earlier publications, namely:

1. Smart labels with the main data being recorded on embedded RFID tags which would then be read as the vehicles passed a gate equipped with a RFID reader no longer seemed to be the preferred way forward.
2. The traditional 1D linear bar-codes, which are usually read with hand-held scanners, were considered to be inferior to the more recent 2D bar codes (e.g. QR codes) which were felt to give more consistent readability.

5. RECOMMENDATIONS

5.1 POSITIONING OF THE LABEL

As part of the development of the previous ECG recommendation a number of physical tests were carried out in Zeebrugge:

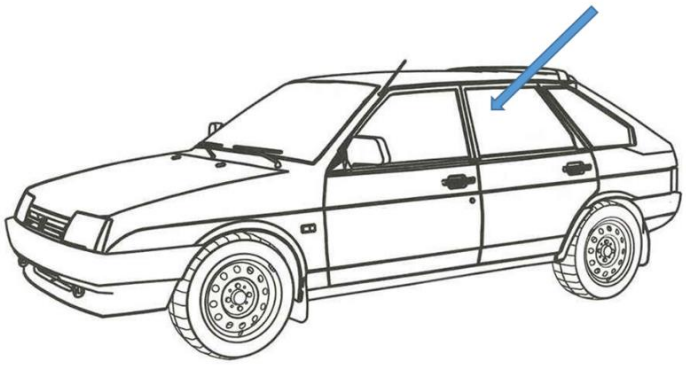
- to test scanning existing barcode labels
- to measure benefits of a unique solution

The test covered the GATE-IN and GATE-OUT process for road, rail and maritime transport. The result of the tests showed that it was possible to reduce the scanning time by almost 75% for the units of some vehicle manufacturers if the label contains the complete VIN number and is on the window.

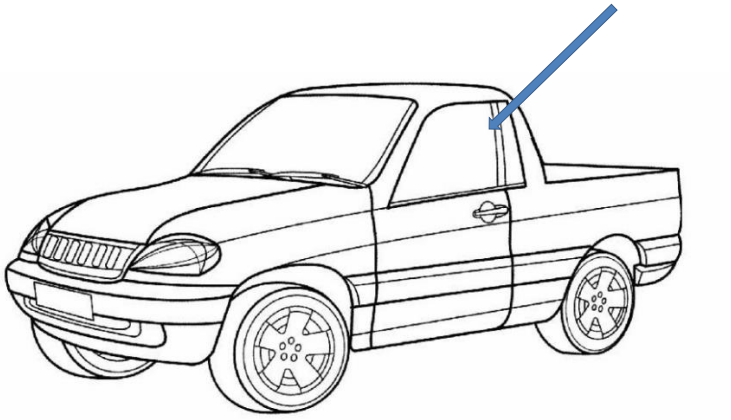
The tests demonstrated that, in one example, the scanning took 57 seconds for 5 units if the label was on a paper inside the car, needing the door to be opened each time, whereas the scanning took just 15 seconds for 5 units if the VIN label was on the window.

The detailed data of the tests is given in Annexe 1.

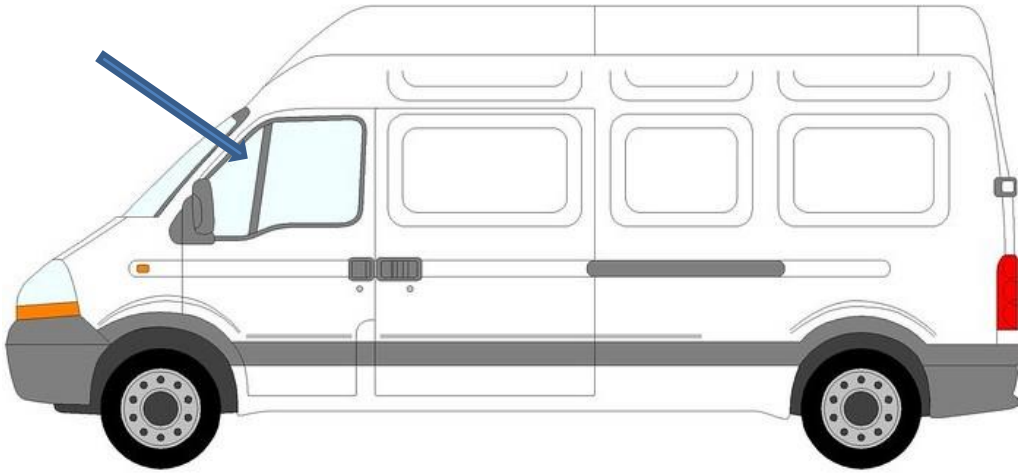
The tests also determined that the best location for the label is the left top corner of the left rear side window – for both left-hand drive and right-hand drive vehicles.



For pickups without rear side windows the recommendation is the right top corner of the left front side window.



For vans, the recommendation is the fixed part of the left front window (if there is one), above the mirror (as the mirror might get folded and hide the label).



5.2. FIXING OF THE LABEL

Inside or outside of the window

The label should be placed outside of the window, if possible, to facilitate scanning (particularly if the window is tinted). The label and the adhesive material must be able to withstand weather conditions and washing at the compound.

If the label is equipped with an RFID tag (i.e. a Smart Label), then it should be outside to facilitate data transmission.

Method of application

The label has to be applied completely flat on the window without any wrinkles which would prevent correct scanning. If a tool is used to apply the label, this must not scratch the label which could potentially damage the barcode.

5.3. CONTENT OF THE LABEL

The mandatory information for the label is the following:

- **VIN 17 digits – Human readable and bar coded**
  Currently some vehicle manufacturers use control digits with the VIN which adds confusion. It is recommended that control digits should not be added to the VIN, neither in its human readable format nor in its bar-coded format.
- **Delivery Destination/Market/Country**
  It is often not possible to give a precise delivery address at the time that the vehicle is moved from a vehicle manufacturer compound but normally it should be possible for a destination country or market to be determined and shown.
- **Fuel Type**
  The advent of alternative fuel vehicles, especially battery electric vehicles, has given rise to concerns about hazards such as vehicle fires during transport, especially during sea transport. The European Maritime Safety Agency (EMSA) issued a guidance document in May 2022 on how to deal with such hazards and have provided recommendations on how to mitigate the risk. One recommendation is that the fuel type should be clearly indicated on the vehicle. Appendix 2 of this document defines a set of 3-letter codes to be shown on the labels.

The following information, although not mandatory, could be very useful for the LSPs

- **Vehicle type/model**
  Compound operators do not always have information about the unit and may be unable to retrieve it via the VIN number. Having a human readable model or commercial name (e.g. Passat, Berlingo) on the label would help to fill gaps in the compound management system.

It is recommended to include this information immediately below the VIN Number area and above the Additional Information area of the label (see label examples below)

- **Vehicle weight**
  To ensure a load that is both legal and balanced, it can be helpful for the loader to be able see the weight of the unit during the loading process.

  It is recommended to include this information at the top of the Additional Information area of the label (see label examples below)

- **Vehicle dimensions**
  Depending on deck height, the height of the unit is important for the stevedores to prepare for stowing the vehicle in the hold of a ship. This height should include any accessories fitted on the vehicle. The length and width of the unit can also be useful when preparing for stowage.

  It is recommended to include this information at the top of the Additional Information area of the label (see label examples below)

The vehicle manufacturer may also add other information, for instance:

- **Manufacturing plant**
  This information should be displayed in the Manufacturer area at the top left of the label.

- **Production number**
  Although the VIN is always used as the unique identifier of a vehicle throughout the distribution chain and its subsequent life, the manufacturer will sometimes include an internal production number as a separate identifier.
  It is recommended to include this information immediately below the VIN Number area and above the Additional Information area of the label (see label examples below)

- **Production date**
  It is recommended to include this information immediately below the VIN Number area and above the Additional Information area of the label (see label examples below)

Data Consistency
In cases where partners in the vehicle distribution chain are exchanging information electronically, the data included on the label must be consistent with data included in the associated FVL digital messages.

5.4. BAR CODING OPTIONS

Up to now, the bar codes used on labels to carry the VIN number have typically been linear 1D bar codes using either Code 39 or Code 128 symbology, but an increasing number of vehicle manufacturers are now adding 2D bar codes to their labels, using QR or Data Matrix symbology, and at least one manufacturer is using a 2D bar code only.

The FVL service providers taking part in the project, expressed a preference for the 2D bar code because of the greater error-correction potential that this type of bar code offers. 2D bar codes can usually be read even if up to 30% of the bar code area is damaged. FVL service providers also expressed their belief that most scanning equipment in use in compounds and terminals is capable of reading 2D bar codes.

It is therefore recommended that all vehicle manufacturers should move to using 2D bar codes to hold the VIN Number rather than the traditional 1D bar code. If, however, the printing or reading of a 2D bar code is not possible, or not convenient, a 1D bar code can be included in the Optional Data area on the label (see label examples below).

Another significant advantage of using a 2D barcode is that, besides the VIN Number, it can also hold other pieces of relevant information which can free up space on the label if this data does not need to be human readable during logistics operations.

It is recommended to use a model 2 QR-Code according to ISO/IEC18004 (often referred to as QR-Code (JIS)).

Data Identifier
The Data Identifier (DI), as the name implies, identifies a data element and is essential when more than one element of bar-coded data is being scanned. The Data Identifier is omitted from the human readable characters.

The Data Identifier is either a single alpha character on its own or a single alpha character preceded by one, two or three numeric digits (nnna).

The main Data Identifier used in Finished Vehicle Logistics is I (upper case “i”) which identifies that the data that follows is a full Vehicle Identification Number. The data stream encoded in a 2D symbol MUST include the VIN preceded by the Data Identifier I.

Each other data element included in a 2D barcode will have its own Data Identifier.

We recommend encoding according to the syntax described in DIN 16598 / AFNOR NF Z 63-400. The syntax is indicated by a leading “.” (dot) as syntax flag character, followed by the first Data Identifier and its associated data, e.g.

.IWVWZZZ1JZXW000001 for the VIN number WVWZZZ1JZXW000001.

If more data fields are to be included in the data stream, the separator character "^” is used to indicate the beginning of a new data field, again identified by a Data Identifier followed by the relevant data.

As an example the following string
.IWVWZZZ1JZXW000001^16D20220722^8D2022073117^W12345678901234567
contains:

- The VIN identified by DI I: WVWZZZ1JZXW000001
- The production date identified by DI 16D: 2022-07-22
- The delivery due date identified by DI 8D and (trailing) qualifier 17: 2022-07-31
- The production number identified by DI W: 12345678901234567

This syntax guarantees keyboard and web compatible encoding of data elements in machine readable symbols applied with ASC Data Identifiers.

Data Identifiers complying with ANSI MH10.8.2 as required in ISO/IEC 15418 shall be used.
For reference, we recommend the Odette publication JA01 JAIF Data Identifiers Table for use in AutoID.

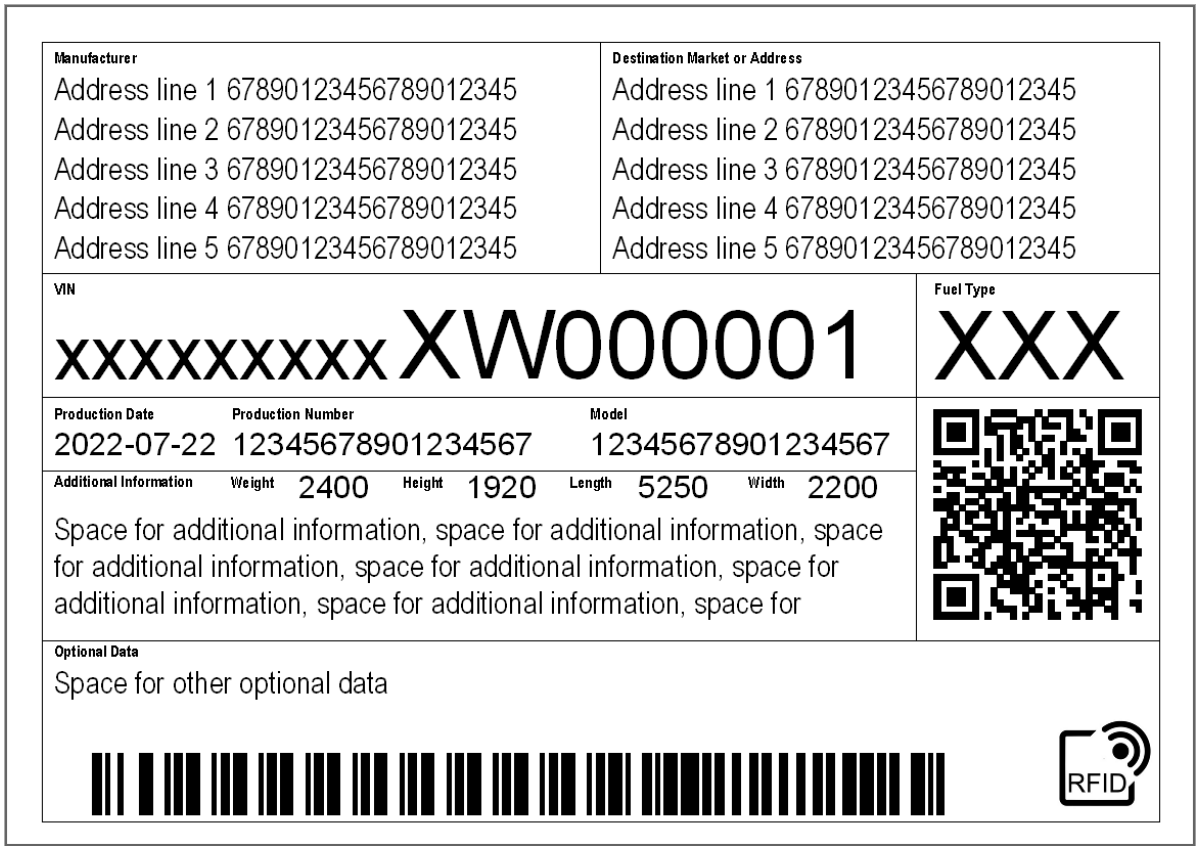
5.5. SIZE AND LAYOUT OF THE LABEL

It is recommended that, where possible, an A5 size label is used as it is felt that this size of label provides the best ‘trade-off’ between the space available in the recommended fitting positions and the human readability of data on the label. However, some thermal printers have a maximum width capacity of 100mm, therefore a label size of 100mm x 150mm can be used as an alternative. Label printers, in common with most other printers, can print in either landscape or portrait format So the

smaller thermal printer labels can be printed 100 x 150 mm or 150 x 100 mm. The A5 layout will be reduced to approximately 71 % of the original size but is otherwise identical.

An essential standardisation step in the layout of the VIN label is the arrangement of the essential data fields in "standard blocks".

A5 Label Template



Manufacturer (approx. 10.0 cm x 4.25 cm)

A data block to identify the vehicle manufacturer's plant. The area provides space for five lines with 35 characters each (standard address format). If only name and plant ID are necessary, the character font used can be larger than in the template.

Template font size: 16, Arial Narrow

Destination Market or Address (approx. 10.0 cm x 4.25 cm)

A data block to identify the destination. Also here, a fully specified address can be printed, if necessary. Otherwise, the destination market can be specified, e.g. by using a country code or name. Template font size: 16, Arial Narrow

VIN (approx. 15.5 x 2.25 cm)

In this area the VIN is printed in human readable form. It is recommended to show the serial number part (last 8 digits) of the human readable VIN number in slightly bigger font so that it is readable from a distance by the stevedores (they sometimes need to crosscheck the VIN number on the label with the engraved number). It is suggested to use a basic font, without embellishment, of size 48 for this purpose (e.g. Arial, Helvetica, etc.). For the rest of the VIN font size 24 is recommended. See the template.

Fuel Type (approx. 4.5 cm x 2.25 cm)

Identification of the fuel / power type of the vehicle. A three-character code is used – see Annexe 2. Template font size: 48

Production Date, Production Number, Model (approx. 15.5 cm x 1.3 cm)

An area for information most commonly used by the car manufacturers in vehicle distribution processes. Dates should be printed in the ISO format CCYY-MM-DD. For production number and model identifiers up to 17 characters can be printed.
Template font size: 16

Additional information (approx. 15.5 cm x 3.0 cm)

To give the vehicle manufacturer the opportunity to display additional information on the label, the label offers an optional 'unrestricted' block for the entry of manufacturer-specific data.

If weight and / or dimensions are to be included, it is recommended to always put this information above other additional information. Weight to be specified in kilograms, dimensions in millimetres. Other information can include the specification of special equipment, handling instructions etc. Template font size: 16

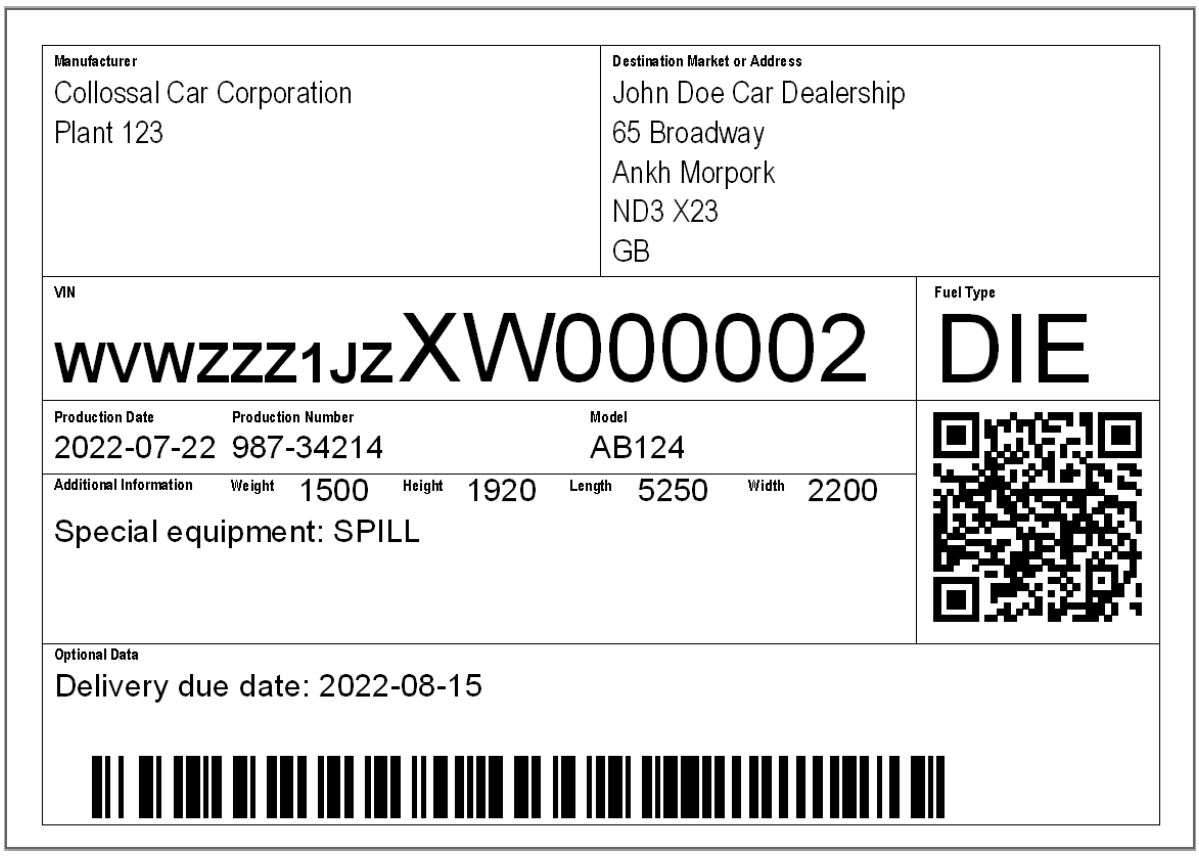
QR-Code (approx. 4.5 cm x 4.3 cm)

Area for the 2D-QR-Code symbol. The recommended maximum symbol size is 4.1 cm x 4.1 cm so that at least 1 mm at each edge remains as silent zone.

Optional Data (approx. 20.0 cm x 3.0 cm)

An area for other data needed for vehicle manufacturer specific logistics and process related information.
If the label is also equipped with an RFID tag containing the VIN number, the RFID-symbol in the lower right corner shall indicate the use of such a “smart label”. Otherwise, the symbol should not appear. This area can also be used to contain the VIN as Code 128 barcode, if not all partners in the distribution chain are able to process the QR-Code.
Template font size: 16

A5 label example



5.6. QUALITY OF THE LABEL

Achieving a high-quality 2D code depends on a combination of factors: printing resolution, ink and contrast, the substrate (material), the printing environment, and the code design.

Visibility and durability of the printed information

There is no preferred method of printing on the labels but the characters printed must be easily readable, withstand all weather conditions and remain readable for the full duration the vehicle is expected to spend in the logistics chain (minimum of 6 months).

Label material (substrate)

The label material shall be white, machine-finished, moisture and weather resistant, with black printing. The label must be durable enough to ensure readability at its destination. The material must not be too glossy as the scanner light can reflect and cause the barcode to improperly scan.

Label adhesive

Adhesive labels must be moisture resistant and be easy to remove without leaving behind any residue.

See label quality test results in Annexe 3.

6. REFERENCES

AIAG B-2, Vehicle Identification Number (VIN) Application Standard, version 3.1, November 2018

ECG, VIN labels in vehicle distribution processes, July 2020

ISO 534:2011, Paper and board — Determination of thickness, density and specific volume

ISO 536:2019, Paper and board — Determination of grammage

ISO/IEC 15415:2011, Information technology — Automatic identification and data capture techniques — Bar code symbol print quality test specification — Two-dimensional symbols

ISO/IEC 15416:2016, Automatic identification and data capture techniques — Bar code print quality test specification — Linear symbols

ISO/IEC 15418:2016, Information technology – Automatic identification and data capture techniques – ASC MH10 Data Identifiers and maintenance

ISO/IEC 18004:2015, Automatic identification and data capture techniques – QR Code bar code symbology specification

Odette LL08, Global transport label, European profile, version 2.01, June 2019

Odette LR02, RFID in Vehicle Distribution Processes, version 1R0, January 2010

Odette JA01, JAIF Data Identifiers for use in AutoID, version 1.0, May 2022

7. GLOSSARY

Term	Definition
First place of rest (FPR)	A nominated area where vehicles are parked when unloaded after a transport leg
Gate in	Vehicle arrival
Gate out	Vehicle departure
LSP	Logistics Service Provider
OEM	Original Equipment Manufacturer; in the context of these Guidelines, a vehicle manufacturer
RFID	Radio frequency identification. Automatic identification method, using devices called RFID tags or transponders
Simple label	Paper label without any tags
Smart label	Passive RFID tag integrated in the paper label
Standardised label	Label with the mandatory information located on the particular place on the car
VIN	The vehicle identification number is a unique, 17 digit alphanumeric serial number used globally by the automotive industry to identify individual motor vehicles. It is assigned by the OEM manufacturer and etched onto the vehicle body/chassis in various places.

Disclaimer:

The contents of this document reflect the latest level of technical information. Application of this recommendation is the total responsibility of the user and Odette/ECG cannot be held responsible in any way for its use or application. This recommendation has been developed from ECG recommendation, VIN labels in vehicle distribution processes - July 2020, and has been updated to reflect current needs and the latest technical developments.

ANNEXE 1 – LABEL READING TESTS

The detailed data of the test held in Zeebrugge on 06 September 2019.

Results of the test day

OEM	Label type	Label location	Scanning time (sec.)	Scanning time per car (Σ: 5 cars)	Scan value	Comments
A	A/4 sheet + label (barcode)	label on the windscreen A/4 sheet inside the car	57	11.4	17-digit VIN on A/4 sheet 8-digit VIN on the label	
B	label (barcode)	rear passenger window (on the left side of the window)	15	3	17-digit VIN +2 characters + *	
C	2-3 sheets of paper (with barcode)	Inside the car	58	11.6	17-digit VIN	
D	Label (QR code)	Windscreen	15	3	17-digit VIN	need to have 2-dimension scanner
E	label (barcode)	rear passenger window (on the left side of the window) but INSIDE	52	10.4	17-digit VIN	when the rear window is tinted it is difficult to scan the barcode there are 2 barcodes - it is difficult to focus on one

ANNEXE 2 – FUEL TYPE CODE

The advent of alternative fuel vehicles, especially battery electric vehicles, has given rise to concerns about hazards such as vehicle fires during transport, especially during sea transport. The European Maritime Safety Agency (EMSA) issued a guidance document in May 2022 on how to deal with such hazards and have provided recommendations on how to mitigate the risk. One recommendation is that the fuel type should be clearly indicated on the vehicle.

In the ECG-Odette-VDA FVL digital messages document, an EDIFACT code list (7041 - Power Type) was used to identify the fuel used by a Means of Transport which in the FVL scenario could be a car transporter, a railway locomotive, a ship or a barge.

This EDIFACT code, however, is a single digit numeric, which is fine for use in digital messaging but is not so good in an environment where the code needs to be easy for humans to read and interpret in emergency situations.

Odette and ECG have therefore developed an 3 alpha character code extension to the EDIFACT code list for each fuel type used by passenger cars currently on the market or known to be under development.

Some of the identified fuel types are not yet included in the EDIFACT code list but Odette has submitted change requests to UN/CEFACT, the controlling body for EDIFACT codes, to ask for these fuel types to be added.

ECG-Odette VIN Label Code	ECG-Odette Description	EDIFACT Code List 7041	EDIFACT Description
BEV	Battery Electric	**3**	Electric
CNG	Compressed Natural Gas	Requested	
DIE	Diesel	**1**	Diesel
DHY	Diesel Hybrid	**2**	Diesel and Electric
HYD	Hydrogen Fuel-Cell	Requested	
LNG	Liquified Natural Gas	Requested	
LPG	Liquified Petroleum Gas	**4**	Liquid Propane Gas
PET	Petrol	**5**	Petrol
PHY	Petrol Hybrid	**6**	Petrol and Electric

ANNEXE 3 – LABEL QUALITY TESTS

Below are described the tests of the label quality performed in the laboratory:

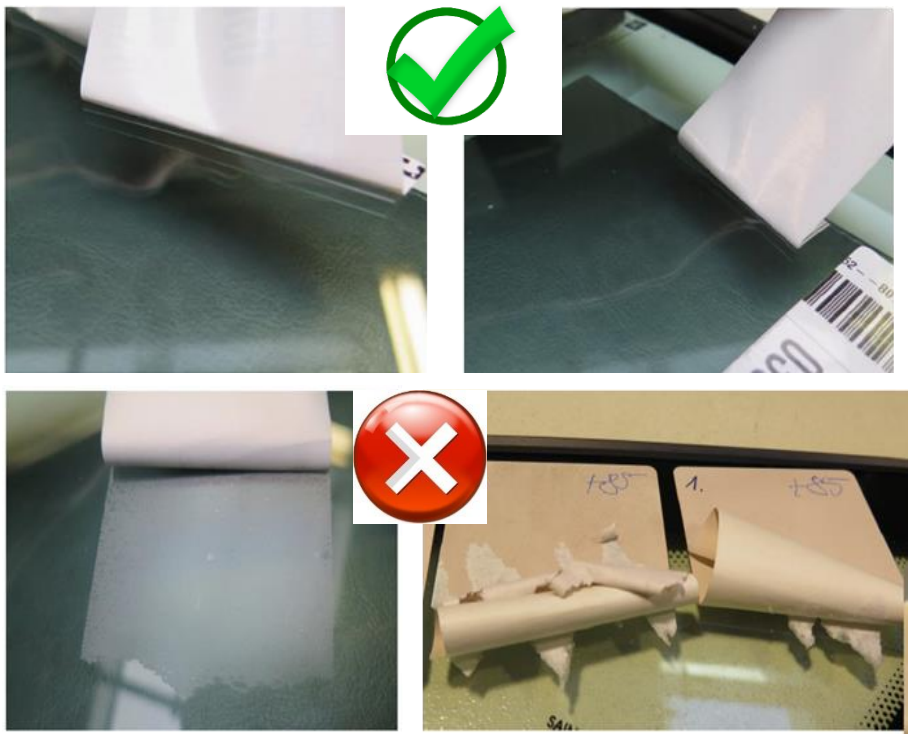
- 9 different tests
- 10 different types of paper and glue (5 producers)

Conditions of the test:

- Labels were affixed on the glass and conditioned for 9 to 18 days
- Room temperature
- Humidity (+40°C / 40%RH)
- Heating in +75°C
- Cooling in -30°C
- Temperature - humidity cycles (+40°C / 40%RH)

Final result:

- label does not leave traces of glue on the glass,
- the peel strength for the label is low (easy for dealer to remove the label)



Afterwards, the labels were affixed to the window glass for 50 cycles of closing and opening of the window.

Conditions:

- Humidity (+40°C / 95%RH)
- 50 cycles

Results:

After 50 cycles, there is no change to the printing, the labels stick to the glass. The peel strength is low, no glue stays on the glass.

Here is the example of UECC Label and Material Specification:

Label

Label size 110m x 149.5mm with perforation between labels. Supplied in rolls of 630 labels on 76mm cores. Material: C502P

Material

C502P

Matt White Plasticised Vinyl Film with good flexibility and conformability on cured surfaces

Weight	110g/m^2 +/- 10%	ISO-536
Thickness	80 microns +/- 10%	ISO-534-80

Adhesive

Type	Semi-permanent acrylic	
Min Application temp	+10 Degrees C	
Service temperature	-40 degrees C - +100 degrees C	
Shear	High	
Tack	Medium N/25mm	FINAT FTM9
Final Adhesion	Medium N/25mm	FINAT FTM2

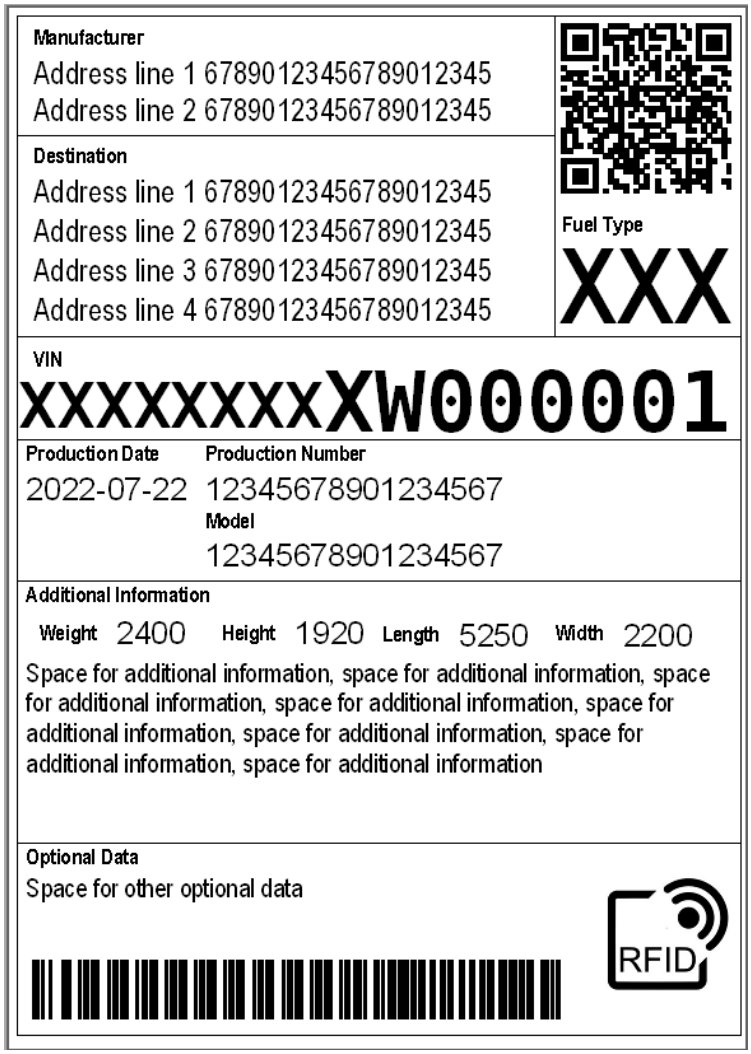
Liner

Type	1 sided Siliconized Glassine	
Colour & Finish	White	
Weight	90g/m^2 +/-10%	PP-032-ISO536
Thickness	77 microns +/- 10%	ISO534

ANNEXE 4 – PORTRAIT LAYOUT AND EXAMPLE

If for any reason a portrait layout is preferred, the following recommendation applies:

Portrait Template



Portrait Example