



**SOLARIS**  
A **CAF** GROUP COMPANY

# WORKS STANDARD

SN22-004-00L Release 12

## Marking

**Identification of places, information and scope  
of marking**

Solaris Bus & Coach sp. z o.o. (hereinafter  
referred to as "Solaris")

Release: June 2021

with its registered office in the locality of Bolechowo-Osiedle at: Obornicka 46, 62-005 Owińska, entered into the Register of Entrepreneurs of the National Court Register, kept by the District Court Poznań Nowe Miasto and Wilda in Poznań, 8<sup>th</sup> Commercial Division of the National Court Register, entered under KRS No. 0000236619, Tax ID (NIP) No. 524-00-15-630, share capital totalling PLN 160 169 580.00, fully paid-up.

This English version is a translation. In case of doubt or conflict the valid polish – language original will govern.

## Table of Contents

1. Application area and objective .....	3
2. Scope of Works Standard .....	3
3. Referenced standards .....	3
4. Terms and definitions .....	3
5. Types of marking .....	4
6. Selection of marking type .....	5
7. Exemption from the marking obligation .....	5
8. Works Standard application .....	5
9. Marking of plastics .....	12
10. Marking of air brake pipes .....	13
11. Marking of hydraulic lines .....	13
12. Marking of roof panels .....	14
13. Affixing the required marking .....	16
14. Durability of markings .....	16
15. Tasks of the Supply Control Department - marking control .....	16
16. List of Figures .....	17
17. List of Tables .....	17

## 1. Application area and objective

The subject of this Works Standard is to determine the methods of marking inseparable parts (definition see item 4.2) performed by the cooperating companies for the purposes of Solaris Bus & Coach sp. z o.o. (SBC) and performed on the premises of SBC.

The objective of the Works Standard is to ensure the correct identification and traceability of parts and details. The development of the standard is also intended to provide information on the location, method and scope of marking. Beginning with the implementation of this SBC Works Standard, marking is mandatory for inseparable parts and individual parts within the vehicle structure.

Internal information IW-817/2011/QFI expires, replaced by Works Standard SN 22-004-000, effective as of implementation of the standard.

## 2. Scope of Works Standard

- 2.1. The Works Standard is effective at Solaris Bus & Coach sp. z o.o.
- 2.2. For subcontractors, this Works Standard may be incorporated into the technical documentation.

## 3. Referenced standards

In the case of non-dated references, the last edition of the publication referred to shall apply.

The Works Standard refers to the following standards:

- 3.1. EN 2424 - Aerospace - Marking of aerospace products.
- 3.2. ISO 7628 EN - "Road vehicles — Thermoplastics tubing for air braking systems."
- 3.3. EN 853, EN 854, EN 856, EN 857 – „Hydraulic hoses and tubes."
- 3.4. EN ISO 9001 – "Quality Management Systems. Requirements."
- 3.5. PN-EN ISO 11469 – "Plastics."
- 3.6. PN-EN ISO 1043-1 – „Plastics. Symbols and abbreviations. Part 1: Basic polymers and their characteristics."
- 3.7. PN-EN ISO 1043-2 – "Plastics. Symbols and abbreviations. Part 2: Fillers and reinforcing materials."

## 4. Terms and definitions

- 4.1. SBC - Solaris Bus & Coach.
- 4.2. Inseparable parts to be marked include: permanently connected individual details included in e.g. welding, gluing, soldering, riveting, subassemblies etc.
- 4.3. Marking - marking allows for full identification of products and their producers, thus supporting brand protection, quality control and product monitoring.

## 5. Types of marking

The following types of marking can be distinguished:

### 5.1. Surface-invasive marking [T]

The process of giving a permanent feature or marking directly on the workpiece, making it impossible to remove or change the marking without damaging the place of marking.

The obligation to mark surfaces with surface-invasive marking shall be applied to safety-critical components, as specified by the design engineer, and to components that are subject to a permanent feature or marking on the basis of separate procedures or recommendations.

#### Types of surface-invasive marking:

- micropoint marking
- marking by stamping (punching)
- embossing marking
- laser marking
- engraving
- electrolytic marking
- riser head
- badge

The marking of the marked item should be legible without enlargement after possible surface treatment. Concave and protruding characters shall range from 0.05 mm to 0.25 mm and shall remain within the dimensional tolerance [EN 2424].

### 5.2. Non-invasive marking [N]

- Overprint technique  
A marking method that does not interfere with the surface structure.

The external surface of CNG pipes and other high-pressure pipes shall not have any damage, scratches or engravings that would damage the structure of the pipe wall surface. The marking on the pipes described above must be carried out using the overprint technique.

- Marking with a label

This type of marking requires the use of labels with appropriate properties: durability of overprint, adhesion to the surface, and resistance to dirt and solvents for a period not shorter than the time described in [item 14] and properties described in [item 14].

CAUTION! - labels are not resistant to acetone.

## 6. Selection of marking type

The selection of the type of marking for SBC-designed inseparable parts and individual details is made by the design engineer [pursuant to item 5], based on the requirements and intended use of the manufactured component.

### Product labelling for SBC should comply with item 8

All components, except those exempted from marking in [item 7], shall be allocated an appropriate space by the design engineer to mark the item or inseparable part. The marking should be complete, in accordance with the recommendations of the current SBC Works Standard. Any deviation from the recommendations in this document must be substantiated. In case of doubt about the correct marking, the final decision about the location and type of marking shall be made by the design engineer. In the absence of a reference in the drawing to the recommended marking technique and place, the choice of technique and place is left to the manufacturers.

## 7. Exemption from the marking obligation

- Elements that weigh less than:
  - metal: 200g
  - plastics other than elastomers: 100g
  - elastomers: 200g
- Handrail pipes (not applicable to pipe welding assemblies)
- Parts where there is no available space for Marking

## 8. Works Standard application

The information provided in the Standard must be used during the development of technical documentation and for the marking of inseparable parts and individual details.

### 8.1. Requirements for design engineers

The design engineer shall refer to the number of the applicable standard (without specification of the standard content) when stating the marking technique on SBC documentation. The engineer shall define the marking parameters [Section 8.2.3.] where appropriate, and the choice of the method of marking on the workpiece, in accordance with [Section 5].

## 8.2. Requirements for suppliers

The barcode label is SBC's preferred form of non-invasive marking of details [N].

- **Marking for SBC purposes containing barcode EAN 128**

(valid at SBC from 07.2020)

 <b>SOLARIS</b> <small>A CAF GROUP COMPANY</small> Product name	 XXXX-XXX-XXX	Order No.: 123456789
		Supplier No.: 1234567
		Date of manufacture: YYYY-MM-DD
		Unit of measure: pcs. or m/l

- ← EAN 128 bar code
- ← Solaris part No.
- ← Numbers to fill in
- ← Solaris's SAP supplier number
- ← Date in provided format
- ← Unit of measure pieces/meters/liters  
(unnecessary to be deleted)

\*The supplier's placement of the SBC logo is optional and voluntary

Suggested size of label: 100x50 mm

If it is not technically possible for the supplier to use a new label, the existing form of marking may be used.

- **The minimum data that should be included in the marking:**

1. **SBC Part No.**
2. **Date of manufacture**
3. **Supplier number** acc. to SAP\*

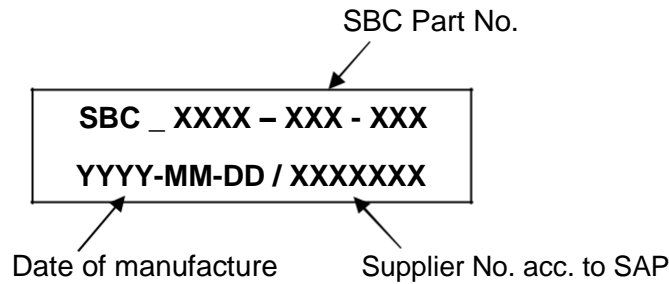
\*Each SBC supplier, as well as prototyping and auxiliary manufacturing departments of SBC, have their own Supplier No., a 7-digit number under which the supplier is recorded in the SAP system.

This number should be referred to on the label and is made available to the supplier by the Purchasing Department.

### Note !

On every occasion before introducing marking rules, the supplier should make sure that equivalent rules have not already been provided in Solaris documentation.

- **Marking for SBC purposes, without bar code**



- **Additional marking, concerning details complying with Regulation No 118.02 of the United Nations Economic Commission for Europe (UN/ECE).**

SBC implements the requirement of additional marking of details complying with Regulation 118.02 or subsequent revisions and plastic materials for which suppliers are not approved but have provided SBC with certification in the form of test reports confirming their compliance.

The label shall be orange in colour and shall bear the **R 118** annotation

- Use 2 additional 'R118' labels per detail (if dimensions permit).

Additional **R 118** marking refers to details made of plastics, which have 2 indexes attached to one documentation:

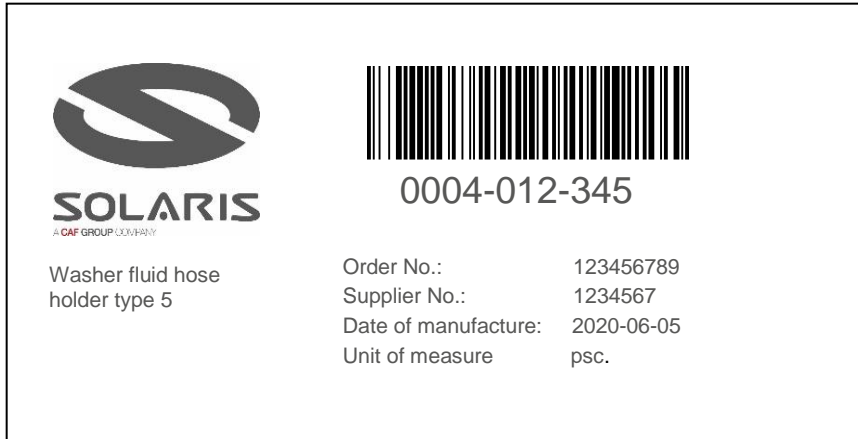
- Standard index
- New index, containing 'R 118' in the name of the component, certifying that the materials used comply with Sections 6.2.1, 6.2.2, 6.2.3 of UN/ECE Regulation 118.02 or later (in accordance with the test methodology in Annexes 6, 7 and 8)

that is, those that, apart from their index number, look identical.

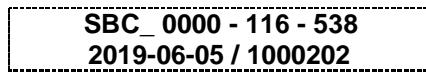
### 8.3. Examples of marking placement

- Example of marking placed on a single piece or inseparable part

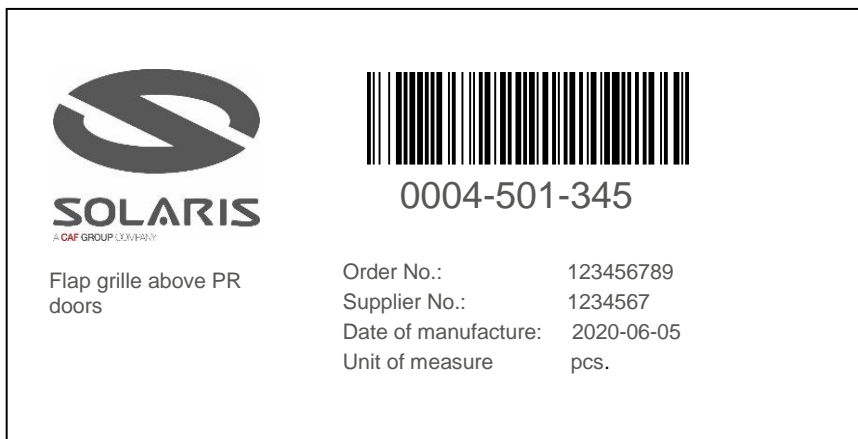
Preferred option:



Marking using [T] technique, [N] technique also permitted



- Examples of marking fulfilling Reg. 118.02 comprising additional R 118 marking.



**R 118**

**R 118**



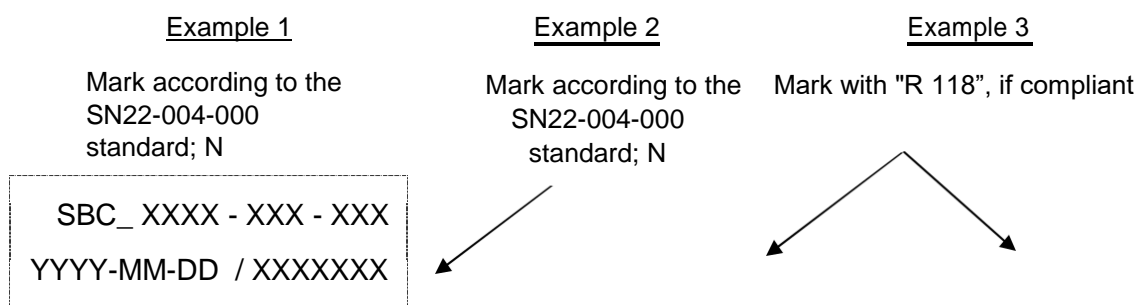
SBC \_ XXXX – XXX - XXX  
YYYY-MM-DD / XXXXXXXX

R 118

R 118

### 8.2.1 Correct marking of product designated for manufacturing for SBC:

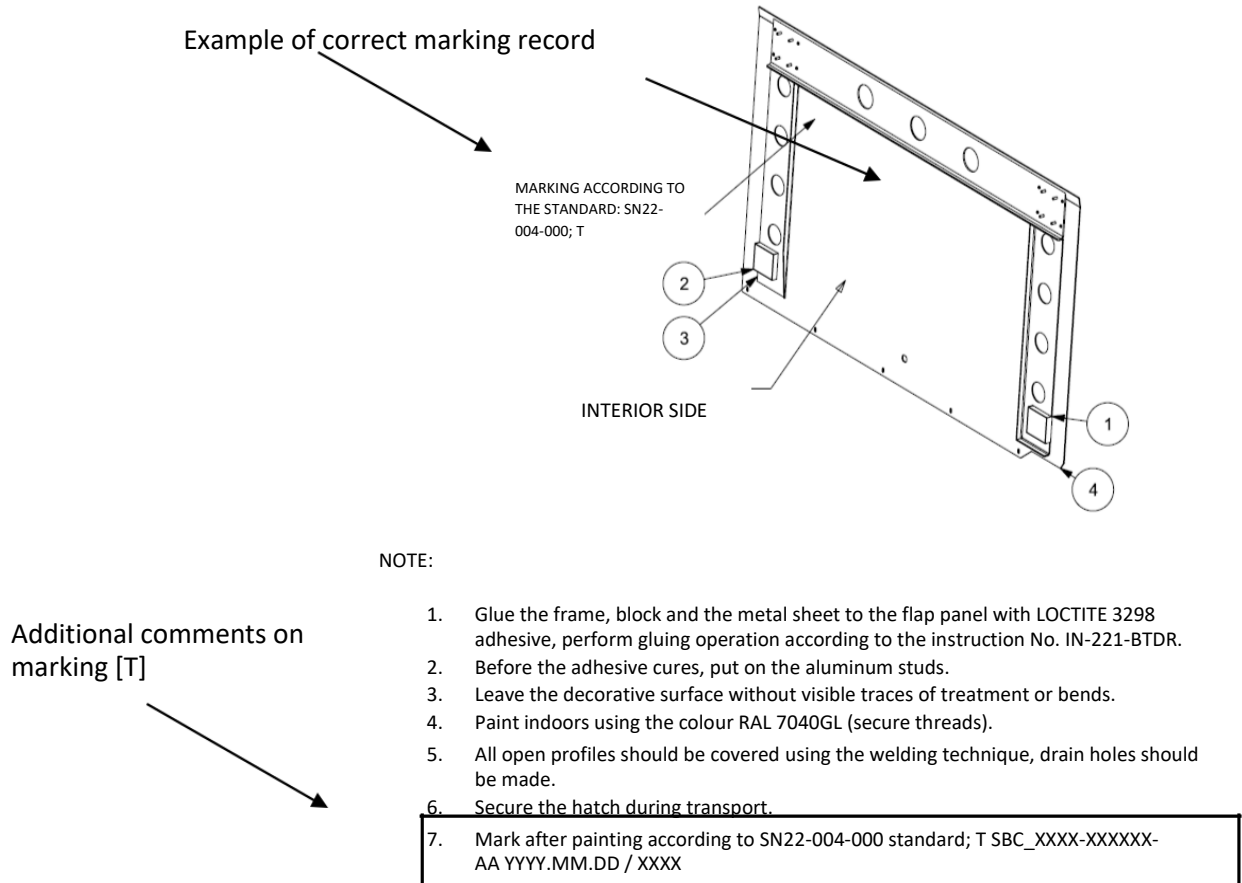
- **Examples of markings which the design engineer places in the technical drawing**



- Enter the letter marking technique according to [item 5]:
  - **T** - Surface-invasive marking
  - **N** - Non-invasive marking

If there is an indication of the marking of one of the techniques recorded in [item 5], enter the selected method in words.

- **Example of recording marking requirements in a Solaris documentation drawing:**



*Fig. 1. Example of a correctly placed permanent marking record in Solaris, ZG documentation, namely on the Battery flap: 050603-0004-416-190-AA*

- **Example of marking requirements record in a drawing of Solaris documentation with a detail meeting the R 118.02 recommendation containing the "R 118" additional marking:**

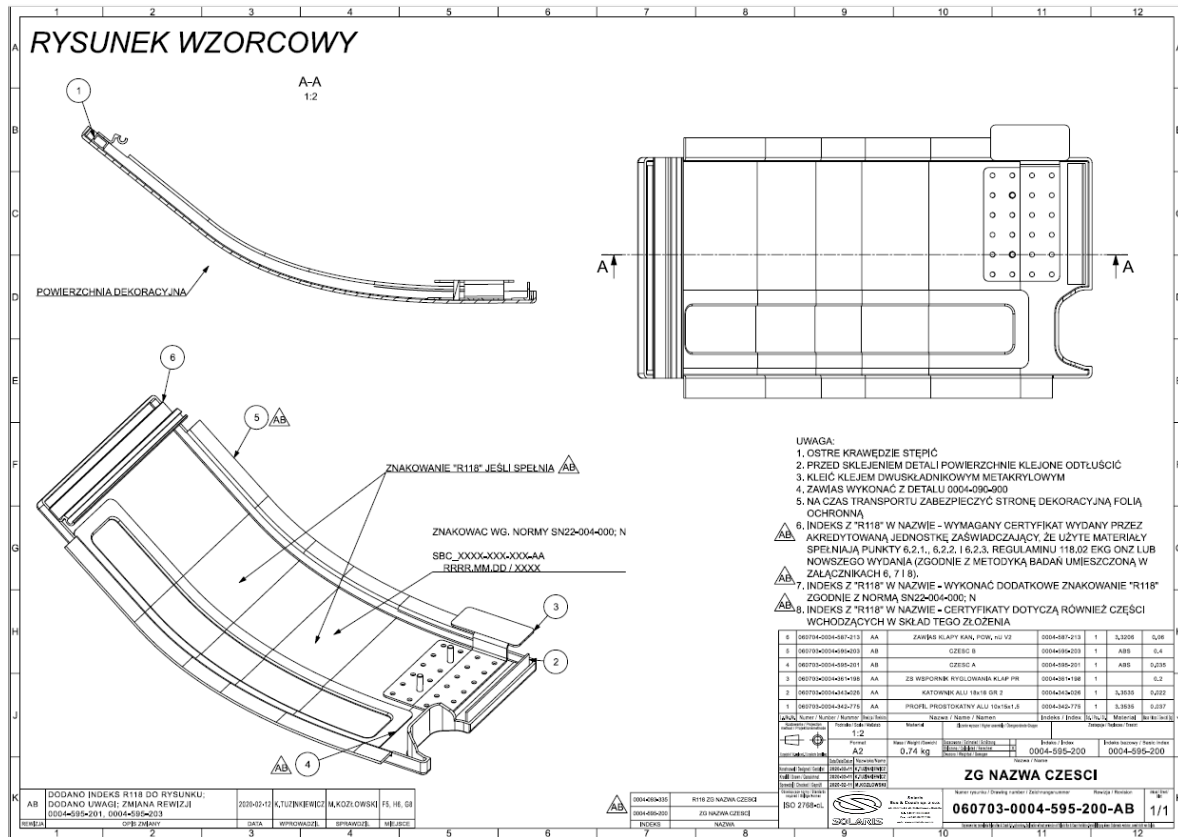


Fig. 2. Example of a correctly placed detail marking record complying with R 118.02 recommendation, in Solaris documentation; reference drawing.

**8.2.2 The size of the marking depends on the element surface:**

The marking of elements depends on the product dimensions, i.e. if the external dimensions of the element exceed the size of the marking area three times, the element should be marked.

Table 1. Size of area to be marked

Size of area to be marked	Width	Height	Label colour
Minimum	40mm	12mm	
Preferred	50mm	13mm	
Label comprising bar code	100mm	50mm	
Maximum	80mm	40mm	
R 118 additional marking	25mm	10mm	orange

It is acceptable to use labels for standard size printers.

### 8.2.3 Marking parameters:

- Mark using **ARIAL font**
- Bold type of the font is permissible
- Font colour - black
- Font size:
  - Suggested – 9 (points)
  - Maximum – 19 (points), R 118 additional marking
  - Other – permissible, if legible

## 9. Marking of plastics

### 9.1. Marking of plastics according to ISO, EN standards

Marking of elastomers weighing more than 200g and other plastics weighing more than 100g should be performed according to the PN-EN ISO 11469 - Plastics standard. The markings used for elastomers weighing more than 200g are specified in the following standard:

- PN-ISO 1629 - Rubbers and latex products. Nomenclature

The markings used for other plastics weighing more than 100g are specified in the following standards:

- PN-EN ISO 1043-1 Plastics. Symbols and abbreviations. Part 1: Basic polymers and their characteristics.
- PN-EN ISO 1043-2 Plastics. Symbols and abbreviations. Part 2: Fillers and reinforcing materials.

### 9.2. Marking techniques for SBC purposes

Plastic components weighing more than 100 g and elastomers weighing more than 200 g for SBC purposes shall be marked according to the formula set forth in [Section 8.2.1].

The types of marking referred to in [Section 5] are permitted.

The above regulations do not apply to tyres.

## 10. Marking of air brake pipes

The marking of brake pipes shall be carried out in accordance with the ISO 7628 standard. The letters of the (identification) pipe marking shall be a minimum of 2mm high and repeated at intervals of maximum 350mm. The marking should be permanent but must not adversely affect mechanical properties and performance.

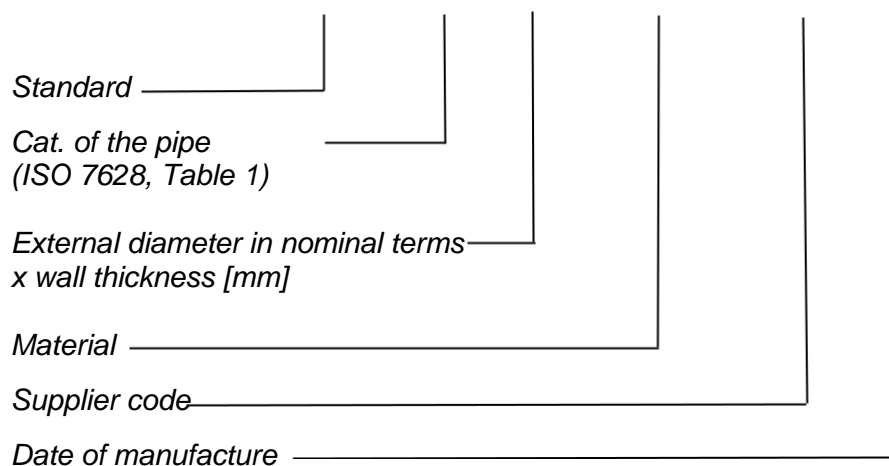
- An example of marking which the design engineer places in the technical drawing  
Mark according to the SN22-004-000 (ISO 7628) standard

- An example of how the correct marking on a pipe should look

ISO 7628 / cat.3 / 10x1 / PA1012 PHL / 0219 / 2011-11

Explanation of symbols:

ISO 7628 / cat.3 / 10x1 / PA1012 PHL / 0219 / 2011-11



## 11. Marking of hydraulic lines

The marking of hydraulic lines must comply with the following standards:

EN 853, EN 854, EN 856 and EN 857.

Marking shall be repeated at the intervals of a maximum of 500 mm.

- An example of marking which the design engineer places in the technical drawing  
Mark according to the SN22-004-000 standard
- An example of how the correct marking on a hose should look

EN 853 / 1TE / 10x1 / 0219 / 2011-11

Standard _____				
Hose type _____ (EN 854 Table 5)				
External diameter in nominal terms _____ x wall thickness [mm]				
Supplier code _____				
Date of manufacture _____				

## 12. Marking of roof panels

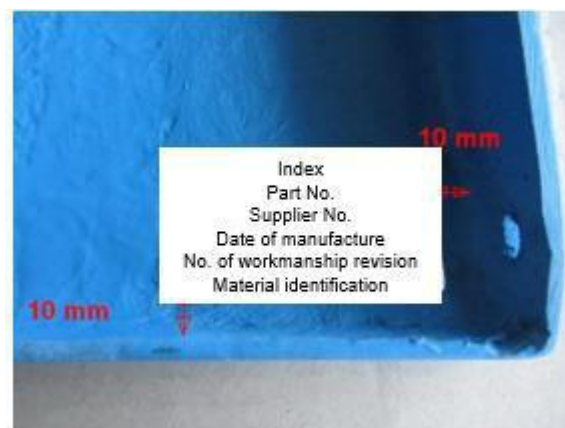
Roof panels should be marked with labels indicating manufacturer and spray painter.

**12.1.** The label of the unpainted panel shall dimensionally comply with the requirements set forth in Section 12.2 or be 30 x 25 mm.

The label should be laminated in the lower corner on the inside at a distance of 10 mm from the edge. It should be weather-proof and protected during painting.

The label shall comprise the following information:

- Solaris Part No.
- Supplier No. (of unpainted panel )
- Date of manufacture
- No. of revision according to which the panel was made
- Identification of the panel material



**12.2.** The label of the painting company should be on the inside of the panel and must be easily removable.

The label shall comprise the following information:

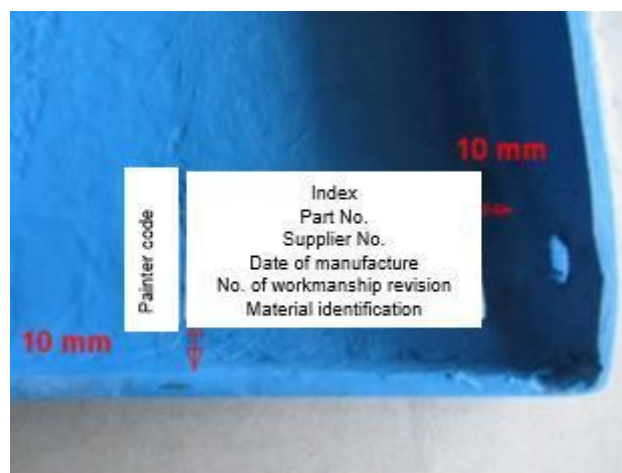
- Solaris Part No.
- Supplier No.
- Date of manufacture
- No. of revision according to which the panel was painted
- Batch / Series



**12.3.** The painter's code should be laminated next to the supplier's code. The label is used when the manufacturer does not paint the laminate on its own.

The label shall comprise the following information:

- Painter code



#### 12.4. Label aesthetics

Labels should be laminated in an aesthetic manner. All labels within one panel batch should be laminated in the same manner. Distortion of the surface structure of the laminate is permitted (resulting from the laminating of the label), a maximum of 3 mm from the edge of the label.

### 13. Affixing the required marking

- If the documentation specifies precisely the dimensions of the marking location, these requirements must be strictly adhered to.
- The product marking must not interfere with e.g. existing holes or other parts attached to a specific product intended for mounting on a bus.
- For components used in km (running meters), the marking should be made at a distance of not more than 100 to 200 mm from one of the ends of e.g. a pipe.
- For sections longer than 4 metres, at least 2 markings per element length.
- In the case of parts for which **aesthetics** is important, the marking must be placed so that the appearance of the component is not distorted.
- The marking must not reduce or undermine the functionality of the component.
- The marking shall be affixed in an accessible location, if possible, in order to easily reach the product index number in case the part needs to be identified or replaced.
- It is not permitted to remove the marking during the manufacturing process.

#### Note !

The inclusion of the supplier's name and supplier's part number on the label or on any other marking method required by SBC is prohibited.

### 14. Durability of markings

All markings shall be durable, legible and shall not impair the functionality of the product [EN 2424]. The durability of the marking, irrespective of the type of marking used, shall be not less than 8 years. Weatherproofness in the vehicle operating environment shall be considered: UV, salt, temp range (-40; +90), resistance to washing with water jet under pressure using detergents, biocomponents, etc.

### 15. Tasks of the Supply Control Department - marking control

The Supply Control Department carries out an inspection for the presence of marking.

- If the position of the text field is dimensioned in the drawing without any tolerance, the marking area on the product may be shifted up to 50 mm from the theoretical area in the drawing.
- The type of marking carried out [Section 5], according to the guidelines in the drawing, is also checked.



## 16. List of Figures

Fig. 1. Example of a correctly placed permanent marking record in Solaris, ZG documentation, namely on the Battery flap: 050603-0004-416-190-AA

Fig. 2. Example of a correctly placed detail marking record complying with R 118.02 recommendation, in Solaris documentation; reference drawing.

## 17. List of Tables

Table 1. Size of area to be marked

<b>Prepared by</b>		<b>Verified by</b>		<b>Approved by:</b>	
Date	Signature	Date	Signature	Date	Signature
27 Sept. 2011	Joanna Serkowska	27 Sept. 2011	Bogdan Kaczmarczyk	27 Sept. 2011	Radosław Harkot

Change no.	Date	Change content	
A	17 January 2012	<ol style="list-style-type: none"> <li>1. An alternative marking technique was added in the drawing (8.2.2).</li> <li>2. The point "referenced standards" has been added (3).</li> <li>3. Added a minimum and maximum marking area. The marking area was enlarged (10.2.3).</li> <li>4. The point "marking of air brake pipes" was added (9).</li> <li>5. The point "marking of hydraulic lines" was added.</li> <li>6. The formatting of the standard has been brought in line with the requirements of the "Manual for the development of workshop newsletters".</li> <li>7. "For internal use only" (header) was deleted</li> <li>8. A reference to the ISO 9001 standard was added.</li> </ol>	
		<table border="1"> <tr> <td>Prepared by: Kaczmarczyk B.</td> <td>Verified by: Serkowska J..</td> <td>Approved by: Harkot R.</td> </tr> </table>	Prepared by: Kaczmarczyk B.
Prepared by: Kaczmarczyk B.	Verified by: Serkowska J..	Approved by: Harkot R.	
B	25 October 2012	1.Solaris logo updated	
		<table border="1"> <tr> <td>Prepared by: Kaczmarczyk B.</td> <td>Verified by: Kaczmarczyk B.</td> <td>Approved by: Harkot R.</td> </tr> </table>	Prepared by: Kaczmarczyk B.
Prepared by: Kaczmarczyk B.	Verified by: Kaczmarczyk B.	Approved by: Harkot R.	
C	1 March 2013	<ol style="list-style-type: none"> <li>1. References to SN - "Plastics" standard have been taken out.</li> <li>2. References have been added to the standards set forth in the Ordinance of the Minister of Economy concerning marking techniques, dated 28 December 2005.</li> <li>3. The minimum weights of the parts affected by the marking obligation have been modified.</li> </ol>	
		<table border="1"> <tr> <td>Prepared by: Kaczmarczyk B.</td> <td>Verified by: Kaczmarczyk B.</td> <td>Approved by: Harkot R.</td> </tr> </table>	Prepared by: Kaczmarczyk B.
Prepared by: Kaczmarczyk B.	Verified by: Kaczmarczyk B.	Approved by: Harkot R.	
D	March 6, 2014	1. Marking has been established for roof panels (11)	
		<table border="1"> <tr> <td>Prepared by: Kaczmarczyk B.</td> <td>Revised by: Maćkowiak B. Nowak K. Kolasiński Ł.</td> <td>Approved by: Harkot R.</td> </tr> </table>	Prepared by: Kaczmarczyk B.
Prepared by: Kaczmarczyk B.	Revised by: Maćkowiak B. Nowak K. Kolasiński Ł.	Approved by: Harkot R.	
E	24 July 2015	<ol style="list-style-type: none"> <li>1. "Marking" Annex 1 of the Works Standard has been taken out.</li> <li>2. The number of digits (from 4 to 7) for the supplier's code under which the supplier is stored in the SAP system was modified. The number will be provided by the Purchasing Department.</li> <li>3. The correct number of characters in the marking (for the supplier's code) (Section 12.2).</li> <li>4. In the marking example, a new valid 7-digit supplier code was introduced (Section 12.2.2).</li> <li>5. Annex 1 information was taken out (Section 2.2).</li> </ol>	

		Prepared by: Serkowska J.	Revised by: Serkowska J.	Approved by: Kaczmarczyk B.
F	30 June 2017	Making information in points 5, 6, 12, 15 more precise.		
		<ol style="list-style-type: none"> <li>1. Section 5.2 (Section 10 was replaced with Section 14).</li> <li>2. Section 6 (Section 8.2.1 was replaced with Section 12.2.1. Section 4 was replaced with Section 5, Section 6 was replaced with Section 7).</li> <li>3. Section 12.1 (Section 8.2.1 was replaced with Section 12.2.1. Section 8.2.4 was replaced with Section 12.2.4; Section 4 was replaced with Section 6).</li> <li>4. Section 12.2.2 (Section 4 was replaced with Section 5).</li> <li>5. Section 12.2.3 (Section 8.2.1 was replaced with Section 12.2.1).</li> <li>6. Section 15 (Section 4 was replaced with Section 5).</li> </ol>		
		Prepared by: Serkowska J.	Revised by: Serkowska J.	Approved by: Kaczmarczyk B.
G	26 July 2017	<ol style="list-style-type: none"> <li>1. EN deleted , 2008 deleted, 8.4 added, 7.5.3 to 8.5.2 updated (1).</li> <li>2. Standard publication dates were deleted (3).</li> <li>3. Standard numbering was modified: Section 12 was transferred into Section 8. The numbering of the remaining Sections starting from 8 changed by one.</li> <li>4. Section 9 was split into 9.1; and 9.2 (content was added).</li> <li>5. Information on the minimum data to be included on the label was added (8.1).</li> <li>6. Revision level from marking for SBC purposes was taken out (8.2.1).</li> <li>7. Content modified (8.2).</li> <li>8. Example of marking in the technical drawing, an example of a technical drawing was added (8.2.2).</li> <li>9. The following phrase was added: It is acceptable to use labels for standard size printers (8.2.3).</li> <li>10. Information about marking location indicated in the drawing was modified, information about permission to place the manufacturer's logo on the label was added (13).</li> <li>11. List of Figures was added (16).</li> <li>12. List of Tables was added (17).</li> </ol>		
				Prepared by: Serkowska J.

H	16 September 2019	<ol style="list-style-type: none"> <li>2015 deleted (1).</li> <li>The following phrases were added: In case of non-dated references the last edition of the referred to publication shall apply (3).</li> <li>The following phrases were taken out: both in-house and third parties' (3).</li> <li>The SBC logo was updated.</li> </ol>		
		Prepared by: Serkowska J.	Revised by: Serkowska J.	Approved by: Harkot R.
I	26 February 2020.	<ol style="list-style-type: none"> <li>Section 1 was modified.</li> <li>Information on additional marking of production materials complying with UN/ECE Regulation 118 (8.2) was added.</li> <li>An example of additional marking of production materials complying with R 118.02 (8.2.1) was added.</li> <li>Figure 2 was added, an example of a correctly placed marking record for an item complying with R118.02 in Solaris documentation; reference drawing (8.2.2).</li> <li>Guidelines for R118 additional marking were added (8.2.3).</li> <li>Font colour and recommended font height for R 118 additional marking were added (8.2.4).</li> <li>Entries were updated (13).</li> <li>List of Figures was updated (16).</li> </ol>		
		Prepared by: Serkowska J.	Revised by: Serkowska J.	Approved by: Harkot R.
J	9 June 2020.	<ol style="list-style-type: none"> <li>Section 8 was modified. SBC's preferred form of marking details with the non-invasive technique [N], a label containing EAN 128 bar code, were added.</li> <li>The suggested size of the bar code label (Table 1) was added.</li> <li>A comment was added: The inclusion of the supplier's name and supplier's part number on the label or on any other marking method required by SBC is <u>prohibited</u> (Section 15).</li> <li>The SBC logo was updated.</li> <li>The document template was brought into compliance with that specified in the SBC Guidelines.</li> </ol>		
Release 10		Prepared by: Serkowska J.	Revised by: Serkowska J.	Approved by: Harkot R.
K	8 January 2021.	The following changes have applied:		
Release 11		<ol style="list-style-type: none"> <li>Company name: the name Solaris Bus &amp; Coach S.A. changes to Solaris Bus &amp; Coach sp. z o. o.</li> </ol>		
		Prepared by: Serkowska J.	Revised by: Serkowska J.	Approved by: Harkot R.
L	1 June 2021.	<ol style="list-style-type: none"> <li>Formatted the document</li> </ol>		
Release 12		Prepared by: Serkowska J.	Revised by: Serkowska J.	Approved by: Harkot R.

