

AAR COMPONENT IDENTIFICATION (CID) BAR CODE STANDARD

**Standard
S-920**

Adopted: 2012; Last Revised: 2012

1.0 PURPOSE AND SCOPE

The purpose of this standard is to establish an industry standard for the AAR component identification (CID) bar code labels with reference to the applicable AAR data specifications herein and also for those portions maintained by Railinc and made available online.

1.1 This standard defines the method and content of bar code labels on components to be tracked within the AAR systems. This will better support the management, administration, and maintenance of railroad equipment assets by providing traceability of component performance throughout the full life cycle.

1.2 This standard is applicable to all equipment and components as stipulated by the appropriate AAR committees that require an AAR CID or to those defined components that are part of an assembly requiring an AAR CID. The AAR CID acts as a standardized serial number for that particular unit.

1.3 This standard supersedes any and all similar recommendations of Recommended Practice RP-021. RP-021 remains in effect for items not specifically addressed herein.

1.4 The bar codes defined herein are required to be used for the purpose of communicating the required data elements from one party to another. These bar codes are not required to be applied and used as an internal communication method. For example, a repaired axle need not have a bar code applied when being processed within a wheel shop as long as the required data is captured and supplied to the subsequent customers using the required methods.

2.0 DEFINITIONS

2.1 Bar Code

A pattern of information-encoding symbols (symbology) that is machine-readable in real time.

- 1D linear bar code symbology is a single row of dark bars and light spaces, variable in width and height.
- 2D (two dimensional) stacked symbology uses multiple rows of variable-width bars and spaces.
- 2D matrix symbology encodes information in a two-dimensional pattern of data cells.
- “Code” or “payload” refers to the actual data that the bar code contains, whereas “symbol” or “image” refers to the arrangement of the bars and spaces or data cells.

Bar coding reduces errors in data capturing, speeds up data acquisition, and is part of an automatic identification technology designed to identify, track, document, and control material and processes.

IMPLEMENTED 01/2012

2.2 AAR Component ID (CID)

The combination of 1) the AAR Component ID Company Code element and 2) the AAR Component ID Number element makes up the complete AAR Component ID (CID). This unique CID is generally associated with or assigned to an equipment initial (mark), equipment number, and the AAR-defined location on said equipment using electronic means by all shops applying or modifying components on equipment governed by the AAR. This record and the associated detail are stored in a database at Railinc. The AAR CID is designed to be the single required item coded within a 1D bar code label on AAR-defined components of assemblies that are associated with equipment. The CID also may be found within 2D bar code labels for the purpose of identifying components that make up an AAR-defined assembly or in cases where additional detail is required to be communicated through the use of bar codes.

2.3 AAR Component ID Company Code

2.3.1 The company code assigned by AAR (Railinc) generally identifies the company adding, modifying, or deleting an associated record, but may also identify the company responsible for the record or portion of a record for which they do not directly control. This element also is used as part of the string that defines a standardized part number (e.g., ABCD0001, where ABCD is the company code and ABCD1234 might be a standardized replacement for any part number such as XX-12-ZA4).

2.3.2 Company codes are assigned by Railinc. There are three methods to find your company code.

- Go to <http://www.railinc.com>. Click **CEPM Project Site** and then click **Company ID Order Form**.
- Call 1-877-RAILINC (1-877-724-5465) to speak to a Railinc representative
- Send an email inquiry to csc@railinc.com

2.4 AAR Component ID Number

The number is used in union with the AAR Component ID Company Code for the purpose of creating a unique identification of the component or assembly. This number is generated and assigned by the AAR Component ID Company. This element is used only in combination with an AAR Component ID Company Code.

3.0 BAR CODE LABEL APPROVAL PROCESS

3.1 Each material supplier generating or applying an AAR-required bar code must have the bar code approved by the AAR before use. This approval process is made available to ensure that the subsequent customer (the downstream user) has a central point for conflict resolution. However, it is recommended that the supplier also works directly with each customer to ensure satisfactory performance.

3.2 The current process through which AAR CID bar codes are approved is as follows:

3.2.1 The supplier required to apply the bar code must provide a sample bar code design/layout to the AAR—Chief Technical Standards (via e-mail) as a bitmap image (.bmp) with the intended dpi printing resolution. For instance, if using a 300 × 300 dpi printer, a 2-in. square label should be 600 pixels high and 600 pixels wide.

3.2.2 The AAR analyzes the label for proper format and functionality and communicates with the supplier to resolve any discrepancies.

IMPLEMENTED 01/2012

AAR Manual of Standards and Recommended Practices
Lettering and Marking of Cars

S-920

3.2.3 When agreement is reached, the supplier provides the AAR with a five sample labels from each printer (if self-printing labels) or from each label vendor (if purchasing labels).

- Include the printer identification (make and model) for each set of labels.
- Include contact information [name(s), phone number(s), e-mail address(es), and address(es)].
- Ship the samples to the following address:

Chief—Technical Standards
AAR CID Labels
Transportation Technology Center, Inc.
55500 DOT Road
Pueblo, CO 81001
eec@aar.com

3.2.4 The labels are analyzed within five working days of receipt and an e-mail message stating the acceptance or required changes is sent or communicated, respectively. The supplier may be required to order new label stock, address requests for programming, and/or order parts for printers before the labels are approved.

3.2.5 Any changes to the printing equipment, label materials, bar code image layout, or bar code vendor must be communicated to the Chief—Technical Standards and approved using the process described above.

4.0 GENERAL LABEL REQUIREMENTS

4.1 The print quality must be in accordance with American National Standards Institute (ANSI) Bar Code Quality Guideline [ANSI X3.182-1990(R1995)]. The ANSI print quality grade of “C” is the minimum acceptable standard. Note that future enhancements to support automated readers may require ANSI “A” or “B” print quality.

4.2 For both prototype and production labels using the approved symbologies, the expected first-read rate shall exceed 95%. A misread or no read shall be considered as one failure toward the percentage calculation for the first-read rate for new tags.

4.3 Each label shall consist of human-readable text and machine-readable data (bar code image) as described herein. The human-readable text and the bar code image are not required to contain the same amount of information, but both must contain the minimum data specified by the AAR CID specification, Appendix A, “Wheel set Data Glossary.” The payload must be formatted exactly as specified in Appendix A for each field. The human-readable text may be formatted differently to enhance understanding, as long as it is equivalent.

4.4 The human-readable text is needed to allow a method for manual data collection when bar codes are damaged. The human-readable text must identify the subcomponent type and all of the required fields designated in Appendix A as required text.

4.5 Data fields required to be shown as human-readable text must be 12-point font or larger. Other text used for description, titles, or other purposes may be of a smaller font (e.g., if a date is required to be printed, the word “Date:” may be 8-point font, but the actual date “1/1/2012” must be 12-point font or larger).

4.6 Other text and graphics are allowed, such as the manufacturer name, logos, non-AAR bar codes, etc., as long as they do not obscure the required information or interfere with AAR-required bar code readability. Any non-AAR bar code shall be identified as a non-AAR bar code and should be spaced at least 1/4 in. from any AAR bar code.

IMPLEMENTED 01/2012

5.0 EQUIPMENT

5.1 A printer with a minimum 200 × 200 dpi shall be used for creating or reproducing AAR-required bar codes.

5.2 Bar code readers must support the decoding of the AAR-approved formats in the allowable layouts. Note that the ability to read a quality label quickly and repeatedly may be greatly influenced by the set-up and programming of the device, as well as the device quality.

5.3 Computer equipment used to generate or verify bar code dates and/or time stamps shall be automatically synchronized and manually verified no less than once per day. The accuracy of any created Coordinated Universal Time (UTC) time stamps also shall be verified.

6.0 LABEL MATERIALS AND APPLICATION

6.1 At a minimum, the label must be made of non-brittle, synthetic face stock. A synthetic (polyester or Kimdura®)-based label with an aggressive permanent acrylic or other high-performance adhesive is recommended to provide a waterproof, scratch/tear-resistant, and durable label. Other labels or tags of a more durable nature may be used but must meet the minimum specifications outlined herein.

6.2 To achieve a high-contrast image, the face stock must not contain unnecessary tinting. Similarly, the face stock must be highly opaque so that the component surface is not visible through the label.

6.3 Resin or wax/resin ribbon ink in conformance with the latest specifications for materials manufactured is recommended. Direct thermal printing (with no ribbon) is not recommended because it tends to fade more readily. Black carbon-based inks are recommended because they also are readable with infrared scanners, whereas alcohol-based or dye-based inks are not.

6.4 Unless otherwise specified herein, the AAR-required bar code labels must be applied prior to shipping an applicable component or subcomponent to the user. At least one label shall be affixed to each component or assembly requiring a bar code. When no standard location has been designated, the labels shall be affixed or applied in a way that does not interfere with the operation of the component in service. The labels shall be applied in a conspicuous location to facilitate ease of reference while in service, while disassembled, and while in transport. The labels shall not obscure stamped markings.

6.5 The supplier shall be fully responsible for providing and attaching the labels to each component and for the accuracy of attachment to the correct component. The supplier must document the label application procedure, including necessary preparation steps that are dependent upon material conditions (rusty, clean, dirty, greasy) and environmental conditions (hot, cold, wet, dry, windy).

6.6 The supplier must verify scannability of each label once (after application but prior to shipment). Note that lighting can affect scanning performance. Outdoor readers shall utilize appropriate optics. Mercury vapor, helium neon, and other lighting sources may need special attention. It is sufficient to have a device that indicates a good read (audible or visible signal) without any system data transfer.

6.7 Labels shall maintain physical integrity, adhesion, and readability for the component while in inventory prior to assembly (for subcomponents) or application to rolling stock.

6.8 The supplier must provide a replacement bar code image to the customer upon request. The replacement image must be transmittable via e-mail as a Portable Document Format (PDF) file attachment and must be machine-readable when printed with a 300 × 300 or 600 × 600 dpi laser printer.

IMPLEMENTED 01/2012

AAR Manual of Standards and Recommended Practices
Lettering and Marking of Cars

S-920

7.0 BAR CODE SYMBOLOGY AND CODING—GENERAL

7.1 Bar code symbologies shall be in accordance with Automatic Identification Manufacturers (AIM) Uniform Symbol Specification.

7.2 Carriage returns and line feeds are not allowed within the code for AAR-specified 1D or 2D symbologies.

7.3 For 1D bar codes, the supplier must use the Code128 symbology. This symbology uses a check-sum to eliminate most errors.

7.4 For 2D bar codes, the supplier must use Data Matrix (ECC200) or PDF417 symbology. Multiple bar code images with identical information are encouraged, where possible.

- The 2D Data Matrix (ECC200) symbology offers a maximum data character capacity of 2,335 text characters or 3,116 digits or 1,556 bytes. Data Matrix has benefits of generally being smaller than PDF417 for the same level of error correction, is readable with many of the cell phone applications, and supports direct part identification (imprinting on the part).
- Data Matrix (ECC200) symbology must have an X dimension between 10 and 20 mil. A larger X dimension between 15 and 20 mil is preferred because it is more tolerant of damage. The square format must be used.
- The 2D PDF417 symbology offers a maximum data character capacity of 1,850 text characters or 2,710 digits or 1,108 bytes.
- The PDF417 symbology must have an X dimension between 10 and 20 mil. A larger X dimension between 15 and 20 mil is preferred because it is more tolerant of damage. The row height must be between 2× and 4×. The number of columns must be between 7 and 15 (9 to 11 is preferred). The minimum error correction level is dependent upon the size of the payload data according to the PDF417 standard. Error correction level 5 is appropriate for 321- to 863-byte payloads.

7.5 For 2D symbologies, the payload must be an XML-type data format as specified herein and by the W3C committee on XML (<http://www.w3.org/standards/xml/>). This minimizes the need to do any parsing or special programming and facilitates future modifications and additions with minimal efforts.

7.6 All XML time stamp fields must be given in UTC using the format “yyyy-mm-ddThh24:mi:ss” (e.g., 2011-12-30T23:59:59). The root element of the payload shall identify the component or sub-component type (i.e., wheel, axle, and bearing) in the root element.

7.7 The 2D bar code images shall be designed to allow for additional information to be added without significant redesign of the label.

7.8 Required labels should not exceed 4 in. in height or width.

8.0 AAR-REQUIRED 1D CID LABELS

8.1 The 1D AAR CID label must contain the following specified information in human-readable format:

- Supplier name
- Component name (i.e., WHEEL SET)
- “AAR Component Identification” or “AAR CID”

IMPLEMENTED 01/2012

8.2 The 1D CID shall show the AAR Component ID Company Code field (upper case) and the AAR Component ID Number field separated by two to four spaces (e.g., “ABCD 1234567890”). The 1D bar code must have only a 14-character string in the code (e.g., “ABCD1234567890”) that includes the following:

- The AAR Component ID Company Code (with trailing spaces for company codes of less than four characters)
- The AAR Component ID Number (with leading zeros for numbers that require less than 10 digits)

Note: The width of the image may be different, even with a fixed X dimension, depending on the pattern of letters, digits, and spaces. Therefore, it is recommended to design for all possible combinations.

8.3 For ease of scanning, the requisite 1D bar code image must be 0.50 in. high, minimum. Additional, duplicate bar codes may be any size, as long as they are functional.

8.4 The X dimension on the requisite bar code must be between 10 and 20 mil. Larger X dimensions are desirable and shall be used to maximize the available space.

8.5 There must be a quiet zone on both ends of the requisite bar code, each at least 10 times the X dimension (e.g., 0.1 in. white space on either end of a bar code with a 10 mil (0.010 in.) X dimension). However, it is recommended that the quiet zone be at least 0.25 in.

9.0 AAR-REQUIRED 2D CID LABELS

9.1 Wheel Set Subcomponents

9.1.1 Wheels, bearings, and axles that are manufactured, remanufactured, or reconditioned must be identified by attaching a 2D bar code label containing the detail information as defined by this standard. This detail information is required to be read by a 2D bar code scanner and compiled at the time of wheel set assembly by a wheel shop.

9.1.2 Wheel set subcomponents (wheels, bearings, axles) must be identified by attaching a label containing the AAR-required data utilizing a 2D bar code. Apply a minimum of one AAR CID label to each component to facilitate reading during the wheel set assembly process.

9.1.3 The data payload must contain only data that is defined in Appendix A with an existing bar code element ID. Other than the root element tag (e.g., <wheel>) that defines the component or subcomponent, the defined bar code element IDs are the only allowable XML tags. The data payload must contain all elements required by the relevant AAR specifications of the *Manual of Standards and Recommended Practices*, Sections G, G-II, H, and H-II.

9.1.4 The data payload may contain XML tags for non-existent data (e.g., if the Extended Wheel codes are not required and not available, the payload may still contain the corresponding XML tags, <C119></C119>). The data payload may contain fields that comprise the component ID (CID) for the individual component along with the other requisite data fields in anticipation of or to facilitate future changes. It is expected that all subcomponents shall be required to have a CID in the future.

9.1.5 The wheel shop shall associate all detail information from the subcomponents with the CID for the entire wheel set assembly. This CID, created by the wheel shop parent company, shall be transmitted to Railinc along with the requisite subcomponent detail.

AAR Manual of Standards and Recommended Practices

Lettering and Marking of Cars

S-920

10.0 WHEEL SET CID LABELS

10.1 Wheel sets must be identified by attaching a label containing the AAR Component Identifier (CID) for that wheel set. A minimum of one AAR CID label must be applied to the outside wheel plate (opposite the hub stamp) to facilitate reading before and after wheel sets are applied or when loaded on a trailer or flatcar. The label shall be placed on a relatively flat portion of the plate to minimize curvature of bar code image and to minimize wrinkling of the label.

10.2 The wheel shop shall associate all detail information from the subcomponents with the wheel set CID. This CID, created by the wheel shop parent company, shall be transmitted to Rail-inc along with the requisite subcomponent detail.

10.3 A new CID shall be created for each wheel set leaving a facility. The CID must be unique, may not be reused, and must be used only once.

10.4 Sample Wheel Set Labels

Sample payload (applies to Figs. 10.1 and 10.2):

ABCD1234567890

Label Size (2.67 in. × 1.25 in.),
300 dpi bitmap (800 × 375 pixels), 12-point text
Code 128-1D image (2.35 in. × 0.50 in.),
X dimension = 14.2 mil
Data Payload = "ABCD1234567890" (without the quotes)

Note: The black border shown in this example is provided only to indicate size (not recommended).



Fig. 10.1 Wheel set component ID—sample label

Label Size (2.67 in. × 1.11 in.),
300 dpi bitmap (800 × 333 pixels), 12-point text
Code 128-1D image (2.35 in. × 0.50 in.),
X dimension = 14.2 mil
Data Payload = "ABCD1234567890" (without the quotes)

Note: The black border shown in this example is provided only to indicate size (not recommended).

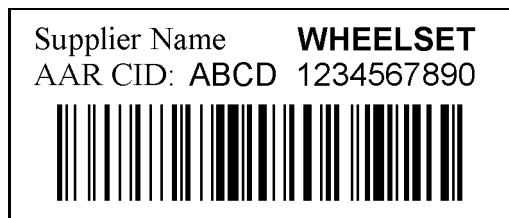


Fig. 10.2 Wheel set component ID—sample label

IMPLEMENTED 01/2012

11.0 WHEEL LABELS

Wheel labels are required for new wheels only.

11.1 The label shall be placed on the inside or back plate of the wheel (side with manufacturer’s mark) on a relatively flat portion of the wheel plate and oriented to minimize label curvature. The label shall be placed in a location that minimizes the likelihood of submersion during storage.

11.2 Elements required in the payload include C103–C118 and C120, as listed in Appendix A.

11.3 Sample Wheel Labels

Sample payload (applies to Figs. 11.1 and 11.2):

```
<Wheel><companyCode>ABCD</companyCode><idNumber>1234567890</idNumber>
<C103>GRFI</C103><C104>2011-10-06T18:55:12</C104><C105>11</C105><C106>01</C106>
<C107>GK</C107><C108>D</C108><C109>22</C109><C110>0</C110><C111>1231</C111>
<C112>1234ABCD</C112><C113>36</C113><C114>CH</C114><C115>CrV S</C115>
<C116>241.25</C116><C117>N</C117><C118>AMST1234</C118><C119>ABCD1234</C119>
<C120>8.75</C120><C121>FUTURE01</C121><C122>FUTURE02</C122></Wheel>
```

Note: the payload has no line feeds or carriage returns, but is shown on separate lines only for ease of reading.

Label Size (3 in. × 2 in.),
300 dpi bitmap (900 × 600 pixels), 12-point text
Code PDF417-2D image (2.59 in. × 0.91 in.),
X dimension = 10.8 mil, Row Height = 2X,
Columns = 9, EC = 5

Note: The black border shown in this example is provided only to indicate size (not recommended).

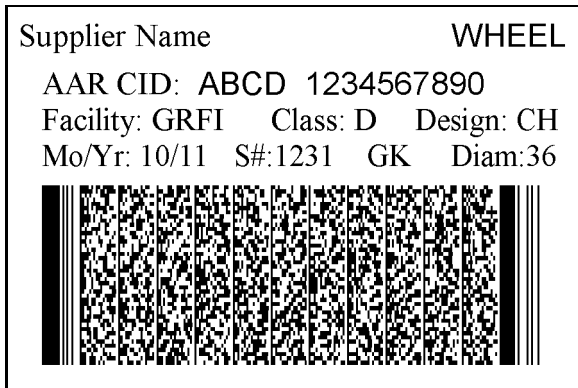


Fig. 11.1 Wheel (with wheel CID)—sample label

Label Size (2 in. × 2 in.),
300 dpi bitmap (600 × 600 pixels), 12-point text (8-point descriptors)
Code Data Matrix (ECC200) 2D image (1.08 in. × 1.08 in.),
X dimension = 15.2 mil

Note: The black border shown in this example is provided only to indicate size (not recommended).



Fig. 11.2 Wheel (with wheel CID)—sample label

IMPLEMENTED 01/2012

AAR Manual of Standards and Recommended Practices

Lettering and Marking of Cars

S-920

12.0 AXLE LABELS

Axle labels are required for new axles and converted axles.

12.1 To avoid mutilation on axle racks and by forklift tongs, the label must not be placed close to the wheel seat. The label shall be placed on the barrel, oriented to minimize bar code curvature, with the nearest edge approximately 6 in. from the middle of the axle.

12.2 Elements required in the payload for new axles include C303–C310 and C113, as listed in Appendix A.

12.3 Converted axles require C303–C313, as listed in Appendix A.

12.4 Sample Axle Labels

Sample payload (applies to Figs. 12.1 and 12.2):

```
<Axle><companyCode>ABCD</companyCode><idNumber>1234567890</idNumber>  
<C303>AXPA</C303><C304>2011-01-30T18:55:12</C304><C305>6.5</C305><C306>12</C306>  
<C307>1</C307><C308>123123 ABCDEF</C308><C309>RWS</C309><C310>7</C310>  
<C311>ABCD</C311><C312>2011-05-22T18:55:12</C312><C313>F+</C313><C314>AXIS1234</C314>  
<C315>AXIS1234</C315><C316>GRBX1234</C316><C317>FUTURE01</C317></Axle>
```

Note: The payload has no line feeds or carriage returns, but is shown on separate lines only for ease of reading.

Label Size (3 in. × 2 in.),
300 dpi bitmap (900 × 600 pixels), 12-point text
Code PDF417-2D image (2.39 in. × 0.91 in.),
X dimension = 10.8 mil, Row Height = 2X, Columns = 8,
EC = 5

Label Size (3 in. × 2 in.),
300 dpi bitmap (900 × 600 pixels), 12-point text
Code Data Matrix (ECC200) 2D image 1 (0.084 in. × 0.084 in.),
X dimension = 12.5 mil
Code Data Matrix (ECC200) 2D image 2 (1.32 in. × 1.32 in.),
X dimension = 19.2 mil

Note: The black border shown in this example is provided only to indicate size (not recommended).

Note: The black border shown in this example is provided only to indicate size (not recommended).

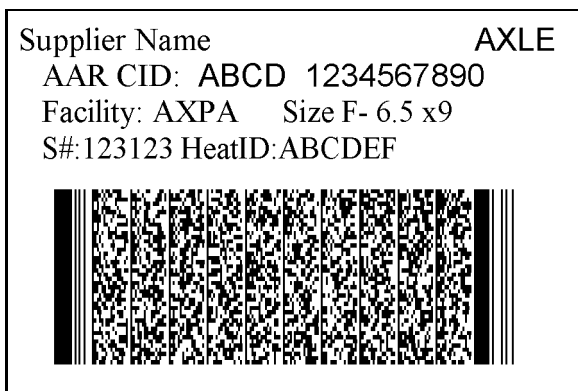


Fig. 12.1 Axle (with axle CID)—sample label

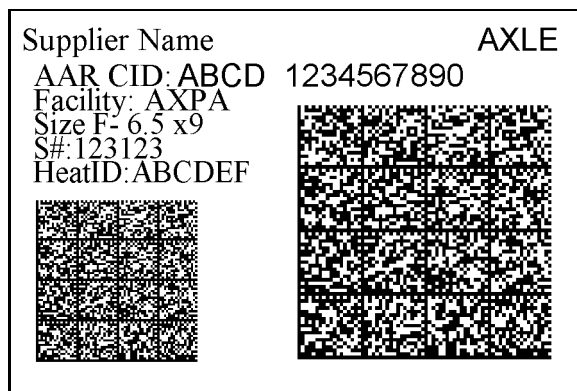


Fig. 12.2 Axle (with axle CID)—sample label

IMPLEMENTED 01/2012

13.0 BEARING LABELS

Bearing labels are required for new and reconditioned bearings.

13.1 The standard label location designated for a bearing is near the outer cup centerline. The label is not required to be readable after installation on a freight car. To avoid bar code damage during shipping, two bar codes shall be located on the label such that abrasion with another cup shall affect only one of the bar codes. The label shall not obscure the bearing cup stamping.

13.2 Elements required in the payload for new bearings include C203–C211 and C213–C216, as listed in Appendix A.

13.3 Reconditioned bearings require C203, C204, C208–C211, and C213–C216, as listed in Appendix A.

13.4 Sample Bearing Labels

Sample payload:

```
<Bearing><companyCode>TMK1</companyCode><idNumber>1234567890</idNumber>
<C203>TRBC</C203><C204>2011-01-30T18:55:12</C204><C205>12345678</C205>
<C206>11</C206><C207>01</C207><C208>6.5</C208><C209>12</C209><C210>5A</C210>
<C211>R</C211><C212>GRBX1234</C212><C213>GRBX1234</C213><C214>GRBX1234</C214>
<C215>GRBX1234</C215><C216>GRBX1234</C216><C217>FUTURE001</C217>
<C218>FUTURE002</C218><C219>FUTURE003</C219><C220>FUTURE004</C220></Bearing>
```

Note: The payload has no line feeds or carriage returns, but is shown on separate lines only for ease of reading.

Label Size (3.5 in. × 2.5 in.), 300 dpi bitmap (1050 × 750 pixels), 12-point text (8-point descriptor)
 Code PDF417 2D image 1 (rotated 2.19 in. × 1.08 in.), X dimension = 10.8 mil, Row Height = 2X, Columns = 7, EC = 5
 Code Data Matrix (ECC200) 2D image 2 (1.32 in. × 1.32 in.), X dimension = 14.2 mil

Note: The black border shown in this example is provided only to indicate size (not recommended). The 1 1/2 in. letter N (required in MSRP G-II) is not required to be on this label, but it may be.

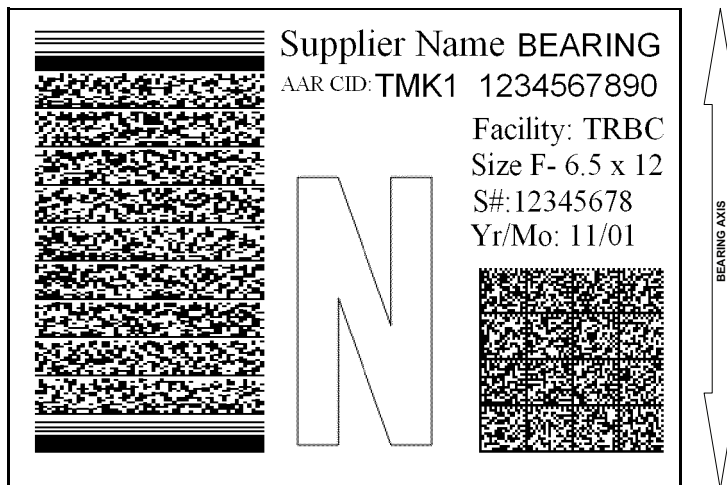


Fig. 13.1 Bearing (with bearing CID)—sample label

IMPLEMENTED 01/2012

**AAR Manual of Standards and Recommended Practices
Lettering and Marking of Cars**

S-920

APPENDIX A

**APPENDIX A
WHEEL SET DATA GLOSSARY**

IMPLEMENTED 01/2012

Element ID (XML tag)	Name	Sample(s)	Text On Label R = Required	Full Description
Wheel Set Bar Code				
n/a	AAR Component ID (Wheel Set)	GRBX1234567890	R	4 char w/leading spaces + 10 digits with leading zeros—The leading spaces and zeros are necessary because some company codes contain digits and this allows easy data parsing. This shall not be used in a combined field to input 14 bytes in order to avoid parsing issues that could lead to data integrity issues.
companyCode	Component ID Company Code	GRBX		4 char max, no leading spaces. Because this is a data field all by itself, it has already been parsed out and no leading spaces are needed. This field must be generated by the wheel shop company and be included in the wheel set registration data sent to Railinc for all wheel sets.
idNumber	Component ID Number	1234567890		10 digits max, no leading zeros. Because this is a numeric field all by itself, there is no need for adding leading zeros. This field must be generated by the wheel shop company and be included in the wheel set registration data sent to Railinc for all wheel sets.
C003	Component AAR Facility Code	MRSK		4 char max, no leading spaces. Because this is a data field all by itself, it has already been parsed out and no leading spaces are needed. This is the facility code assigned by the AAR QA committee. This field must be included in the wheel set registration data sent to Railinc for all wheel sets.
C004	Component Assembly Timestamp	2011-03-01T14:24:25		Time stamp to no less than seconds precision. You may choose to simply give the date, but if there is a logical time available, it should be used. This is typically the time that the wheel set was finally inspected or when the wheel set was last wanded or some other useful attribute of your process. This field must be included in the wheel set registration data sent to Railinc for all wheel sets.
C005	Extended Wheel Set Codes	GRBX1234		These are internal codes but designed to be included/documented in the AAR standards. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. When used, the codes and their general meaning must be communicated to the AAR so that conflicts do not arise. An example would be that Company XXXX used code XXX on wheel sets produced with a maximum runout of 0.003 in. It is meant to enable quality improvements that would otherwise be very difficult to implement or track.
C006	Shipping Codes	GRBX1234		These are internal codes but designed to be included in the AAR standard. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. When used, the codes and their general meaning must be communicated to the AAR so that conflicts do not arise. In the future, some codes may be mandatory. It is intended that this field be used to assist with improved shipping and inventory management by providing customers with relevant attributes about the process.
Wheel Bar Code				
n/a	AAR Component ID	8AMS1234567890	O	Same as any AAR Component ID—see wheel set definition for instance. Allows a company to prepurchase bar code labels and avoid expense of printers and downtime with the tradeoff of requiring electronic messaging to send the details to Railinc. Note that the consumer of these components (i.e., wheel shops) would also have to build a process for retrieving the detail data electronically.
companyCode	Component ID Wheel Company Code	8AMS		4 char max, 2 char min, no leading spaces. Also a single character followed by 3 digits. This field must be included in the wheel set registration data sent to Railinc for wheel sets with new wheels if provided by the wheel manufacturer. This field will not be populated on wheel sets with turned wheels.

AAR Manual of Standards and Recommended Practices

Lettering and Marking of Cars

Element ID (XML tag)	Name	Sample(s)	Text On Label R = Required	Full Description
Wheel Bar Code (continued)				
idNumber	Component ID Wheel Number	1234567890		10 digits max, no leading zeros. This field must be included in the wheel set registration data sent to Railinc for wheel sets with new wheels if provided by the wheel manufacturer. This field will not be populated on wheel sets with turned wheels.
C103	Wheel AAR Facility Code	GRFI	R	4 char max, no leading spaces. Because this is a data field all by itself, it has already been parsed out and no leading spaces are needed. This is the facility code assigned by the AAR QA committee. This field must be provided by the wheel manufacturer and be included in the wheel set registration data sent to Railinc for wheel sets with new wheels. This field will not be populated on wheel sets with turned wheels.
C104	Wheel Manufactured Timestamp	2011-02-01T02:55:12		Time stamp to no less than seconds precision. You may choose to simply give the date, but if there is a logical time available, it should be used. This is typically the time that the wheel was finally inspected or when the wheel was last wanded or some other useful attribute of your process. This field must be provided by the wheel manufacturer and be included in the wheel set registration data sent to Railinc for wheel sets with new wheels. This field will not be populated on wheel sets with turned wheels.
C105	Wheel Stamped year	11	R	2 digits only—a year. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C106	Wheel Stamped Month	01	R	2 digits only—a month. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C107	Wheel Stamped Mfg Code	GK	R	The MID shop code for current or historical wheel manufacturers—XX is not allowed for registration. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C108	Wheel Stamped Class	A, B, C, D, or U	R	The stamped wheel material class: A,B,C,D, U. Also called the heat treat class. This term is used loosely and is not well defined, but is standard and consistent. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C109	Wheel Rim Thickness Side Scale Reading	22		Number of 16th inches of rim thickness according to <i>Field Manual of the AAR Interchange Rules</i> , Rule 41, using the steel wheel gauge. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C110	Wheel Finger Gauge Reading			Finger reading according to Rule 41. A narrow full-flange contour is defined as a finger reading less than 2. Max indicated is 11. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C111	Wheel Stamped Serial Number	1231	R	Up to 8 digits/letters. Examples of 6 digits are in the <i>MSRP</i> , but not well defined nor required. Whether the stamping on the wheel contains only a serial number or a combined heat and serial number, the entire stamped string shall be entered in this field as the serial number. Note: some manufacturers have used letters as a part of the serial number—WABL's opinion was that these instances were rare and not necessary to include. Several companies are using letters as a part of their serial number and it has been verified that there are several thousand of these being processed each year. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.

IMPLEMENTED 01/2012

AAR Manual of Standards and Recommended Practices
Lettering and Marking of Cars

S-920

APPENDIX A

IMPLEMENTED 01/2012

Element ID (XML tag)	Name	Sample(s)	Text On Label R = Required	Full Description
C112	Wheel Heat/Melt	1234ABCD		Up to 8 digits or characters according to manufacturer—no existing specification. Even if the heat or melt information is somehow contained in the stamped serial number, the applicable portion shall be supplied in this field. For companies with no such designation currently, a logical attribute that corresponds to a grouping of wheels shall be chosen and supplied. This field must be provided by the wheel manufacturer and be included in the wheel set registration data sent to Railinc for new wheel sets. This field will not be populated on wheel sets with turned wheels.
C113	Wheel Nominal Diameter	36	R	The nominal design diameter (stamped on wheel as part of the wheel design designation); 28, 30, 33, 36, 38 are typical for freight cars—up to 45 on locomotives. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C114	Wheel Design Code	CH		Part of the wheel design designation stamped on a wheel prior to the nominal diameter. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C115	Wheel Plate Type	CP or SP		CP or SP (Curved Plate or Straight Plate) The straight-plate design is called a high-stress design because heat input creates large stresses in these wheels. Curved-plate designs are called low-stress designs because they flex upon heating to allow relief. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C116	Wheel Tape Size	241.25		The circumference on a new wheel or newly turned wheel according to a wheel tape. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C117	Wheel New or Turned	N	R	A new wheel is one that has not yet been in service. A turned wheel was removed from service and subsequently processed at a wheel shop. This designation actually applies to the wheel set and <i>should probably be</i> C007—Railinc and CEPM to determine handling. This field must be provided by the wheel manufacturer or be determined by the wheel shop and be included in the wheel set registration data sent to Railinc for all wheel sets.
C118	Wheel Rim Type			1W, 2W, or MW—one-wear, two-wear or multi-wear. This is needed for determining job codes but can be derived from the wheel design code and nominal diameter. It was determined that this <i>not</i> be input or sent by the wheel manufacturer or wheel shop, but that it be derived by Railinc upon registration. This field is not required to be provided by the wheel manufacturer, not determined by the wheel shop, and not required to be sent to Railinc for registration. Railinc will derive this field from the Wheel Design Code and Wheel Nominal Diameter.
C119	Extended Wheel Codes	8AMS1234		These are internal codes but designed to be included/documented in the AAR standards. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. When used, the codes and their general meaning must be communicated to the AAR so that conflicts do not arise. An example would be that Company XXXX used code XXX9 on wheels produced with a special NDT qualification. It is meant to enable quality improvements that would otherwise be very difficult to implement or track. This field, if provided by the wheel manufacturer, must be sent to Railinc for registration.

AAR Manual of Standards and Recommended Practices
Lettering and Marking of Cars

Element ID (XML tag)	Name	Sample(s)	Text On Label R = Required	Full Description
C120	Rough Wheel Bore	10.75	R	Rough wheel bore on new wheels shipped to wheel shops—not useful for registration and not sent to RailInc—only sent by OEM to wheel shop on new wheels. This field must be provided by the wheel manufacturer on new wheels. It is not required to be sent to Railinc for registration.
Bearing Bar Code				
n/a	AAR Component ID (bearing 1)	8TIM1234567890	O	4 char w/leading spaces + 10 digits with leading zeros.
companyCode	Component ID bearing Company Code	8TIM		4 char max, no leading spaces. This field must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings if provided by the bearing manufacturer or reconditioner.
idNumber	Component ID bearing Number	1234567890		10 digits max, no leading zeros. This field must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings if provided by the bearing manufacturer or reconditioner.
C203	Bearing AAR OEM/Recon Facility Code	TRBC	R	4 char max, no leading spaces. Because this is a data field all by itself, it has already been parsed out and no leading spaces are needed. This is the facility code assigned by the AAR QA committee. This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.
C204	Bearing Manufactured Timestamp	2011-02-01T18:55:12		Time stamp to no less than seconds precision. You may choose to simply give the date, but if there is a logical time available, it should be used. This is typically the time that the bearing was finally inspected or when the bearing was last wanded or some other useful attribute of your process. This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.
C205	Bearing Cup Serial Number*	12345678	R*	Up to 8 digits. Examples in the <i>MSRP</i> , but not well defined. * Required for new bearings 2/1/2012 within the bar code and the human-readable text. Required for reconditioned bearings starting 1/1/2013 within the bar code and the human-readable text. This field must be provided by the bearing manufacturer and must be included in the wheel set registration data sent to Railinc for wheel sets with new bearings. Reconditioners must provide this information starting in 2013. Partial markings, to the extent that they can be read, are acceptable on reconditioned product.
C206	Bearing Cup Stamped Year*	11	R*	2 digits only—a year. * Required for new bearings 2/1/2012 within the bar code and the human-readable text. Required for reconditioned bearings starting 1/1/2013 within the bar code and the human-readable text. This field must be provided by the bearing manufacturer and must be included in the wheel set registration data sent to Railinc for wheel sets with new bearings. Reconditioners must provide this information starting in 2013. Partial markings, to the extent that they can be read, are acceptable on reconditioned product.

IMPLEMENTED 01/2012

AAR Manual of Standards and Recommended Practices Lettering and Marking of Cars

S-920

APPENDIX A

IMPLEMENTED 01/2012

Element ID (XML tag)	Name	Sample(s)	Text On Label R = Required	Full Description
Bearing Bar Code (continued)				
C207	Bearing Cup Stamped Month*	01	R*	<p>2 digits only—a month (although at least one manufacturer uses a letter for the stamped month and at least one other wants to start). The numeric representation is preferred and shall be used in all databases and electronic or paper communications.</p> <p>* Required for new bearings 2/1/2012 within the bar code and the human-readable text.</p> <p>Required for reconditioned bearings starting 1/1/2013 within the bar code and the human-readable text.</p> <p>This field must be provided by the bearing manufacturer and must be included in the wheel set registration data sent to Railinc for wheel sets with new bearings.</p> <p>Reconditioners must provide this information starting in 2013. Partial markings, to the extent that they can be read, are acceptable on reconditioned product.</p>
C208	Bearing Nominal Diameter	5.5, 6, 6.5, 7	R	<p>This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.</p>
C209	Bearing Nominal Length	8, 9, 10,	R	<p>This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.</p>
C210	Bearing Certificate #	1, 1A, 2, 3, 3A		<p>This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.</p>
C211	Bearing New or Reconditioned	N or R	R	<p>This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.</p>
C212	AAR Extended Bearing Codes	GRBX1234		<p>These are codes designed to support future requirements of the AAR standards. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. An example would be that Company XXXX would use code 9XXX on bearings produced with a defect-free designation. It is intended that this code enable tracking and support premium designations that would otherwise be very difficult to implement or track.</p> <p>This field, if provided by the bearing manufacturer or reconditioner, must be sent to Railinc for registration.</p>
C213	Bearing Seal Type	GRBX1234		<p>These are codes designed to be used as standardized part numbers. These standardized part number codes will be used instead of the company's internal part numbers. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. An example would be that Company XXXX would use code XXX1 on bearings produced with rubbing-type seal design ABCDEF as defined in the grease/seal matrix.</p> <p>This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.</p>
C214	Bearing Grease Type	GRBX1234		<p>These are codes designed to be used as standardized part numbers. These standardized part number codes will be used instead of the company's internal part numbers. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. An example would be that Company XXXX would use code XXX1 on bearings produced with grease type ZZZZZZ as defined in the grease/seal matrix.</p> <p>This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.</p>

AAR Manual of Standards and Recommended Practices
Lettering and Marking of Cars

Element ID (XML tag)	Name	Sample(s)	Text On Label R = Required	Full Description
Bearing Bar Code (continued)				
C215	Bearing Cage Type	GRBX1234		These are codes designed to be used as standardized part numbers. These standardized part number codes will be used instead of the company's internal part numbers. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. An example would be that Company XXXX would use code XXX1 on bearings produced with a steel cage and code XXX2 for bearings produced with poly cages with part number 123456 as defined in <i>MSRP</i> Section H or HII. This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.
C216	Bearing Backing Ring Type	GRBX1234		These are codes designed to be used as standardized part numbers. These standardized part number codes will be used instead of the company's internal part numbers. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. An example would be that Company XXXX would use code XXX1 on bearings produced with a universal backing ring with part number 123456 and code XX1X on bearings produced with a Standard fitted backing ring with part number 234 as defined in <i>MSRP</i> section H or HII. This field must be provided by the bearing manufacturer or reconditioner and must be included in the wheel set registration data sent to Railinc for wheel sets with new or reconditioned bearings.
Axle Bar Code				
n/a	AAR Component ID (Axle)	8AMS1234567890	O	4 char w/leading spaces + 10 digits with leading zeros
companyCode	Component ID Axle Company Code	8AMS		4 char max, no leading spaces. This field must be included in the wheel set registration data sent to Railinc for wheel sets with new or converted axles if provided by the axle manufacturer or converter.
idNumber	Component ID Axle Number	1234567890		10 digits max, no leading zeros. This field must be included in the wheel set registration data sent to Railinc for wheel sets with new or converted axles if provided by the axle manufacturer or converter.
C303	Axle AAR OEM/Recon Facility Code	AXPA	R	4 char max, no leading spaces. Because this is a data field all by itself, it has already been parsed out and no leading spaces are needed. This is the facility code assigned by the AAR QA committee. The stamped manufacturer codes on the axle include up to 4 characters/digits and in some cases a symbol. This may cause difficulty in determining facility code and appropriate lookup shall be necessary. This field must be included in the wheel set registration data sent to Railinc for wheel sets with new or converted axles. This field will not be populated on wheel sets with secondhand axles.
C304	Axle Manufactured Timestamp	2011-02-01T18:55:12		Time stamp to no less than seconds precision. You may choose to simply give the date, but if there is a logical time available, it should be used. This is typically the time that the axle was finally inspected or when the axle was last wasted or some other useful attribute of your process. This field must be included in the wheel set registration data sent to Railinc for wheel sets with new or converted axles. This field must be populated for wheel sets with secondhand and converted axles to the best of one's ability (e.g., "1981-01-01T00:00:00" is acceptable if "81" is the only legible marking).
C305	Axle Nominal Diameter	5.5, 6, 6.5, 7	R	This field must be provided by the axle manufacturer or converter or be determined by the wheel shop for secondhand axles, and must be included in the wheel set registration data sent to Railinc for all wheel sets.
C306	Axle Nominal Length	8, 9, 10,	R	This field must be provided by the axle manufacturer or converter or be determined by the wheel shop for secondhand axles, and must be included in the wheel set registration data sent to Railinc for all wheel sets.

IMPLEMENTED 01/2012

AAR Manual of Standards and Recommended Practices

Lettering and Marking of Cars

S-920

APPENDIX A

IMPLEMENTED 01/2012

Element ID (XML tag)	Name	Sample(s)	Text On Label R = Required	Full Description
Axle Bar Code (continued)				
C307	Axle AAR Condition Code	1, 2, 3		This field must be provided by the axle manufacturer or converter or be determined by the wheel shop for secondhand axles, and must be included in the wheel set registration data sent to Railinc for all wheel sets.
C308	Axle S# and Heat ID	123123 ABCDEF	R	In new axles, the axle serial number and heat ID shall be provided in a string with a single space between them (12+12alphanumeric). Because the order of stamping is not well defined or determinable in an easy way from a physical inspection, the two groupings stamped on the axle that appear to be the serial number and heat shall be entered in the logical order that they appear for secondhand and reconditioned axles. Up to 8 characters/digits are allowed for each. This field must be provided by the axle manufacturer or converter or be determined by the wheel shop for secondhand axles, and must be included in the wheel set registration data sent to Railinc for all wheel sets. This field must be populated for wheelsets with secondhand and converted axles to the best of one's ability (e.g. "AB 123" is acceptable if "123" and "AB" are the only portions of legible markings likely to be the "heat ID" and "Serial #" and one is not sure which is "Serial #" and which is the "heat ID.")
C309	Axle AAR Type	RWS		RWS is the only possible value for new wheel set or turned wheel set registration because black collar axles are no longer allowed to reenter service. The black collar axles are still in service and need to be available for field registration and for backfill. This field must be provided by the axle manufacturer or converter or be determined by the wheel shop, and must be sent to Railinc for registration.
C310	Axle Grade	F, G, H		Axle grade of steel based upon heat treatment—per M-101 (F, G, and H currently)—previously called Axle classification. This field must be provided by the axle manufacturer or converter or be determined by the wheel shop for secondhand axles, and must be included in the wheel set registration data sent to Railinc for all wheel sets.
C311	Axle Converter AAR Facility Code	ABCD		4 char max, no leading spaces. Because this is a data field all by itself, it has already been parsed out and no leading spaces are needed. This is the facility code assigned by the AAR QA committee. This field must be provided by the axle converter and must be included in the wheel set registration data sent to Railinc for all wheel sets with converted axles.
C312	Axle Converter Timestamp	2011-02-01T18:55:12		This field must be provided by the axle converter and must be included in the wheel set registration data sent to Railinc for all wheel sets with converted axles.
C313	Axle Body Design	E, F, F+		This field must be provided by the axle manufacturer or converter or be determined by the wheel shop for secondhand axles, and must be included in the wheel set registration data sent to Railinc for all wheel sets.
C314	Axle Plating	AXIS1234		These are internal codes, but designed to be included/documentated in the AAR standards. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. When used, the codes and their general meaning must be communicated to the AAR so that conflicts do not arise. An example would be that Company XXXX used code XXX1 on axles produced with a specific plating process. It is meant to enable quality improvements that would otherwise be very difficult to implement or track. This field, if provided by the axle manufacturer or converter, must be sent to Railinc for registration.

AAR Manual of Standards and Recommended Practices
Lettering and Marking of Cars

Element ID (XML tag)	Name	Sample(s)	Text On Label R = Required	Full Description
Axle Bar Code (continued)				
C315	AAR Extended Axle Codes	AXIS1234		<p>These are codes designed to support future requirements of the AAR standards. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. An example would be that Company XXXX would use code 9XXX on axles with fully machined bodies and a defect-free designation. It is intended that this code enable tracking and support premium designations that would otherwise be very difficult to implement or track.</p> <p>This field, if provided by the axle manufacturer or converter, must be sent to Railinc for registration.</p>
C316	Int Extended Axle Codes	GRBX1234		<p>These are internal codes, but designed to be included/documented in the AAR standards. The format is a fixed format with the first four characters being the company code with leading spaces and the last four characters being digits with leading zeros. When used, the codes and their general meaning must be communicated to the AAR so that conflicts do not arise. An example would be that Company XXXX used code XXX1 on axles produced with a special surface qualification. It is meant to enable quality improvements that would otherwise be very difficult to implement or track.</p> <p>This field, if provided by the axle manufacturer or converter, must be sent to Railinc for registration.</p>

IMPLEMENTED 01/2012