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विषय: विशिष्टता प्रकाशन संख्या MDTS 49398 Rev 00.

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S. No	Description	Specification No.
1.	TECHNICAL REQUIREMENTS FOR GENERATION OF LIFETIME ID CODE AND MARKING THE CODE ON COMPONENT	**MDTS 49398 Rev 00**

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लाइफटाइम आईडी कोड बनाने और घटक पर कोड अंकित करने के लिए तकनीकी आवश्यकताएँ

TECHNICAL REQUIREMENTS FOR GENERATION OF LIFETIME ID CODE AND MARKING THE CODE ON COMPONENT

GS1 India

Square

Rectangle

Specification Number	MDTS 49398		
Revision Number	Nil	**Date of Issue**	20/02/2024

Brief Description
This document contains the requirements for generation of unique lifetime ID for components and marking the same on the components for supply to Indian Railways.

FOREWORD

The modern railway vehicles manufactured at the Rail Coach Factory Kapurthala (RCF/KXH) are designed for high safety and reliability and enable economical operations over many years of service life. During these years in operation, the vehicle configuration is upgraded, and the vehicle is subjected to many maintenance schedules ensuring the optimum level of reliability in operations.

There is a need to have a uniform system of identifying and marking components used during manufacturing and maintenance. This is a pre-requisite for setting up systems for enabling track & trace processes to optimize the maintenance inputs and OEM's support.

This specification has been prepared to define a system of generating a lifetime ID code for each component and marking the same on the component for use during the lifetime of the item.

This specification is drafted In line with the Government of India Polices, this document aims to leverage, and further build the design and manufacturing capabilities of both RCF and its contractors in a synergetic manner to deliver world class coaches for Indian Railways.

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LIST OF AMENDMENTS

S. No.	Amendment Date	Revision	Details
1.	19/02/2024	0	First issue.

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0 Background & Introduction

The LHB-FIAT coaches have lifespan of 35 years. During the lifetime, the coach undergoes multiple maintenance schedules and equipment upgradation. There is a need to track the components used in the coach systems and sub-systems to accurately determine the appropriate time of replacement and to follow up with the manufacturer for the post contract / lifecycle management support services.

This document describes a system for generating and printing lifetime readable codes on coach components. GS1 standards and processes are mandated for generation of componentID. Laser etched Datamatrix 2D barcodes to GS1 specification are proposed as default for marking.

1 Objective of this document

This specification document has been drafted with the objective of defining a method of creating unique ID codes for components and printing the same on the respective components for track & trace requirements during the lifetime of the component on the Indian railways.

2 Scope of the specification

This document shall be used for defining the coding & marking scheme, while ordering / manufacturing components & assemblies for IR rolling stock. The instructions contained in this document shall be applicable as called by the specifications / contracts controlling the production or procurement of the components and assemblies.

3 List of standards and documents referred

S. No.	Standard / Document	Title
1.	GS1	General Specification
2.	GS1	Identification of Components and Parts in the Rail Industry - Application Standard
3.	GS1	DataMatrix Guideline: Overview and technical introduction to the use of GS1 DataMatrix

Table 1: List of referred standards & documents

4 Abbreviations / Terminology

S. No.	Abbreviations / Terminology	Expansion / Explanation
1.	GTIN	Global Trade Item Number
2.	HRI	Human Readable Interpretation
3.	IR	Indian Railways
4.	KXH	Indian Railways station code for Kapurthala
5.	LHB	Linke-Hofmann-Busch the transfer of technology partner for RCF/KXH.
6.	OEM	Original Equipment Manufacturer
7.	QAP	Quality Assurance Plan
8.	RCF	Rail Coach Factory
9.	WTC	Work test certificate

Table 2: Abbreviations & Terminology

Note: *This specification uses standards / guidelines and best practices issues by Global Standards 1 (**GS1**). The user of this document is recommended to review and understand document issued by GS1 available at the following URLs*
https://www.gs1.org/ The GS1 home page
https://ref.gs1.org/ The GS1 persistent repository for standards, guidelines, documents and tools.
https://www.gs1india.org/ The GS1 India Homepage for country specific information and resources.
https://www.gs1india.org/content/register-for-barcodes/ Registration page for GTIN
https://ref.gs1.org/ai/?lang=en GS1 page for Application Identifiers

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5 Generation of lifetime component / assembly ID

The generation of the component code shall be in compliance with the GS1 Document Titled "***Identification of Components and Parts in the Rail Industry - Application Standard***". The copy of the document is enclosed as an annexure; however, all users shall verify the latest version of the standard from the GS1 portal, prior to use. The latest version of the standard shall be applicable.

5.1 Types of codes Serial / Batch (or Lot)

The code generation shall be of two types as described below.

5.1.1 Batch Type

This type of code shall be used for components that are not reusable and are designed for one time application and are expected to be discarded after use.

5.1.2 Serial Number Type

This type of code shall be used for components that are reusable and are designed to undergo multiple cycles of operations & maintenance.

5.2 Mandatory data in the GS1 code for supply to IR

The following data shall be mandatorily included in the GS1 code for supply to Indian Railways

5.2.1 GTIN

The code shall be generated in conformance to

GS1 AI 01 : Global Trade Item Number (GTIN)

5.2.2 Production Date

The code shall be generated in conformance to

GS1 AI 11 : Production date (YYMMDD)

5.2.3 Serial or Batch number

The code shall be generated in conformance to

GS1 AI 10 : Batch or lot number

Or

GS1 AI 21 : Serial number

Either of the above shall be used dependent on the component type.

5.2.4 Purchase order & Date

The code shall be generated in conformance to

GS1 AI 400 : Customer's purchase order number

5.2.5 Global Location Number (GLN) of the production or service location

The code shall be generated in conformance to

GS1 AI 416 : Global Location Number (GLN) of the production or service location

5.2.6 Component / Part ID of the OEM

The code shall be generated in conformance to

GS1 AI 8010 : Component/Part Identifier (CPID)

The CPID serial number shall be used where required as per

GS1 AI 8011 : Component/Part Identifier serial number (CPID SERIAL)

5.3 Other GS1 AI for code generation

The manufacturer may use additional GS1 AIs as required for the generation of component code. It shall be ensured that the generated code is as short as possible and is feasible for marking on the components.

6 Approval of coding template

The code template shall be prepared as per guidelines given in this document and shall be submitted for approval prior to initiation of supply.

Unless specified, the default authority for approval shall be CDE/RCF.

7 Marking the code on the component

The marking on the component shall be in conformance with "***GS1 DataMatrix Guideline: Overview and technical introduction to the use of GS1 DataMatrix***". The copy of the document is enclosed as an annexure; however, all users shall verify the latest version of the document from the GS1 portal, prior to use. The latest version of the standard shall be applicable.

The following guidelines shall be applicable for marking the code on each component.

7.1 Code Format

GS1 Datamatrix code shall be used as per the guidelines.

7.2 Mandatory HRI Marking

The following AI data shall be marked as HRI.

1. GS1 AI 01 : Global Trade Item Number (GTIN)
2. GS1 AI 11 : Production date (YYMMDD)
3. GS1 AI 10 : Batch or lot number Or GS1 AI 21 : Serial number
4. GS1 AI 400 : Customer's purchase order number

8 Marking Location

The marking location on the coach/bogie component shall be as per location shown in the relevant drawing of the component.

Where no location is mandated in the drawing, the manufacturer shall select the marking location keeping the following requirements in view:

1. It should be positioned in a way that does not obstruct the functionality or structural integrity of the component.
2. Consideration should be given to factors such as component shape, surface area, and potential interference with other markings or operational requirements.

8.1 Approval for marking location

Whenever the manufacturer plans to fix or change the marking location on the component, a proposal for approval shall be submitted prior to initiation of supply.

Unless specified, the default authority for approval shall be CDE/RCF.

9 Marking Method

9.1 Laser Etching

Laser etching method shall be the preferred and default method for marking the DataMatrix codes on the components. The laser system should be capable of producing high-quality, permanent marks that are easily readable and durable.

9.2 Other marking methods

In cases where laser etching process for marking is not feasible, the manufacturer shall propose alternate marking methods e.g. MetalPhoto® plates pasted with lifetime adhesives, Shot peening etc.

It shall be ensured that the marked component DataMatrix code shall be readable with handheld scanners. The scanned information should be directly verifiable on the screens of the scanner. The HRI marking shall be readable with naked eye.

Whenever the manufacturer plans to use alternative marking methods, a proposal for approval shall be submitted prior to initiation of supply.

Unless specified, the default authority for approval shall be CDE/RCF.

9.3 Lifetime of the component marking

The lifetime of the marking on the component shall be in excess of the lifetime of the component.

9.4 Provision of secondary marking location or remarking of component during maintenance

Incase on any doubt about the lifetime of the marking on the component, the manufacturer shall propose a secondary marking location where a second code shall be marked on the component. This shall be used upon the failure of the code at the primary location.

Alternatively, for components that are reusable, the manufacturer shall provide a process for rejuvenation of the component marking during maintenance schedules.

Whenever the manufacturer plans to use such secondary marking locations or a remarking process, a proposal for approval shall be submitted prior to initiation of supply.

Unless specified, the default authority for approval shall be CDE/RCF.

10 Size of marking on the component

The manufacturer shall select the most appropriate size of the component marking as per the GS1 DataMatrix Guidelines. The size is dependent upon the code size, location and the texture of the component.

The manufacturer shall submit a proposal for approval of the size / location prior to initiation of supply.

Unless specified, the default authority for approval shall be CDE/RCF.

11 Quality of Marking and Assurance Process

The quality of marking shall be such that it is readable over the lifetime of the component. The GSI DataMatrix Guidelines shall be followed.

11.1 Quality Assurance

To maintain the effectiveness of the marking process, compliance and quality assurance procedures shall be established by the manufacturer. Periodic inspections shall be carried out to ensure the continued legibility and accuracy of the Data Matrix codes on components. Quality assurance measures should include regular audits of the marking process, calibration and maintenance of marking equipment, and adherence to best practices for marking and verification.

12 Protective Coating

To enhance the durability and longevity of the DataMatrix codes on components due to harsh environmental conditions, a suitable protective anticorrosive transparent coating shall be applied immediately after marking. The protective coating material should be compatible with the component material. It should adhere well to the surface and provide adequate protection without affecting the readability of the code.

The protective coating and the application process shall be selected and proposed by the manufacturer after conducting appropriate testing to ensure it meets the desired quality standards and provides adequate protection.

The documents related to the test carried out for coating shall be submitted to RCF for verification and approval by CDE/RCF.