UGL REGIONAL LINX

AUTOMATIC EQUIPMENT IDENTIFICATION REQUIREMENTS

CRN-STD-ROL-713026361-2292

CRN RS 014

LINKING COMMUNITIES. CONNECTING CUSTOMERS.

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Document Control

Function	Position	Name	Date
Approver	A&E Manager	Lucio Favotto	17/02/2022

Revision	Issue Date	Revision Description
1.2	03/02/2022	UGLRL Operational Standards Template applied
2.0	17/02/2022	First approved and issued UGLRL version

Summary of changes made from previous version

Section	Summary of change
All	This document is based on the previous rail infrastructure maintainer (RIM). Full revision history is available on request from UGLRL.

1 Introduction

The NSW rail networks have installed electronic equipment to monitor vehicle condition, such as, train loads, hot boxes and dragging equipment. These monitoring stations have facilities to automatically read data off the AEI tags to identify the vehicle and vehicle information.

In order to enable the future monitoring of rolling stock operating on the CRN all rolling stock shall be fitted with Automatic Equipment Identification (AEI) Tags.

For compatibility and interoperability the CRN also requires all rolling stock to be fitted with AEI tags.

The prescribed requirements are applicable to freight vehicles, locomotives, passenger vehicles, on-track maintenance vehicles and rail compatible freight trailers.

This document also includes information for the location, fitting and data fields for AEI tags.

2 Purpose

This section describes the electronic automatic equipment identification (AEI) requirements for all rail vehicles operating on the CRN, with the exception of infrastructure maintenance vehicles and road/rail vehicles that operate solely in worksites.

3 General principles

An interrogation unit (or reader) operating in UHF radio waves shall decode the modulated radio waves reflected by the tag. The tag itself shall not be a transmitter, but shall act as a field disturbance device, modifying and reflecting the signal transmitted by the reader system.

4 AEI system requirements

The design, construction, operation, performance and coding principles for the AEI system shall comply with the requirements of Association of American Railroads (AAR) Standard S-918 in Section K of the AAR Manual of Standards and Recommended Practices

Certain administration provisions of AAR Standard S-918 are not applicable. Clauses relating to the approval of changes in tag position are examples.

Tag coding for freight vehicles, locomotives and other types of equipment are prescribed in AAR Standard S-918, Appendices A to J. Coding details for all vehicles are summarised in Tables 1 and 2 below. Detailed tables of AAR data fields are reproduced in the following tables.

Table 3 Data fields for freight, passenger and infrastructure maintenance vehicles [AAR Manual of Standards and Recommended Practices S-918 Appendix A]

Table 4 Data fields for locomotives (including passenger cab control cars and multiple unit cars)

[AAR Manual of Standards and Recommended Practices S-918 Appendix B]

Rail compatible Trailers with separable rail bogies, such as Road/Railer units, shall be tagged as road trailers or chassis in accordance with AAR Standard S-918 paragraphs 9.2, 9.5, and 9.6. Coding details are given in Appendices C and D of S-918.

Bogies for Rail Compatible Trailers shall be tagged as freight vehicles, with the coding details given in AAR Standard S-918, Appendix A and summarised in Table H1 below.

AAR AEI tags operate in the frequency range 902 to 928 MHz. The AEI readers used on the NSW network operate in the frequency range 918 to 928 MHz.

Re-use of used AEI tags is not permitted

5 Australian application of transponder tags for rolling stock

For Australian applications, the first ten fields, 1 to 10, are compulsory. Fields 11 to 19 are optional or system generated. Data to be entered shall match data listed in the Locomotive and Rolling Stock Data or Track Maintenance Vehicle Data sections in the CRN Train Operating Conditions manual.

The data fields are summarised in Tables 1 and 2.

For reference, the complete AAR data tables are reproduced in Tables 2 to 5.

Data field	Information
1	Vehicle type (Equipment group code): 5 = locomotives (including passenger cab control cars and multiple unit cars) 19 = Freight vehicles, passenger vehicles and infrastructure maintenance vehicles. (excluding passenger cab control cars and multiple unit cars)
2	Tag type: This is the physical properties of the tag. The tag encoding company will know what data to input.
3	Vehicle class (alpha code), (see Data field 4 for number codes or the number part of the code) If a locomotive code is a number only, enter “LOCO” in this field. For alphanumeric codes, the “alpha” part of the code goes in this field. eg. Locomotives – for NR87 enter ‘NR’, T381 enter ‘T’ Freight – NDFF2201 enter ‘NDFF’, L1174 enter ‘L’, SWT5 enter ‘SWT’ Passenger cars – DCM8021 enter ‘DCM’, T4005 enter ‘T’, FAM2391 enter FAM, AK2382 enter ‘AK’ Infrastructure vehicles – TJ091 enter ‘TJ’, BTM07 enter ‘BTM’,RR24 enter ‘RR’ See Note below.

Table 1 - Summary of AEI tag data requirements (part 1)

4	Vehicle class and number (numeric only), (see Data field 3 for the alpha part of an alphanumeric code). If a vehicle code is a number only, enter that number in this field. For alphanumeric codes, only the “number” part of the code goes in this field. eg. For locomotives 2201, 42303, 4819, 8021 enter the full number, for NR87 enter ‘87’, T381 enter ‘381’, L251 enter ‘251’ Freight – NDFF2201 enter ‘2201’, L1174 enter ‘1174’, SWT6 enter ‘6’ Passenger cars – DCM8021 enter ‘8021’, T4005 enter ‘4005’, FAM2391, AK2382 enter ‘2382’ Infrastructure vehicles – For 42303 enter the full number, for TJ091 enter ‘091’, BTM06 enter ‘06’, RR24 enter ‘24’ See Note below.

Table 2 (Continued) – Summary of AEI tag data requirements (part 1)

Data field	Information
5	Vehicle side (left or right). A left and a right tag are required for each vehicle. The coding for left is '0' and for right it is '1'. The coding program does not accept '0' or '1' but accepts "left" of "right".
6	Vehicle length. Enter the coupled length as listed in the RailCorp TOC manual in decimetres. That is multiply the length in metres by 10. eg. A 48 class locomotive is 14.8 metres, enter '148'
7	Number of axles.
8	Owner identifier. This would normally be the owner's initials or name up to five letters.
9	Bearing type: 0 = plain bearings 1 = roller bearings, not otherwise classified 2 = roller bearings, inboard 3 = roller bearings, 3 axle bogie, 1 axle obstructed (Buckeye design) 4 = roller bearings, in plain bearing housing 5 = roller bearings, cylindrical oil filled 6 = reserved 7 = reserved

Table 3 - Summary of AEI tag data requirements (part 2)

10	0 = single platform vehicle or for each vehicle portion of a semi-permanent coupled group. Platform identifier for multipack freight vehicles only: For Australian applications, the allocation of data values for platform identification in Clause 1.9 of Appendix A of AAR Standard S-918 are not appropriate, and shall be amended as follows. 1 = 'A' platform 2 = 'B' platform 3 = 'C' platform 4 = 'D' platform 5 = 'E' platform 6 to 14 applies to 'F' to 'N' platforms 15 = 'O' platform and any platforms beyond the 15th.
11	Spare – the owner can use this for any additional information they choose
12	Spare – the owner can use this for any additional information they choose
13	Blank
14	Security – Optional – owners choice or blank
15	Data format code – system generated
16	Second check sum – system generated
17	Frame marker – system generated
18	First check sum – system generated
19	Reserved frame marker – system generated

Table 4 (Continued) – Summary of AEI tag data requirements (part 2)

6 Location of AEI tags on rolling stock

6.1 Dimensional position of tags

AEI tags shall be located and fastened to vehicles in accordance with the criteria specified below and AAR Standard S-918.

Detailed requirements for the location and mounting of tags on various types of vehicles and equipment are prescribed in clauses 9.1 to 9.7 of AAR Standard S-918.

For tank vehicles, tags and their mounting plates shall not be attached to the tank shell. Tags shall be attached only to the tank vehicle underframe or boundary members.

Tags shall be fitted towards the right hand end of a vehicle when facing the side of the vehicle.

For location of AEI tags on vehicles refer to the following Figures:

- Figure 1 General location of tags (AAR S-918 Figure 9.1)
- Figure 2 Four axle freight and passenger vehicles (AAR S-918 Exhibit A)
- Figure 3 Six axle freight and passenger vehicles (AAR S-918 Exhibit A)
- Figure 4 Two axle vehicles (AAR S-918 Exhibit A)
- Figure 5 Six axle locomotives (AAR S-918 Exhibit B)
- Figure 6 Four axle locomotives (AAR S-918 Exhibit B)

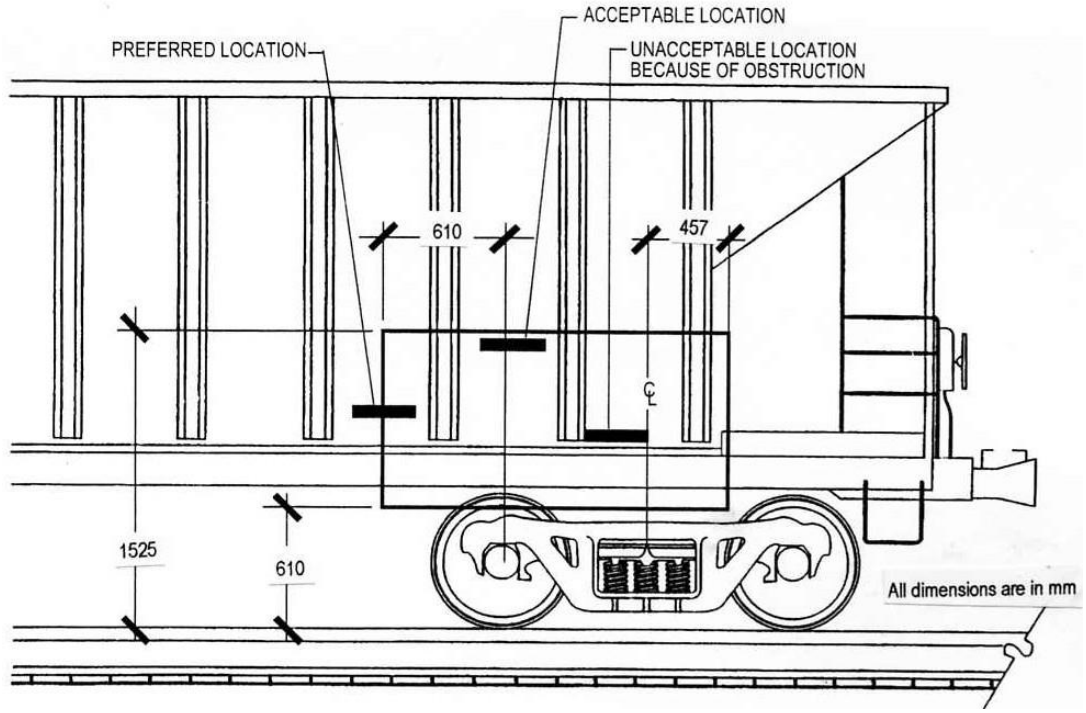

Figure 1 - Diagram H1 - Location of AEI tags on vehicles.

[AAR Manual of Standards and Recommended Practices S-918 Figure 9.2]

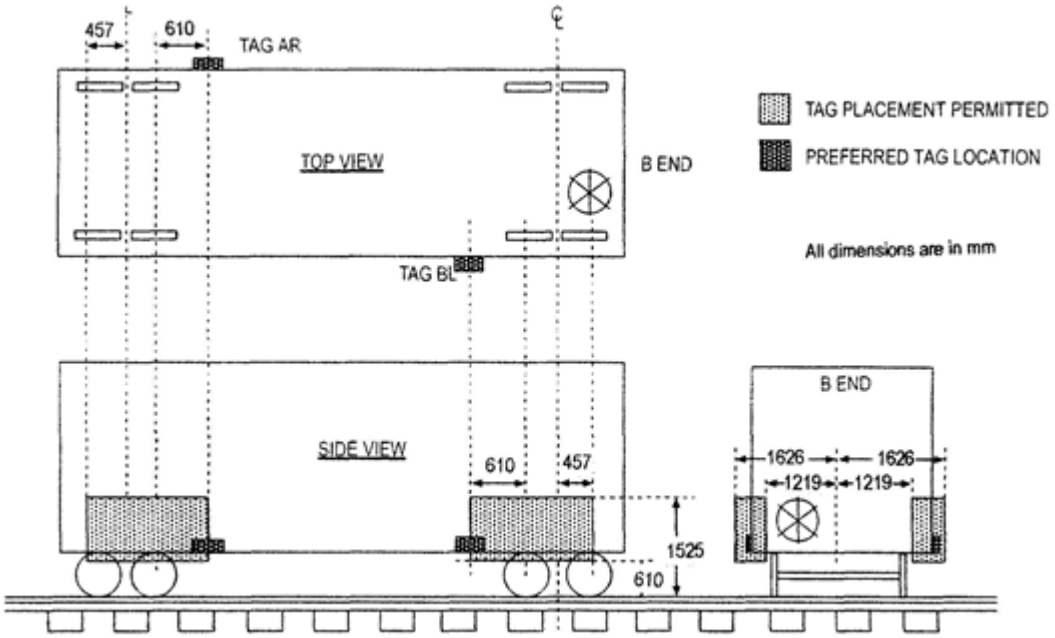

Figure 2 - Location of AEI tags – Four axle freight & passenger vehicles.

[AAR Manual of Standards and Recommended Practices S-918 Exhibit A]

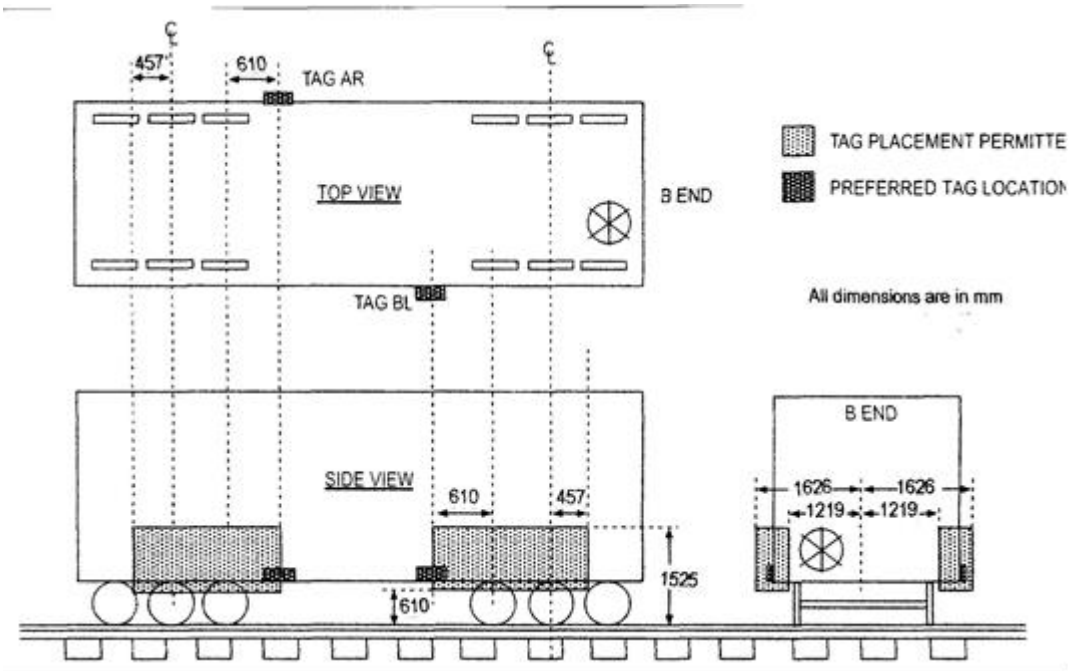

Figure 3 - Location of AEI tags – Six axle vehicles

[AAR Manual of Standards and Recommended Practices S-918 Exhibit A]

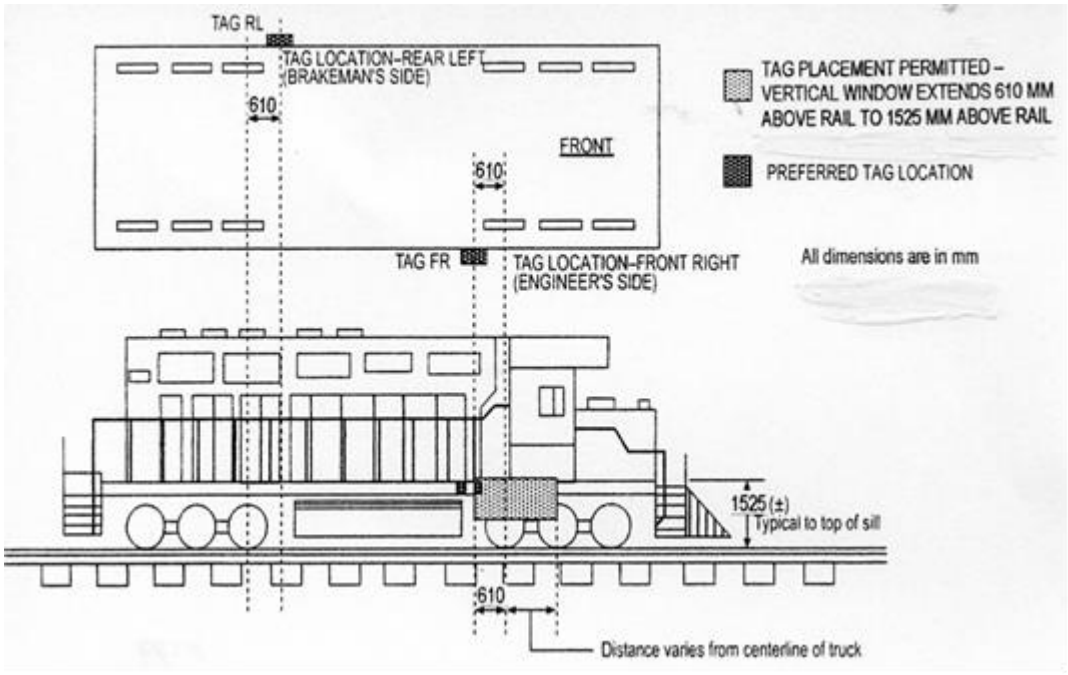

Figure 4 - Location of AEI tags – Six axle locomotive

[AAR Manual of Standards and Recommended Practices S-918 Exhibit B]

NOTE: In the case of double ended cab locomotives the front of the locomotive is the No 1 end

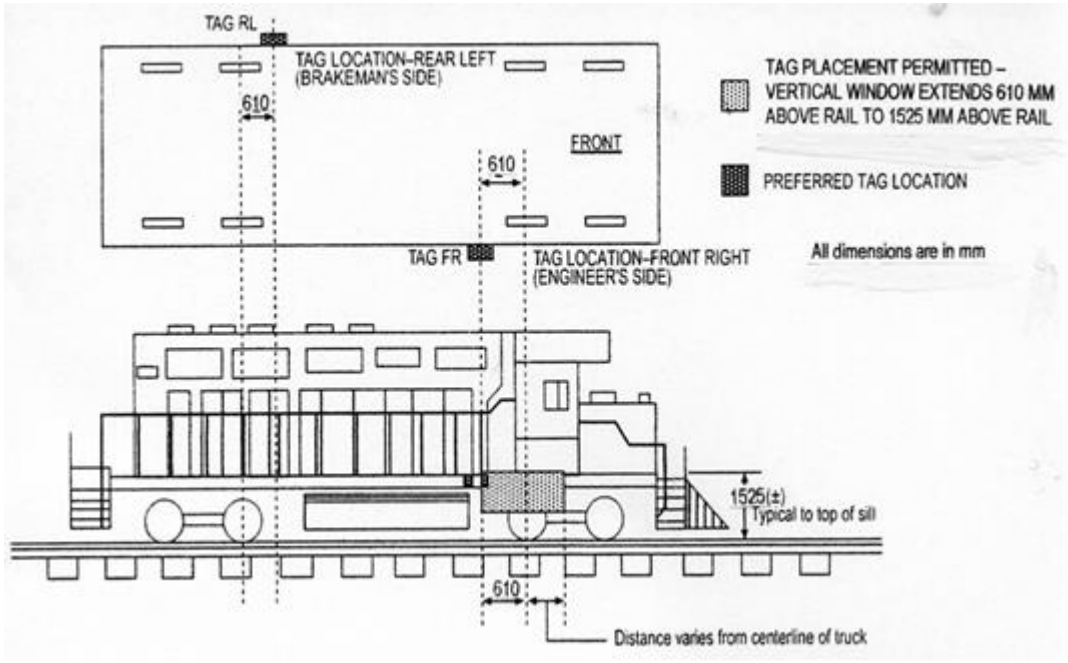

Figure 5 - Location of AEI tags – Four axle locomotive

[AAR Manual of Standards and Recommended Practices S-918 Exhibit B]

NOTE: In the case of double ended cab locomotives the front of the locomotive is the No 1 end

6.2 Tag mounting clearance

Clearance around AEI tags must provided to prevent any part of the vehicle body or structure shielding the AEI tag from the tag readers. Clearance must be provided in accordance with Figure 6.

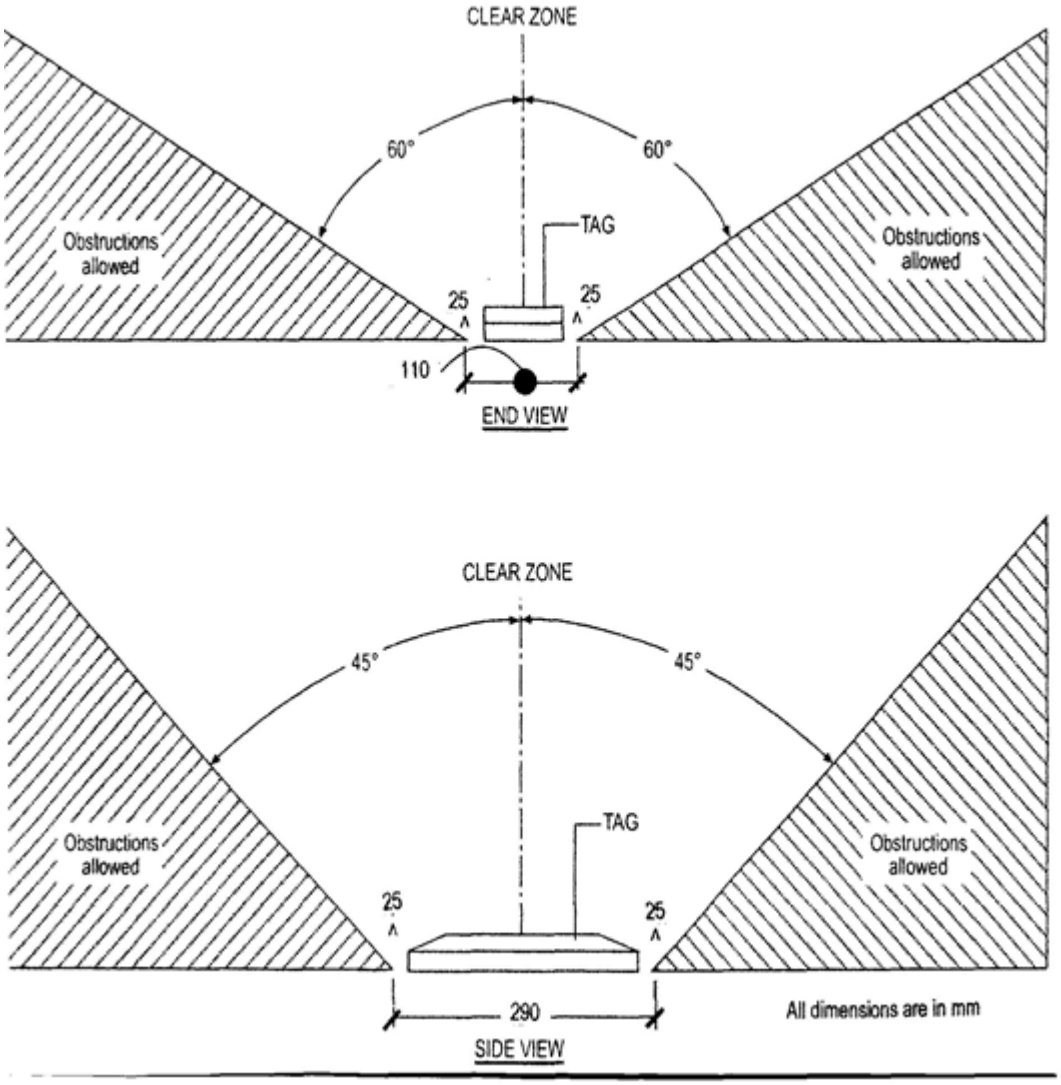

Figure 6 - Tag mounting clearance

[AAR Manual of Standards and Recommended Practices S-918 Figure 9.2]

7 AAR Data field tables

7.1 Freight, passenger and infrastructure maintenance vehicles

Entry	Bits required	Tag data sequence	Minimum value	Maximum value	Units
Equipment group code **Note 2**	5	0-4	0	31	Type code
Tag type	2	5-6	1	4	Type code
Vehicle class (code)	19	7-25	A	ZZZZ	Alpha
Vehicle number	20	26-45	0	999999	Numeric
Side indicator code	1	46	0	1	Side code
Length (**Note 1**)	12	94-96, 47-55	0 [0	4095 1343	Decimetres feet]
Number of axles	5	56-59, 64	1	32	Axles
First check sum	2	60-61			
Reserved frame marker	2	62-63			
Bearing type code	3	65-67	0	7	Type code
Platform identifier code	4	68-71	0	15	Platform code
Owners identification	5	72-76			Alpha
Spare #2	10	77-86			Owners use
Spare #3	7	87-93			Owners use
Reserved	9	97-105			
Security	12	106-117			Security or owners use
Data format code	6	118-123	0	63	Format code
Second check sum	2	124-125			
Frame marker	2	126-127			

Table H1 - Data fields for vehicles

[AAR Manual of Standards and Recommended Practices S-918 Appendix A]

NOTE 1: This field records the vehicle length in both feet and decimetres. Bit order shall be 94, 95, 96, 48, 49, 50, ….55.

7.2 Locomotives

Entry	Bits required	Tag data sequence	Minimum value	Maximum value	Units
Equipment group code – **Note 2**	5	0-4	0	31	Type code
Tag type	2	5-6	1	4	Type code
Equipment Initial (mark)	19	7-25	A	ZZZZ	Alpha
Locomotive number	20	26-45	0	999999	Numeric
Side indicator code	1	46	0	1	Side code
Length	9	47-55	0 [0	510 167	Decimetres feet]
Number of axles	5	56-59, 64	1	32	Axles
First check sum	2	60-61			
Reserved frame marker	2	62-63			
Bearing type code	3	65-67	0	7	Type code
Owners identification	5	68-72			Alpha
Spare	25	73-97			Owners use
Reserved	8	98-105			Reserved for future use
Security	12	106-117			Security or owners use
Data format code	6	118-123	0	63	Format code
Second check sum	2	124-125			
Frame marker	2	126-127			

Table H2 - Data fields for locomotives

[AAR Manual of Standards and Recommended Practices S-918 Appendix B

NOTE 2:. The Equipment Group Code for:

- freight vehicles, infrastructure maintenance vehicles and trailer passenger cars 19
- locomotives, control trailer cars a multiple unit power cars 5