

SECTION 23

**CLASSIFICATION AND NUMBERING OF
FREIGHT VEHICLES**

TABLE OF CONTENTS

Section	Description	Page No.
23.1	SCOPE	23-1
23.1.1	General.....	23-1
23.1.2	Terminology.....	23-1
23.2	VEHICLE CLASSIFICATION	23-3
23.2.1	General Requirements	23-3
23.2.2	Alpha Code.....	23-3
23.2.3	Numbering.....	23-4
23.2.4	Check Letters	23-5
23.3	BOGIE CLASSIFICATION	23-6
23.3.1	General Requirement.....	23-6
23.3.2	Alpha Code.....	23-6
23.3.3	Numbering.....	23-7

23.1 SCOPE

23.1.1 GENERAL

23.1.1.1 This Section defines the classification and numbering system to be applied to *new and existing vehicles and bogies* in intersystem service (regular or intermittent) on both standard and broad gauge lines.

23.1.1.2 Vehicles and bogies are classified according to ownership, type and operating speed.

23.1.2 TERMINOLOGY

23.1.2.1 Throughout this Section, the following terms have the specific meanings and application given.

23.1.2.2 General Terms

Rolling stock	A collective term for a large group of rail vehicles of various types, including locomotives, freight and passenger vehicles.
Rail vehicle	Used where the context requires, or is enhanced by, a differentiation between rail and road vehicles.
Vehicle	Used to denote rail vehicles where reference to a specific type or class is not required or not intended.
Car	Used when describing, or in reference to, rail vehicles of a specific type or group, eg freight cars, passenger cars, service cars, box cars, tank cars, flat cars etc (commonly referred to as a 'wagon').
Bogie	A structure incorporating suspension elements and fitted with wheels and axles, used to support rail vehicles at or near the ends. Capable of rotation in the horizontal plane. It may have one, two or more axle sets, and may be the common support of adjacent units of an articulated vehicle (commonly referred to as a 'truck' in AAR terminology).
'COFC'	An acronym for 'Container on Flat Car'.
'TOFC'	An acronym for 'Trailer on Flat Car' (piggyback).

23.1.2.2 Vehicle Types

Box Car	A fully enclosed car with side and end walls and roof, having one or more doors in each side.
Louvre Car	A box car in which the wall panels include louvres or similar devices for ventilation.
Refrigerated Car	A box car with insulated walls, roof and floor, with or without provision for the application of refrigeration equipment.
Curtain Side Car	A box car in which the side walls consist entirely or predominantly of weather-proof flexible panels as described in Section 21 of this Manual.
Open Car	A car with substantially vertical sides and ends, a flat floor and an open top, with or without doors in the side walls or floor.
Hopper Car	A car with the floor and/or walls sloping from the sides and ends to one or more discharge points or hoppers. Hopper cars may have open or covered tops and incorporate one or more of: (a) bottom doors (sliding or swing) for gravity discharge (b) equipment for pneumatic pressure discharge (c) equipment for vacuum discharge

General Purpose Flat Car	A car with a full width substantially flat deck, without side walls and with or without stanchions, bulkheads and other load support and restraint systems.
Container Flat Car	A flat car specially equipped with approved securing devices for the transport of freight containers. The car may have a full width deck, with or without apertures, or be of skeletal construction.
Well Car	A flat car having the height above rail of the underframe/deck structure reduced between the bogies to provide additional vertical load space.
Container Well Car	A well car specially equipped with approved securing devices for the transport of freight containers.
Tank Car	A car comprising a horizontal, basically cylindrical container for the transport in bulk of liquids, compressed gases, granular or pelletised solids etc.
'TOFC' Car	A flat car specially equipped with bridge plates, wheel guides, support and lashing equipment for the transport of road trailers with or without prime movers.
Articulated Car	A car comprising two or more vehicle units, the adjacent ends of individual units being supported on a common bogie and permanently connected by a device which permits free rotation in all planes.
Articulated Platform	The individual end and intermediate units of an articulated flat or well car.
Skeletal Car	A car whose only longitudinal load bearing structure between the bogies is the centre sill. The load support structure consists of lateral members attached to the centre sill.
Motor Car Carrier	A rail vehicle specially equipped for the transport of private and light commercial motor vehicles.
Steel Products Car	A rail vehicle specially equipped for the transport of steel products in bulk, eg rolled sections, slabs, bars, billets, plate, coiled strip etc.

23.2 VEHICLE CLASSIFICATION AND NUMBERING

23.2.1 GENERAL REQUIREMENTS

- 23.2.1.1 All new vehicles whether intersystem or intra-system shall be classified and numbered in accordance with the requirements of this Section.
- 23.2.1.2 Each vehicle shall be identified by an alpha-numeric group indicating the class of vehicle, a unique number within that class and an optional check letter.
- 23.2.1.3 The vehicle identification shall be located in accordance with Section 22.
- 23.2.1.4 The maximum authorised track speed is determined for a particular vehicle-bogie combination.

23.2.2 VEHICLE CLASSIFICATION - ALPHA CODE

- 23.2.2.1 The vehicle classification shall consist of a four (4) character group indicating the owning system, the type of vehicle and operating characteristics.
- 23.2.2.2 *The first character* indicates the owning system, or the system with which the vehicle is registered for maintenance purposes, as follows:
- (a) A = Australian National (AN)
 - (b) N = State Rail Authority of New South Wales (SRA)
 - (c) V = Public Transport Corporation, Victoria (PTC)
 - (d) W = Western Australia Government Railway (Westrail)
 - (e) Q = Queensland Railways (QR)
 - (f) R = National Rail Corporation (NRC)
- 23.2.2.3 *The second character* indicates the general category to which the vehicle belongs in accordance with the following:
- (a) Box Cars
 - 'B' indicates : box car with solid walls
 - 'L' indicates : louvre car
 - 'R' indicates : refrigerated car
 - (b) Steel Products Car
 - 'C' indicates : coiled steel strip
 - 'K' indicates : bulk steel products (slab, sections, plate, etc)
 - (c) Flat Cars
 - 'E' indicates : container car with electric wiring
 - 'F' indicates : non-container flat car
 - 'Q' indicates : container flat car (specially equipped) including container wells
 - (d) Hopper Cars
 - 'H' indicates : hopper car with bottom (gravity) discharge
 - 'P' indicates : hopper car with pneumatic pressure discharge
 - 'G' indicates : hopper car for grain (if desired)
 - (e) Open Cars
 - 'O' indicates : open wagon with or without side doors
 - (f) 'M' indicates : motor car carrier
 - (g) 'S' indicates : livestock cars
 - (h) 'T' indicates : tank cars
 - (i) 'V' indicates : brake vans
 - (j) 'W' indicates : well cars other than those specially equipped for container transport

- (k) 'Z' indicates : miscellaneous service or special purpose vehicles not adequately covered by any of the above descriptions

23.2.2.4 *The third character* is allocated at the discretion of the owning or registration system, and may be used to denote special operating characteristics, variations in construction within a class, specific products etc.

23.2.2.5 *The fourth character* of the alpha group indicates the authorised maximum track speed of the particular *vehicle and bogie combination*.

23.2.2.5.1 The maximum authorised speed may be limited by bogie characteristics, vehicle design or loading, eg high centre of gravity, undamped bogies.

23.2.2.5.2 *Fourth character allocation* shall be as follows:

- (a) 'A' vehicles not permitted to work at normal 'express freight' speeds; restricted to 70 km/hr or less
- (b) 'F' vehicles permitted to work at normal 'express freight' speeds, but which are not for bogie exchange; maximum speed 80 km/hr
- (c) 'L' vehicles suitable for limited bogie exchange operations, generally intrasystem, but not complying fully with all requirements for general exchange/intersystem working; maximum speed 80 km/hr
- (d) 'X' vehicles fitted with standard three-piece exchange bogies with roller bearings and oscillation control, suitable for unrestricted bogie exchange operations; maximum speed 80 km/hr
- (e) 'Y' vehicle and bogie combinations which are suitable for normal mainline speeds up to 110 km/hr
- (f) 'Z' vehicle and bogie combinations which are suitable for normal mainline speeds up to 130 km/hr
- (g) 'S" vehicle and bogie combinations which are suitable for normal mainline speeds up to 145 km/hr
- (h) 'T' vehicle and bogie combinations which are suitable for normal mainline speeds up to 160 km/hr

23.2.2.5.3 Determination of the maximum authorised speed for vehicles and bogies shall be in accordance with the requirements of Section 3.

23.2.3 VEHICLE NUMBERS

23.2.3.1 Each vehicle shall be allocated a number comprising up to five (5) digits, ie in the range of 1 to 99999.

23.2.3.2 Vehicle numbers shall not be duplicated within a class and preferably not used in other classes.

23.2.3.3 A vehicle shall retain its original allocated number throughout its service life except where:

- (a) It is converted or substantially modified for a different purpose or product and reclassified accordingly, and the number has previously been allocated to an existing vehicle within its new class

OR
- (b) It is used to form part of a new vehicle, eg articulation, combination of two vehicles to create one larger vehicle etc

OR
- (c) It has been written off or otherwise disposed of and subsequently reinstated in either its original or a modified form.

In these circumstances a new number shall be allocated.

23.2.3.4 Numbers shall be allocated sequentially at the discretion of the owning System, allowance being made for existing vehicles. Where differentiation is required between groups of vehicles which bear the same alpha-numeric classification, (eg to distinguish differences in length, capacity or specific features) the numbers may be segregated into easily recognisable blocks.

23.2.4 CLASSIFICATION CHECK LETTERS

23.2.4.1 A check letter shall be included in all vehicle identification (class and number) groups as a suffix to the vehicle number.

23.2.4.2 The check letter shall be determined in accordance with the following procedure:

- (a) Alpha characters are allocated a numerical value according to their position in the alphabet, viz A = 1, B = 2, C = 3, Y = 25, Z = 26.
- (b) Leading zeros are inserted if necessary between the alpha group and the number to form a 9 character vehicle classification.
- (c) Assign numerical values to each character to form a sequence a1, a2, a3, a4, N1, N2, N3, N4 and N5, where a1 to a4 correspond to the vehicle class and N1 to N5 refer to the vehicle number.
- (d) Calculate the value of the following series:

$$(1 \times a_1) + (2 \times a_2) + (3 \times a_3) + (4 \times a_4) + (5 \times N_1) + (6 \times N_2) + (7 \times N_3) + (8 \times N_4) + (9 \times N_5)$$
- (e) Divide the sum by 23 and add one (1) to the remainder to give the position of the check letter in the alphabet. A check letter value of 1 is to be recorded as X, and 0 is recorded as Y.

23.2.4.3 The following example illustrates the procedure:

$$\frac{(1 \times a_1) + (2 \times a_2) + (3 \times a_3) + (4 \times a_4) + (5 \times N_1) + (6 \times N_2) + (7 \times N_3) + (8 \times N_4) + (9 \times N_5)}{23}$$

= X + R R + 1 = position of check letter in alphabet, except 1 is to be read as X and 0 is to be read as Y.

Method of Calculation

Example

Count letters and figures in classification

'AMOX'18

Insert zeros between the last letter and the first digit to form a 9 character vehicle number

'AMOX'00018

Assign numerical values to the letters (A=1, B=2, ... Z=26) to form a sequence a₁, a₂, a₃, a₄, N₁, N₂, N₃, N₄, N₅, where a₁ ... a₄ correspond to the vehicle class and N₁ ... N₅ refer to digits in the wagon number

1, 13, 15, 24, 0, 0, 0, 1, 8

$$(1 \times a_1) + (2 \times a_2) + (3 \times a_3) + (4 \times a_4) + (5 \times N_1) + (6 \times N_2) + (7 \times N_3) + (8 \times N_4) + (9 \times N_5)$$

$$(1 \times 1) + (2 \times 13) + (3 \times 15) + (4 \times 24) + (5 \times 0) + (6 \times 0) + (7 \times 0) + (8 \times 1) + (9 \times 8) = 248$$

Divide the result by 23, add 1 to the remainder and convert back to the corresponding letter

248 ÷ 23 = 10 + 18 remainder 18 + 1 = 19 corresponding letter is 'S', ie check letter is 'S'

23.3 BOGIE CLASSIFICATION AND NUMBERING

23.3.1 GENERAL REQUIREMENTS

- 23.3.1.1 All bogies used for intersystem freight vehicles, whether regularly or intermittently, shall be classified and numbered in accordance with the requirements of this Section.
- 23.3.1.2 It is highly desirable that *all* bogies, including those fitted to intrasystem, service and special purpose vehicles, shall also be identified as required by this Section.
- 23.3.1.3 Each bogie shall be identified by an alpha numeric group indicating the class or type of bogie and a unique number.
- 23.3.1.4 Bogie identification and other markings shall be located in accordance with Section 22.

23.3.2 BOGIE CLASSIFICATION - ALPHA CODE

23.3.2.1 The bogie classification shall consist of a four (4) character group indicating ownership, bogie type and axle load.

23.3.2.2 *The first character* indicates the owning system, or the system responsible for maintenance as follows:

- (a) A = Australian National (AN)
- (b) N = State Rail Authority of New South Wales (SRA)
- (c) V = Public Transport Corporation, Victoria (PTC)
- (d) W = Western Australia Government Railways (Westrail)
- (e) Q = Queensland Railways (QR)
- (f) R = National Rail Corporation (NRC)

23.3.2.3 *The second character* indicates the basic bogie type as defined hereunder.

23.3.2.3.1 Three piece bogies \varnothing 305 centre plates:

- (a) 'U' = Undamped or with plain bearings
- (b) 'G' = 720 height; (28 $\frac{1}{4}$ ") gap type side bearers
- (c) 'H' = 720 height; (28 $\frac{1}{4}$ ") constant contact side bearers (CCSBs)
- (d) 'J' = 720 height; (28 $\frac{1}{4}$ ") type 2 CCSBs
- (e) 'K' = 655 height; (25 $\frac{3}{4}$ ") gap type side bearers
- (f) 'L' = 655 height; (25 $\frac{3}{4}$ ") CCSBs

23.3.2.3.2 Three piece bogies \varnothing 350 centre plates:

- (a) 'Q' = 655 height; (25 $\frac{3}{4}$ ") gap type side bearers
- (b) 'R' = 655 height; (25 $\frac{3}{4}$ ") CCSBs
- (c) 'S' = 655 height; (25 $\frac{3}{4}$ ") low level CCSBs

23.3.2.3.3 Three piece bogies \varnothing 400 centre plates:

- (a) 'B' = 655 height; (25 $\frac{3}{4}$ ") CCSBs

23.3.2.3.4 Rigid frame bogies with primary and/or secondary suspension friction or hydraulic damping:

- (a) 'C' = \varnothing 350 centre plate, 655 height (25 $\frac{3}{4}$ "), spring type side bearers
- (b) 'D' = Spherical centre plate, 542 height (21.3"), spring type side bearers
- (c) 'E' = Spherical centre plate, 670 height (26.38"), spring type side bearers

The height given for (b) and (c) is the nominal height from rail to the mating surface between the top bogie bolster and the base of the centre casting assembly.

23.3.2.3.5 Passenger car type bogies with primary and/or secondary suspension, hydraulic damping:

- (a) 'P' = Applied to freight vehicles

23.3.2.4 *The third character* indicates the authorised maximum track speed of the bogie, when applied to an appropriate vehicle, (refer to Section 23.2.2.5) as under:

- (a) 'A' = Maximum speed not more than 70 km/hr (undamped, plain bearings etc)
- (b) 'F' = Maximum speed of 80 km/hr
- (c) 'X' = Maximum speed of 80 km/hr; bogie designated for exchange service (see Section for requirements)
- (d) 'Y' = Maximum speed of 110 km/hr
- (e) 'Z' = Maximum speed of 130 km/hr
- (f) 'S' = Maximum speed of 145 km/hr
- (g) 'T' = Maximum speed of 160 km/hr

Note that the above speed ratings are maximums only, established by field trials in conjunction with compatible vehicles, and do not necessarily indicate the authorised track speed of a bogie fitted to other vehicles. Bogies shall not be applied to vehicles with a higher speed rating except under special circumstances.

23.3.2.5 *The fourth character* indicates the axle load capacity (gross mass at rail) of the bogie in accordance with the following:

Class	Gross Axle Load on Rail, tonnes	Bearing Size	Nominal Vehicle Capacity
B	11	B (4¼ x 8)	30 t
C	15	C (5 x 9)	40 t
D	20	D (5½ x 10)	50 t
E	25	E (6 x 11)	70 t
F	30	F (6½ x 12)	100 t
G	35	G (7 x 12)	125 t

Spring grouping shall be considered when allocating the appropriate fourth character, eg bogies with 6 x 11 bearings sprung for 20 t axle load.

23.3.3 **BOGIE NUMBERING**

23.3.3.1 Each bogie shall be allocated a number comprising up to five (5) digits, ie in the range of 1 to 99999.

23.3.3.2 Bogie numbers shall not be duplicated within a class as defined by the alpha group.

23.3.3.3 Numbers within each class shall commence at one (1) and shall be allocated sequentially. Bogies shall retain their original number throughout their service life, except when both side frames of a three-piece bogie are replaced during repair or overhaul, or when special features are added or removed, resulting in the reclassification to a different alpha code. In these cases a new number shall be issued.

23.3.3.4 Where additional differentiation is required within a bogie class which is not adequately covered by the characters of the alpha group, the bogie numbers may be segregated into easily recognisable blocks, eg ride control, National or Barber type friction damping, hydraulic snubbers, cross bracing etc.