

Specification

Rail Specification - Grooved Rail

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1 PURPOSE

This specification is for the purchasing of grooved rail for use within the Metropolitan Tram Network (MTN).

2 GENERAL

Yarra Trams operates over 250 kilometres of double track within the MTN, of both grooved and Vignole rail. Of this, approximately 80% of the network is in embedded roadway, primarily comprised of concrete or asphalt to surface rail-slab construction.

The welding of grooved rail in-situ within the embedded track is critical to ensure safe operations and optimise the life of the embedded track system. Consequently, the rail required in this specification must be capable of being welded in-situ without pre-heating or use of other invasive techniques that would damage the track system.

The rails shall comply in all aspects of EN14811 Railway applications - Track – Special purpose rail - Grooved rails and associated construction profiles (EN 14811:2019 & LC:2019) unless specified in Section 3 of this specification.

Rail must also comply with AS 1085: Railway Track Material, to ensure compatibility with existing MTN, including the relevant sections of:

- AS1085:1 – Steel Rails
- AS1085:12 – Insulated Joint Assemblies
- AS1085:15 – Aluminothermic Rail Welding
- AS1085:19 – Resilient Fastening Assemblies
- AS1085:20 - Welding of steel rail
- AS1085:21 – Turnouts, Switches and Crossings, and
- AS1085:22 – Alternative Material Sleepers.

3 RAIL SPECIFICS

This specification details the following additional information, as detailed within EN14811: Rail profile

Section Heading		Refer to:
a)	rail profiles	Section 3.1
b)	steel grades	Section 3.2
c)	lengths of rail including any rails for special purposes	Section 3.3
d)	the location and dimensions of holes	Section 3.4
e)	paint code requirements	Section 3.5

3.1 Rail profile

Yarra Trams has adopted the Ri57A/R10 (as per Yarra Trams Standard SND_T0001) grooved rail profile:



3.2 Steel grade

The following section detail both the chemical composition and mechanical properties for:

- Head hardened rail (specific type of heat treating that selectively hardens only the head of the rail)
- Heat treated rail (including full section hardening), and
- Standard rail (as rolled)

Rail markings will be as per EN14811, for head-hardened and standard rail.

3.2.1 Chemical composition

The cast analysis of the steel shall conform to the limits in the table below:

Rail		Chemical Composition (Elements %) in solid state					
		Carbon [C]	Silicon [Si]	Manganese [Mn]	Phosphorus [P] (max)	Sulphur [S] (max)	Vanadium [V] (max)
Specified Rail	Heat Treated (EN14811 table 3, R290GHT, solid)	0.48-0.67	0.13-0.60	0.95-1.30	0.030	0.030	The total content of Cr + Mo + Ni + Cu + V shall be less than 0.35%.
	Standard (EN14811 table 3, R220G1, solid)	0.48-0.67	0.13-0.60	0.95-1.30	0.030	0.030	The total content of Cr + Mo + Ni + Cu + V shall be less than 0.35%
Legacy Rail ¹	Heat Treated	0.50-0.55	0.15-0.58	1.1-1.25	-	-	-
	Standard	0.48-0.55	0.15-0.40	1.20-1.40	0.035 max	0.035 max	-

¹ Should a supplier request to comply with the “Legacy rail supplied Chemical Composition”, this may be considered as an alternative by Yarra Trams.

3.2.2 Mechanical properties

Rail		Mechanical Properties			
		0.2% Proof Stress MPa (PTC TM30)	Tensile Strength Rm MPa (min)	% Elongation Gauge Length = 5.65 pSo	Surface Hardness HBW
Specified Rail	Heat Treated (EN14811 table 3, R290GHT - solid)	-	960	10	290-330
	Standard Rail (EN14811 table 3, R220G1 - solid)	-	780	12	220-260
Legacy Rail ²	Heat Treated	-	≥960	≥10	290-330
	Standard Rail	400	600-880	10- 15	200-300

3.3 Length of rail

The rail should be supplied in lengths of 18 metres.

An option is available for the individual length or individual lengths of the rails. Unless otherwise agreed:

- Short lengths (defined as less than 18 meters but greater than 10 meters) shall be supplied in pairs.
- Each short length shall not be less than half the individual length of the standard rails.
- The total mass of the short lengths shall not exceed 10% of the total mass of the order.
- Any exceptions or variations require agreement from Yarra Trams and may be considered on a case-by-case basis.

3.4 Location and dimensions of holes

There shall be no holes.

3.5 Paint code requirements

There are no paint code requirements for grooved rail.

4 TYPE APPROVAL

Type Approval shall be required for any new or modified rail (including change of suppliers or place of manufacture).

² Should a supplier request to comply with the "Legacy rail supplied Chemical Composition", this may be considered as an alternative by Yarra Trams.



5 REFERENCE DOCUMENTS

Document Title	Number	Version
Tram Tyre Specification - Yarra Trams	RS-020-ST-0075	4.01
Railway applications - Track – Special purpose rail - Grooved rails and associated construction profiles	EN 14811:2019 & LC:2019	
Railway Track Material: Steel Rails	AS1085:1	
Railway Track Material: Insulated Joint Assemblies	AS1085:12	
Railway Track Material: Aluminothermic Rail Welding	AS1085:15	
Railway Track Material: Resilient Fastening Assemblies	AS1085:19	
Railway Track Material: Welding of steel rail	AS1085:20	
Railway Track Material: Turnouts, Switches and Crossings	AS1085:21	
Railway Track Material: Alternative Material Sleepers	AS1085:22	
Standard Drawing - Rail / Wheel Profiles	SND_T0001	A

6 DOCUMENT VERSION CONTROL

Version History	Date	Detail
1.00	20/01/2026	Original Version
1.01	30/01/2026	Updated Standard Drawing reference
2.00	10/08/2026	Updated chemical composition, mechanical properties and parts of AS1085 relevant to the specification. Added Standard specified rail