

Northstar Metals Pty Ltd

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**NORTHSTAR****EXTRUSION BILLET SPECIFICATIONS**

Date	Change
6 November 2013	First Issue
15 April 2018	Second Issue

1. Scope

This specification provides the typical limits and tolerances on chemical, metallurgical and physical quality of NM's primary aluminum billet supplied as defined in Table 1.

Table 1: Product combinations covered by this specification

Billet Sizes (mm)		Alloys
Diameter	Length	6063T
178	5800	

2. Chemical composition limits

Chemical composition is specified by alloy codes with composition limit as defined in the table below. Furnace charges are sampled and analysed according to methods based on ASTM Standards E716 and E1251.

Table 2: Chemical composition limits

Element	6063T		
	Min	Max	Nom
Silicon	0.40	0.47	0.43
Iron	0.14	0.20	0.17
Copper		0.02	0.02
Manganese	0.03	0.05	0.04
Magnesium	0.45	0.52	0.48
Chromium		0.02	0.02
Zinc		0.02	0.02
Titanium		0.02	0.02
Others each		0.02	0.02
Others total		0.15	0.15

Note: Composition in weight percent.

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**NORTHSTAR****3. Metallurgical quality**

Item	Limit of Acceptance
Homogenisation	Microstructure to exhibit reduced microsegregation from casting solidification and dissolution of Mg ₂ Si Phrases Alpha-AlFeSi to be the predominant intermetallic phase Intermetallics to exhibit spheroidisation and break-up Precipitated Mg-Si particles to be generally fine and evenly distributed
Hydrogen gas content	Maximum 0.20cc/100
Inclusions	Each cast shall be filtered with a ceramic foam filter with a minimum rating of 30ppi
Average grain size per ASTM E112-96	Diameter < 200mm - Maximum 200µm Diameter 200-250mm - Maximum 250µm

4. Physical quality

Item	Limit of Acceptance
Centre cracks	Nil as determined by in-line ultrasonic inspection with two probes offset at 90 degrees
Surface contamination	Surfaces shall be free from dirt and grit, oil, grease, swarf and corrosion products
Surface defects	Nil cold shuts/folds, transverse tearing or bleed outs Nil folded oxide patches greater than 5mm in size Nil barber poling which exceeds diameter tolerance Nil brags > 50% of billet length and/or circumference
Mechanical Damage	Nil greater than 2mm in depth Nil greater than 5mm in width

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**NORTHSTAR****5. Dimensions and Tolerances**

Item	Limit of Acceptance
Diameter	±0.50%, with minimum ±1mm
Length	±10mm
Bow	2mm/metre with 10mm max over log length*
Saw cut	Maximum 1mm/100mm deviation from square

*The maximum concave bow is normally measured by placing a 1 meter straight edge across any length of the log and a tight stringline end to end, and measuring the gap with a vernier callipers or equivalent.

6. Marking

Each billet in a bundle shall be stamped on one cut end with the cast number and alloy code. In addition, each bundle of billet shall be labelled to show the producer name, alloy code, cast number and weight.

7. Documentation

A manifest shall be supplied with each shipment of billet providing the alloy code, cast number, chemical analysis and dimension and weight details of the product.

8. Other requirements

If there is any concern about the quality of the product, then both parties shall resolve the issue by mutual discussion.