

Building Product Information Sheet

Product name:

Pacific Steel Grade 500E Reinforcing Steel Bar – *Processed from Coil*

Product line (the product line from which the product is customised) :

Millier Reinforcing Limited - off coil machines

Product description and its intended use (measurements, materials, usage) :

Manufactured by Pacific Steel Ltd to AS/NZS 4671, micro-alloyed grade 500E steel is available as plain and deformed coils for further processing by Millier Reinforcing for the reinforcement of concrete.

Key Tensile Specifications (as per AS/NZS 4671):

Yield Stress (Re): 500-600MPa

Tensile to Yield Strength Ratio (Rm/Re): 1.15-1.40 Minimum Uniform Elongation (Agt): 10%

Product identifier (if applicable) :

HR6, HR8, HR10, HR12 & HR16 (G500e round bars). H10, H12 & H16 (G500e deformed bars)

Place of manufacture: Aotearoa New Zealand Overseas

Legal and trading name of the manufacturer(s):

Manufacturer: Pacific Steel (NZ) Ltd

Processor: Millier Reinforcing Limited

Legal and trading name of the importer (if applicable):

N/A

Address for service – Millier Reinforcing Limited:

Level 1, 30 Highbrook Drive, East Tamaki 2013, New Zealand

Website: www.millierreinforcing.co.nz

Email address: millier@millierreinforcing.co.nz

Millier Phone No: (09) 252 0050

Millier NZBN: 9429031709583

Relevant Building Code clauses:
B1 Structure:

Functional requirements clause:

- B1.2

Performance clauses:

- B1.3.1
- B1.3.2
- B1.3.3 (f)
- B1.3.4 (d)

B2 Durability:

Functional requirements clause:

- B2.2

Statement on how the building product is expected to contribute to compliance (from the manufacturer Pacific Steel Ltd):

Note: the following compliance information is from Pacific Steel Building Products information sheets - Class 1 V1.1 dated 01/09/2023

As per Standards New Zealand, NZS 3101 sets out the minimum requirements for the design of reinforced and pre-stressed concrete structures. When read along with Verification Method B1/VM1, it provides a means of complying with the performance requirements of New Zealand Building Code clause B1 Structure. NZS 3101 specifies reinforcing bars are to comply with the Steel for the Reinforcement of Concrete Standard AS/NZS 4671 and Pacific Steel (PSNZ) manufactures 500E reinforcing steel in compliance with this Standard.

B1.2 and B1.3.1- Designers and engineers account for the combination of loads that structures are likely to experience. When design standards are calibrated against product standards, the use of suitable materials are specified so that the probability of failure is reduced to below acceptable limits. Clause 5.3.2.1 of NZS 3101:Part1:2006 specifies reinforcing bars are to comply with AS/NZS 4671. 500E reinforcing steel meets the minimum product and testing requirements specified in AS/NZS 4671 in order to satisfy these design requirements.

B1.3.2 and B1.3.3(f) - 500E bar and coil meet the AS/NZS 4671 requirements of the earthquake ductility class E reinforcing steel grade. This grade of reinforcing steel was specially developed to perform in seismic conditions and specifies a minimum yield stress of 500MPa, uniform elongation of 10%, and tensile to yield strength ratio of 1.15.

1.3.4(d) - Appendix E of AS/NZS 4671 states that "all manufacturing facilities will produce reinforcing steel products with some variation in mechanical properties. This variation will occur across different batches but also within a single batch. Australian and NZ Standard Technical Committees have taken this into account in the development of Australian and NZ design standards." As such, AS/NZS 4671 emphasises the importance of long term quality to ensure the conformance of the many tonnes of steel produced by a manufacturer rather than just a few sampled batches. 500E products conform to these LTQ requirements.

B2.2 - 500E steel meets the chemical, geometric, and mechanical requirements specified in AS/NZS 4671 to ensure the steel is fit for the reinforcement of durable concrete structures.

Millier Reinforcing limited process and produce cut and bent reinforcing from Pacific Steel Grade 500E Reinforcing Steel coil. The processing of Pacific Steel Grade 500E Reinforcing Steel coil shall be carried out following factory production control procedures to ensure steel properties are maintained in compliance with AS/NZS 4671. AS/NZS4671 requires bars processed/straightened from coil to be retested and recertified to confirm post processing compliance with AS/NZS 4671. Pacific Steel Grade 500E Reinforcing Steel coils processed by Millier Reinforcing are tested and recertified as specified by AS/NZS 4671. Conformance certificates are available for LTQ (Re, Rm/Re & Agt), rib height checks and bend rebend test verification.

Limitations on the use of the building product:

Note: the following limitation information is from Pacific Steel Building Products information sheets - Class 1 V1.1 dated 01/09/2023

NZS 3109 clause 3.3.8 does not permit cold re-bending/straightening of micro alloyed Grade 500E steel that has been bent.

AS/NZS 1554.3 clause 3.3.1 does not permit tack welding to any reinforcing steel used for structural/seismic purposes.

As the mechanical properties of steel are altered through cold working, recertification is required on reinforcing coils that have been subsequently processed (such as by straightening).

Design requirements that would support the use of the building product:

Note: the following design requirement information is from Pacific Steel Building Products information sheets - Class 1 V1.1 dated 01/09/2023

500E bars and coils manufactured by PSNZ are rolled with unique mill and grade bar markings for easy identification on site. These bar markings assist builders, specifiers and inspectors in identifying products as being produced by PSNZ to AS/NZS 4671.

Deformed 500E products have '500E' rolled into the bar surface, two longitudinal ribs and a missing transverse rib before PSNZ's trademark product brand 'SEISMIC'. 500E Reidbar products by PSNZ are rolled with a short transverse rib on one side of the bar in accordance with AS/NZS 4671. Plain 500E bars/coils (as typically used by mesh manufacturers) have a dot and two dashes rolled into the bar surface.

PSNZ's 500E reinforcing steel products are tested as specified by AS/NZS 4671 by PSNZ's IANZ accredited laboratory. Test certificates are available for every production batch for verification.

PSNZ's 500E reinforcing bar and coil products are certified by the Australasian Certification Authority for Reinforcing and Structural Steels (ACRS). This serves as an independent, third-party product certification that PSNZ's 500E products meet the requirements of AS/NZS 4671. 500E bars and coils manufactured by PSNZ are rolled with unique mill and grade bar markings for easy identification on site. These bar markings assist builders, specifiers and inspectors in identifying products as being produced by PSNZ to AS/NZS 4671.

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Continued - Design requirements that would support the use of the building product:

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Installation requirements:

Note: the following installation requirement information is from Pacific Steel Building Products information sheets - Class 1 V1.1 dated 01/09/2023

All activities performed on reinforcing steel (such as bending/welding/galvanising) shall comply with the relevant standards, primarily NZS 3101 and NZS 3109.

Micro-alloyed 500E steel can be hot or cold bent, and can be hot rebent (for procedures refer to 3.3.8 of NZS 3109).

NZS 3101 specifies that "due to the low carbon metallurgy of reinforcing steel manufactured to AS/NZS 4671, the steel is considered readily weldable." Refer to AS/NZS 1554.3 for details of appropriate welding techniques.

NZS 3109 specifies "concrete construction requires that hooks and bends are formed in accordance with the bend requirements of Table 3.1. The minimum diameter of the bend is measured on the inside of the bar". PSNZ's bendometer tool is a helpful guide for details of standard hooks, bends, stirrups or ties, for mesh bend diameter requirements and for galvanised bar bend requirements,

Micro-alloyed bar has the same strength and ductility properties across its cross section so the loss in strength of the bar is proportional to the amount of steel lost during cutting or threading operations (opposed to QT bar which gains its strength from the hard quenched casing, so cutting a thread into this outer casing will mean that the loss in strength is not proportional to the amount of steel which is removed).

Reinforcing steel is often very heavy and difficult to handle. It is recommended that suitable gloves be worn at all times when handling reinforcing steel and suitable lifting equipment is utilised to minimize manual handling injuries. If suitable lifting equipment is not available the full load of the bars should be shared and balanced to ensure load strain is minimized.

Cut and bent reinforcing steel is often sharp. Safety caps on the end of bars are recommended to reduce the risk of abrasions or injury.

PSNZ's Grade 500E reinforcing steel can be galvanised.

Maintenance requirements:

Note: the following maintenance requirement information is from Pacific Steel Building Products information sheets - Class 1 V1.1 dated 01/09/2023

When considering the surface condition of reinforcing steel, some rust should be considered normal. Clause 3.4 of NZS 3109 indicates "tightly adhering mill scale or surface rust do not have a detrimental effect" and AS/NZS 4671 specifies "rust shall not be cause for rejection of reinforcing steel provided that a cleaned sample meets the minimum requirements of the AS/NZS 4671 Standard."

Avoid damage to the surface of reinforcing steel (say by sudden impacts or by introducing sharp notches) and excessive cold working (say by over straightening/bending) as this may detrimentally affect the steels localised ductility thereby raising the risk of brittle failure.

Note: the following statement is from Pacific Steel Building Products information sheets - Class 1 V1.1 dated 01/09/2023

Is the building product/building product line subject to warning or ban under section 26?:

Yes No

Date: 24/11/2023