



## BRANZ Appraised

Appraisal No. 1084 [2024]

## REIDBAR™ REINFORCING BAR CONNECTION SYSTEM

### Appraisal No. 1084 [2024]

This Appraisal replaces BRANZ  
Appraisal No. 1084 [2019]



### BRANZ Appraisals

Technical Assessments of products for  
building and construction.



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## Product

- 1.1 The ReidBar™ Reinforcing Bar Connection System incorporates different solutions for connecting ReidBar™ reinforcing bars within concrete elements. The system is for use as reinforcement bar mechanical connectors and anchors as specified in NZS 3101 for use with in-situ and pre-cast concrete structural elements.
- 1.2 The system includes ReidBar™ Grout Sleeves (including Ramset™ POZIFLO™ HS grout, Sika Grout 212 HP, and Fosroc Conbextra HS), ReidBar™ Threaded Inserts, ReidBar™ Flange Nuts (Steel), ReidBar™ Couplers (Steel), ReidBar™ continuously threaded reinforcing bars, and Ramset™ Epcon™ C8 Xtrem™ epoxy filler to make the connections.

## Scope

- 2.1 The ReidBar™ Reinforcing Bar Connection System has been appraised for use as reinforcement bar mechanical connectors and anchors as specified in NZS 3101, for use with in-situ and precast concrete structural elements.
- 2.2 The following conditions and limitations apply to the ReidBar™ Reinforcing Bar Connection System:
  - the reinforcing bars used in the threaded connections with the ReidBar™ Reinforcing Bar Connection System must be ReidBar™ Grade 500E continuously threaded reinforcing bars that meet the requirements of AS/NZS 4671; and,
  - starter bars which are inserted and grouted with one of the specified grouts to the ReidBar™ Grout Sleeves can be generic bars of Grade 500E (in accordance with AS/NZS 4671) or ReidBar™ Reinforcing Bars and as specified in the Technical Literature; and,
  - the final orientation of the ReidBar™ Grout Sleeve connectors in-service shall be vertical; and,
  - the system must not be used where the in-service temperature may drop below -5°C; and,
  - only ReidBar™ Flange Nuts (Steel) made of steel and ReidBar™ Threaded Couplers (Steel) made of steel may be used where connections may be subjected to high cycle fatigue. All other connectors covered by this Appraisal shall not be used when the system may be subjected to high cycle fatigue; and;
  - concrete cover to the connectors must meet the minimum requirements of NZS 3101.1, Clause 3.11.3 and Table 3.6 as appropriate; and,
  - the ReidBar™ Reinforcing Bar Connection System is subject to specific engineering design by a Chartered Professional Engineer and the installation of the system must be carried out by precast concrete manufacturers or building contractors under the guidance of a Chartered Professional Engineer; and,
  - the ReidBar™ Reinforcing Bar Connection System must be designed and installed in accordance with the conditions and limitations of this Appraisal and the Technical Literature.



## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the ReidBar™ Reinforcing Bar Connection System, if designed, used installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

**Clause B1 STRUCTURE:** Performance B1.3.1, B1.3.2 and B1.3.4. The ReidBar™ Reinforcing Bar Connection System meets the requirements for loads arising from self-weight, imposed gravity loads arising from use, earth pressure, water and other liquids, earthquake, snow, wind, impact, and time dependent effects [i.e. B1.3.3. (a), (b), (d), (e), (f), (g), (h), (j), and (q)]. See Paragraphs 8.1-8.3.

**Clause B2 DURABILITY:** Performance B2.3.1 (a) not less than 50 years. The ReidBar™ Reinforcing Bar Connection System meets this requirement. See Paragraphs 9.1-9.4.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. The ReidBar™ Reinforcing Bar Connection System meets this requirement.

## Technical Specification

4.1 The components of the ReidBar™ Reinforcing Bar Connection System supplied by Reid Construction Systems are:

- **ReidBar™ Grout Sleeves** - reinforcement bar mechanical connectors for precast concrete building elements such as panels and columns, used to make connections to the building structure where the connectors are in a vertical orientation. These are available in sizes suitable for splicing the ReidBar™ reinforcing bars listed below. The ReidBar™ Grout Sleeves are manufactured from Grade 600/3 spheroidal graphite cast iron, manufactured using a proprietary casting process. The ReidBar™ Grout Sleeves part numbers are:

- RB12GS
- RBA16GS
- RB20GS
- RB25GS
- RB32GS

The ReidBar™ Grout Sleeves are marked with the part number and manufacturing batch number.

- **ReidBar™ Grout Sleeve System accessories** - accessories used in the precast yard to set up the system. These include ReidBar™ Grout Sleeve set-up hardware, ReidBar™ Grout Sleeve rubber bungs, PVC port tubes and PF rods.

- **ReidBar™ Threaded Inserts** - reinforcement bar mechanical anchors for precast or in-situ concrete structural building elements. These are available in sizes suitable for anchoring the ReidBar™ reinforcing bars listed below. The ReidBar™ Threaded Inserts are manufactured either from Grade 600/3 spheroidal graphite cast iron using a proprietary casting process, or from mild steel. Both material options are available with and without a galvanised coating. The ReidBar™ Threaded Inserts part numbers are:

**Ductile cast iron threaded inserts:**

- RB12TI
- RBA16TI
- RB20TI
- RB12TIG
- RBA16TIG
- RB20TIG

**Steel threaded inserts:**

- RB12TIS
- RBA16TIS
- RB20TIS
- RB12TISG
- RBA16TISG
- RB20TISG

The ReidBar™ Threaded Inserts are marked with the part number and manufacturing batch number.

- **ReidBar™ Flange Nuts (Steel)** - reinforcement bar mechanical anchors for precast or in-situ concrete structural building elements. These are available in sizes suitable for anchoring the ReidBar™ reinforcing bars listed below. The ReidBar™ Flange Nuts (Steel) are manufactured from mild steel and are available with and without galvanised coating. The ReidBar™ Flange Nuts (Steel) part numbers are:

- RB12FNS
- RBA16FNS
- RB20FNS
- RB25FNS
- RB32FNS
- RB12FN SG
- RBA16FN SG
- RB20FN SG
- RB25FN SG
- RB32FN SG



The ReidBar™ Flange Nuts [Steel] are marked with the part number and manufacturing batch number.

- **ReidBar™ Threaded Couplers [Steel]** - reinforcement bar mechanical couplers for precast or in-situ concrete structural building elements. These are available in sizes suitable for coupling the ReidBar™ reinforcing bars listed below. The ReidBar™ Threaded Couplers [Steel] are manufactured from mild steel and are available with and without galvanised coating. The ReidBar™ Threaded Couplers [Steel] part numbers are:

- RB12CS      • RBA16CS      • RB20CS      • RB25CS      • RB32CS
- RB12CSG      • RBA16CSG      • RB20CSG      • RB25CSG      • RB32CSG

The ReidBar™ Threaded Couplers [Steel] are marked with the part number and manufacturing batch number.

- **Ramset™ POZIFLO™ HS** - a cementitious grout, supplied in 20 kg bags with a shelf life of 8 months after the date of manufacture.
- **Ramset™ Epcon™ C8 Xtrem™ Filler** - a two-part epoxy which is used in the threads of the ReidBar™ components listed above with a part number of C8-450. It is supplied in 450 ml two-component tubes with a shelf life of 2 years.

#### Accessories supplied by others:

- **ReidBar™ Reinforcing Bar** - available in 12 mm, 16 mm, 20 mm, 25 mm and 32 mm diameters. The ReidBar™ reinforcing bar is a continuously threaded, hot-rolled Grade 500E reinforcing bar manufactured in New Zealand to meet the requirements of AS/NZS 4671. The deformed surface of the ReidBar™ reinforcing bar gives the continuous thread. The ReidBar™ reinforcing bars covered by this Appraisal are:
  - RB12      • RBA16      • RB20      • RB25      • RB32
- **Starter Bars** - Grade 500E [in accordance with AS/NZS 4671] reinforcing bars which are grouted into the non-threaded end of the ReidBar™ Grout Sleeve.
- **Sika Grout 212 HP** - a cementitious grout supplied in 25 kg bags with a shelf life of 6 months after date of manufacture. It is identified with the name and batch number on the bags.
- **Fosroc Conbextra HS** - a cementitious grout supplied in 20 kg bags with a shelf life of 36 months after date of manufacture. It is identified with the name and batch number on the bags.
- **Leveling Shims** - are polymeric spacers used to level the pre-cast concrete panels. Levelling Shims shall be used as described in Worksafe Mahi Haumaru Aotearoa - Safe work with precast concrete Good Practice Guide, Section 10.6 and shall meet the requirements of AS 3850.1, Section 2.8.

## Handling and Storage

- 5.1 All components of the ReidBar™ Reinforcing Bar Connection System must be kept clean and dry before installation.

## Technical Literature

- 6.1 This Appraisal must be read in conjunction with:
  - ReidBar™ Grout Sleeve System - Installation Guide, March 2024.
  - ReidBar™ Reinforcing Bar Connection System - Product and Specification Guide, March 2024.
  - POZIFLO™ Grout HS - Technical Data Sheet, Part Number: RPGHS.
  - SikaGrout®-212 HP NZ, Product Data Sheet, January 2021, Version 03.01.
  - Fosroc® Conbextra® HS - Technical Data Sheet, Aug 2023.
- 6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

## Design Information

### General

- 7.1 The ReidBar™ Reinforcing Bar Connection System is reinforcement bar mechanical connectors and anchors for precast concrete building elements such as panels, columns and foundations.
- 7.2 The ReidBar™ Reinforcing Bar Connection System shall be subject to specific engineering design by a Chartered Professional Engineer, in accordance with the requirements of NZS 3101.

### ReidBar™ Grout Sleeves

- 7.3 ReidBar™ Grout Sleeves are used to connect precast concrete elements. The connections are made between horizontal precast element surfaces, with the sleeves and the starter bars in the vertical orientation. The ReidBar™ Grout Sleeves and ReidBar™ are cast into the individual precast concrete elements. The starter bar connections are made by using one of the specified grouts injected into the sleeves. The completed connection will transfer tension and compression forces between precast concrete structural elements.

### ReidBar™ Threaded Inserts

- 7.4 ReidBar™ Threaded Inserts are used in precast or in-situ concrete to connect ReidBar™ to these concrete elements. Ramset™ Epcon™ C8 Xtrem™ Filler must be used to support the mechanical connection between the insert and the ReidBar™.

### ReidBar™ Flange Nuts (Steel)

- 7.5 ReidBar™ Flange Nuts (Steel) are used in precast or in-situ concrete to terminate and anchor ReidBar™ within the concrete building element. Ramset™ Epcon™ C8 Xtrem™ Filler must be used to support the mechanical connection between the ReidBar™ Flange Nuts (Steel) and the ReidBar™.

### ReidBar™ Threaded Couplers (Steel)

- 7.6 ReidBar™ Threaded Couplers (Steel) are used in precast or in-situ concrete to couple two ReidBar™ together. Ramset™ Epcon™ C8 Xtrem™ Filler must be used to support the mechanical connection between the ReidBar™ Threaded Couplers (Steel) and the ReidBar™.

## Structural Design

- 8.1 The ReidBar™ Reinforcing Bar Connection System meets the performance requirements for use as mechanical connections, in particular, structures designed for earthquake effects as defined by NZS 3101.1.
- 8.2 ReidBar™ Reinforcing Bar Connection System connectors have been tested and assessed against the requirements of NZS 3101, Clause 8.9.1.3 (a). Only the ReidBar™ Flange Nuts (Steel) made from mild steel and ReidBar™ Threaded Couplers (Steel) made from mild steel have been tested against NZS 3101, Clause 8.9.1.3 (b), and can be used where high cycle fatigue is a design consideration. All other components of the ReidBar™ Reinforcing Bar Connection System have not been assessed against NZS 3101, Clause 8.9.1.3 (b), and cannot be used where high cycle fatigue is a design consideration.
- 8.3 The ReidBar™ Reinforcing Bar Connection System meets the stiffness requirement of NZS 3101.1, Clause 8.9.1.3 and does not need to be staggered within the member, and may all be placed at the one location.

## Durability

- 9.1 The ReidBar™ Reinforcing Bar Connection System will meet the performance provisions of NZBC B2.3.1 (a) not less than 50 years, provided that the concrete cover to the connectors meets the minimum requirements of NZS 3101.1, Clause 3.11.3 and Table 3.6 as appropriate.
- 9.2 Designers must consider the larger diameter of the ReidBar™ Reinforcing Bar Connection System when designing the members for the purposes of concrete cover to the elements.
- 9.3 Joints between precast concrete panels exposed to weather or moisture conditions must be sealed and maintained so that moisture does not reach the connectors.



### Maintenance

- 9.4 The ReidBar™ Reinforcing Bar Connection System will not normally require maintenance. However, if damage occurs to the cover concrete then repairs must be carried out to ensure the integrity of the structure.

## Installation Information

### Installation Skill Level Requirement

- 10.1 Installation of the ReidBar™ Reinforcing Bar Connection System must be carried out by precast concrete manufacturers or building contractors under the guidance of a Chartered Professional Engineer.

### General

- 11.1 The ReidBar™ Reinforcing Bar Connection System must be installed in accordance with the Technical Literature, the technical information provided by Reid Construction Systems and the requirements of NZS 3101.
- 11.2 The reinforcing bar should be free of any excessive dirt, concrete, slurry, rust or other contaminant that may affect the performance of the ReidBar™ Reinforcing Bar Connection System.
- 11.3 The ReidBar™ threaded reinforcement must be tightened to the recommended torque and adhered using Ramset™ Epcon™ C8 Xtrem™ Filler into the ReidBar™ Grout Sleeves, ReidBar™ Threaded Inserts, ReidBar™ Flange Nuts [Steel] or ReidBar™ Threaded Couplers [Steel] following the instructions in the Technical Literature.
- 11.4 ReidBar™ Grout Sleeves and starter bars must be accurately aligned before concreting the individual precast elements. In installation, starter bars must project the ReidBar™ Grout Sleeve embedment length plus the designed space between the individual precast concrete elements. [Note: Starter bars which are inserted into the grouted end of the ReidBar™ Grout Sleeves can be generic Starter Bars or ReidBar™ Reinforcing Bars, refer to Paragraph 4.1 for specifications].

### ReidBar™ Grout Sleeve

- 11.5 The grouting of the ReidBar™ Grout Sleeves with one of the specified grouts must be carried out following the instructions in the Technical Literature.

## Basis of Appraisal

The following is a summary of the technical investigations carried out:

### Investigations

- 12.1 Assessments of the durability and structural aspects of the ReidBar™ Reinforcing Bar Connection System have been made by BRANZ technical experts.
- 12.2 The manufacturer's Technical Literature and installation instructions have been reviewed by BRANZ and found to be satisfactory.
- 12.3 Site inspections have been undertaken by BRANZ to assess the practicability of installation.

### Quality

- 13.1 The manufacture of the components of the ReidBar™ Reinforcing Bar Connection System has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 13.2 The quality of the ReidBar™ Reinforcing Bar Connection System supplied by Reid Construction Systems is the responsibility of Reid Construction Systems.
- 13.3 The ReidBar™ is covered by ACRS accreditation, Certification No. 40503.



- 13.4 Chartered Professional Engineers specialising in structural design are responsible for incorporating the ReidBar™ Reinforcing Bar Connection System within the design of the structure.
- 13.5 Building contractors are responsible for the quality of the installation of the ReidBar™ Reinforcing Bar Connection System in accordance with the instructions of Reid Construction Systems.
- 13.6 Building owners are responsible for the maintenance of the structure such that suitable concrete cover to the ReidBar™ Reinforcing Bar Connection System is maintained.

### Sources of Information

- AS 3850.1:2015 Amendment 1 Prefabricated Concrete Elements Part 1: General Requirements.
- AS/NZS 4671:2019 Steel for the reinforcement of concrete.
- NZS 3101.1:2006 A3 Concrete structures standard Part 1 – The design of concrete structures.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.
- Worksafe Mahi Haumarū Aotearoa – Safe work with precast concrete Good Practice Guide, Handling, Transportation and Erection of Precast Concrete Elements, October 2019.



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28 May 2024

REIDBAR™ REINFORCING BAR  
CONNECTION SYSTEM



In the opinion of BRANZ, the **ReidBar™ Reinforcing Bar Connection System** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **ITW New Zealand [trading as Reid Construction Systems]**, and is valid until further notice, subject to the Conditions of Appraisal.

### Conditions of Appraisal

1. This Appraisal:
  - a) relates only to the product as described herein;
  - b) must be read, considered and used in full together with the Technical Literature;
  - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
  - d) is copyright of BRANZ.
2. **ITW New Zealand [trading as Reid Construction Systems]**:
  - a) continues to have the product reviewed by BRANZ;
  - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
  - c) abides by the BRANZ Appraisals Services Terms and Conditions;
  - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
  - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and quality of work;
  - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
  - c) any guarantee or warranty offered by **ITW New Zealand [trading as Reid Construction Systems]**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **ITW New Zealand [trading as Reid Construction Systems]** or any third party.

For BRANZ

**Claire Falck**

Chief Executive

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28 May 2024