



BraceSet™ executive summary

- ✓ Designed specifically for precast concrete wall panel bracing
- ✓ Load controlled, torque setting expansion anchor
- ✓ 22.6kN tensile WLL according to the 14 day test regime of AS3850 – 2003

Product description

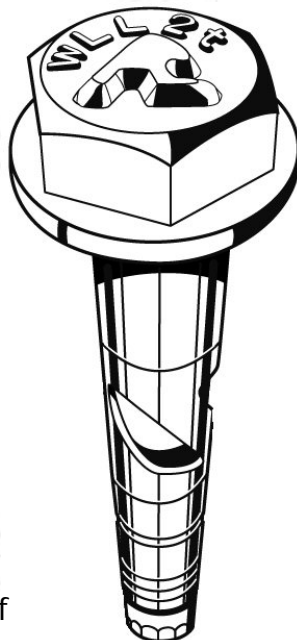
BraceSet™ Bracing Anchor is a heavy duty load controlled, torque setting expansion anchor.

Designed, patented and manufactured by Ramset Fasteners Australia.

Product identification

BraceSet™ is simple to identify:

- ✓ The nominal capacity of the product is clearly marked:
WLL 2t
- ✓ The Ramset 'R' is clearly marked on the bolt head.
- ✓ This combination of markings is unique to BraceSet™.



Applications

BraceSet™ has been designed specifically for fixing the slotted feet of precast concrete wall panel braces.

It may be used at either end of the brace, fixing the brace to the floor slab or to the wall panel.

The capacity information given herein relates to the use of BraceSet™ bracing anchor at either end of the brace, though it will typically be used to anchor the foot of the brace to the floor slab.

Ordering

Ordering BraceSet™ Bracing Anchor is simple !

- ✓ Part Number – BA20115
- ✓ Available in handy project quantity of 40 units supplied in a heavy duty box

Customer service

Contact the Reid customer service team on 1300 780 250 to place your order for BraceSet™ Bracing Anchor.



Capacity derivation

BraceSet™ has been tested in accordance with the requirements of AS3850 – 2003.

This standard requires that where expansion anchors are to be used for securing braces of precast concrete wall panels, they must be tested in accordance with the test program outlined in Appendix A of the standard.

This test method requires anchors to be set through a standard plate then left for 14 days to allow preload relaxation to take place, before being tensile tested.

This test method, agreed to by all major expansion anchor manufacturers in Australia replaces the 0.1mm 'first slip' test from AS3850.1 – 1990 (superseded).

This previous test method tests the anchors load retention immediately after setting and hence is widely recognized as not adequately addressing the issue of preload relaxation over time.

The 14 day test method detailed in AS3850 – 2003 addresses the typical expected duration for this application.

Capacity data – simplified

When tested in accordance with the test program detailed in Appendix A of AS3850 – 2003, BraceSet™ Bracing Anchor enables the following:

- ✓ **Used at either end of the brace, BraceSet™ Bracing Anchor will satisfactorily resist an axial brace load of 22.6 kN (WLL) when the brace is inclined between 45° & 75° to the horizontal and subject to the following:**

Minimum concrete strength	= 20 MPa
Minimum edge distance	= 300 mm
Minimum anchor spacing	= 500 mm
Installation torque	= 150 Nm
Maximum fixture thickness	= 25 mm

The BraceSet™ bolt is unique:

Head size that of an M20 bolt (30mm AF), shank size (shear section) of an M16 bolt (15.8mm diameter) and threadform size M14 (115mm²).

It is this unique combination of physical attributes combined with application specific design that results in BraceSet™ being the ideal expansion anchor for precast wall panel bracing applications.



Capacity data – rigorous design process

All information given here is presented in Working Load Limit (WLL) format. This ensures compatibility with the applicable Australian Standard, AS3850 – 2003.

Pre - design check list

- | | |
|--|------------|
| ✓ Minimum concrete compressive strength | 20 MPa |
| ✓ Installation torque | 150 Nm |
| ✓ Maximum fixture thickness | 25 mm |
| ✓ Drill hole diameter | 20 mm |
| ✓ Absolute minimum edge distance | 200 mm |
| ✓ Absolute minimum anchor spacing | 200 mm |
| ✓ Brace foot slot width | 21 – 26 mm |
| ✓ Permissible brace inclination to horizontal | 45° - 75° |
| ✓ Minimum floor slab thickness (slab on ground) | 125 mm |
| ✓ Minimum wall panel thickness (or suspended slab) | 150 mm |
| This is to ensure no breakthrough occurs during drilling | |

Load case derivation

Load case(s) on braced panels should be determined in accordance with the appropriate Australian Standards and other regulatory codes. The load case(s) should then be transferred to the brace feet and hence into the anchors, taking into account brace foot geometry, anchor offsets etc. Load case(s) should be resolved into anchor tensile and shear load components for comparison to anchor tensile and shear capacity components.

Tensile design

Tensile WLL capacity (N_a) **22.6 kN**

No adjustment to capacity is required when anchor installation meets minimum 'Pre – design check list' requirements above.

CRITERIA 1:

$$N_{\text{applied}} / N_a \leq 1.0$$



Shear design

Check shear capacity of anchors in the table below.

Shear to edge capacity per BraceSet anchor, V_a (kN)											
		Single Brace Foot	2 adjacent brace feet, anchors loaded in shear towards an edge (anchor spacing, mm)								
			200	250	300	350	400	450	500	550	600
Anchor edge distance (mm)	200	23.0	16.1	17.3	18.4	19.6	20.7	21.9	23.0	23.0	23.0
	225	27.5	18.6	19.8	21.0	22.3	23.5	24.7	25.9	27.1	27.5
	250	32.1	21.2	22.5	23.8	25.1	26.4	27.6	28.9	30.2	31.5
	275	37.1	23.9	25.3	26.6	28.0	29.3	30.7	32.0	33.4	34.7
	300	38.9	26.8	28.2	29.6	31.0	32.4	33.8	35.2	36.6	38.0
	325	38.9	29.7	31.2	32.6	34.1	35.6	37.0	38.5	38.9	38.9
	350	38.9	32.7	34.2	35.8	37.3	38.8	38.9	38.9	38.9	38.9
	375	38.9	35.8	37.4	38.9	38.9	38.9	38.9	38.9	38.9	38.9
	400	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9

CRITERIA 2:

$$V_{\text{applied}} / V_a \leq 1.0$$

Combined load cases

All applications for BraceSet™ will involve combined load cases (inclined brace).

Check that the interaction equation below is satisfied to complete the design process for BraceSet™.

CRITERIA 3:

$$(N_{\text{applied}} / N_a) + (V_{\text{applied}} / V_a) \leq 1.2$$

Having satisfied the three criteria above, you are ready to specify BraceSet™ Bracing Anchor for your project !

Specification

Precast concrete wall panel braces to be fixed using Ramset™ BraceSet™ Bracing Anchor, part no. BA20115. Product to be installed in accordance with Technical Data Sheet supplied with every box of anchors. This Technical Data Sheet is to be retained with the structural drawings on site during the panel erection phase.



Install instructions



- ✓ **Drill a 20mm (nominal) diameter hole.**
- ✓ Drill bits should measure between 20.10mm and 20.40mm across the carbide tip.
- ✓ Drill hole depth should be as follows:
For a hole thoroughly blown out / vacuumed:
Hole depth = 130mm – brace foot thickness
For a hole swept clear of debris only:
Hole depth = 140mm – brace foot thickness



- ✓ Position brace foot over the drilled hole.
- ✓ **Hammer BraceSet™ anchor into the drilled hole** until the bolt head comes into contact with the brace foot plate.
- ✓ Preferably, move the brace foot plate so that the BraceSet™ anchor is located in the end of the foot plate slot.



- ✓ **Apply an installation torque of 150Nm.**
- ✓ If using an impact wrench (rattle gun) refer to the 'Impact Wrench guidelines' section of this Technical Data Sheet for tips on how to best meet the installation torque requirement.
- ✓ Required torque is typically achieved after 3 – 5 turns of the head of the anchor.



- ✓ **To remove BraceSet™**, apply counter clockwise rotation to the bolt until the bolt thread disengages from the cone nut.
- ✓ Lift the bolt from the hole, slide the brace out of the way and kick the spacer sleeve out of the hole.
- ✓ The hole is now ready for patching !



Impact Wrench guidelines

It is common for an impact wrench (rattle gun) to be used to set expansion anchors in precast wall panel bracing applications.

They offer speedy, hassle free application of torque to anchors that might otherwise require significant effort to set manually.

Very few impact wrenches can be set to apply a known torque, additionally their performance may vary over the course of a days use and are subject to wear and tear like all power tools.

The tensile capacity of all expansion anchors will be affected by variation of torque from the optimal figure noted in the installation instructions.

BraceSet™ has been designed to allow for installation using an impact wrench and will perform optimally over a wide range of applied torque values.

BraceSet™ will accept installation torque values between 150 Nm and 200 Nm and perform in accordance with the capacity data presented herein.

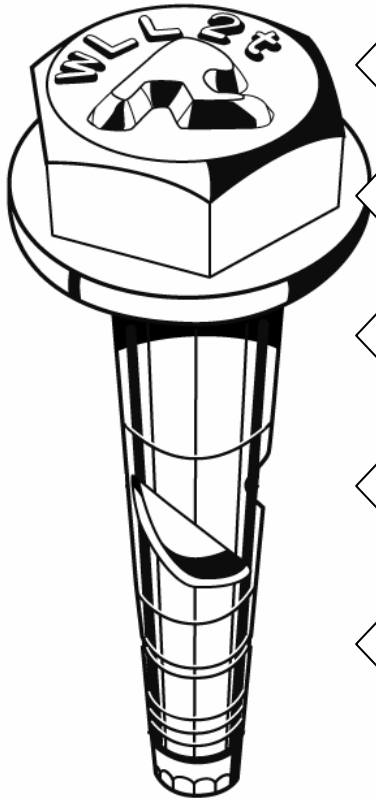
It is recommended that in order to verify that your impact wrench is capable of achieving values in this range, it should be 'calibrated' during use.

An example of how this might be achieved is as follows:

- ✓ Use the impact wrench to set a BraceSet™ anchor until the bolt head ceases turning.
- ✓ Immediately apply a calibrated torque wrench set to 150 Nm and verify that the torque wrench 'clicks' before movement of the bolt head occurs.
- ✓ This check should be undertaken each day for each impact wrench used and for each different concrete batch into which anchors are installed.



BraceSet™ Features & Benefits



- ← **Manufacturers mark and WLL stamped on bolt head.**
Simple to verify that the specified product has been used.
- ← **Large 30mm AF head and 38mm washer.**
Bolt head spans the brace foot slot structurally, does not rely on the fitting of a separate washer.
- ← **High shear capacity for a 20 mm diameter anchor.**
16 mm diameter shear zone gives up to 75 % higher steel shear capacity than M12 based bolts.
- ← **Pull down sleeve ensures fixture clamping.**
If required, the pull down sleeve reduces in height, drawing the fixture down tight against the substrate.
- ← **Heavy duty, thick expansion sleeve & M14 thread.**
Reliably high capacities, 35 % higher steel tensile capacity than M12 bolts. Tolerant of oversized drilled holes.

BraceSet™ is designed specifically for installation into the slotted feet of precast wall panel braces. BraceSet™ can be used in slots from 21mm – 26mm in width.

The unique combination of a 20mm diameter anchor and an M20 (30mm AF) sized head ensures that the head of the anchor bolt takes the full design load – not the washer.

M12 based expansion anchors typically used for this application have a hex head that is only 18mm or 19mm across flats. This is smaller than the slot width found in the majority of brace feet in Australia !

With these smaller heads, most M12 based expansion anchors are therefore reliant on the fitted washer taking the full design load in bending or the fitting of additional washers to ensure that the bolt head does not 'pull through' the slot in the brace foot.



FAQ's

Q: What size socket do I need for BraceSet™ ?

A: 30mm AF (across flats) socket or spanner.

Q: What size is the BraceSet™ washer ?

A: 38mm diameter.

Q: What drill size do I need for BraceSet™ ?

A: 20mm diameter drill bit.

Ramset R3 Plus Quatro Head Drill Bits are ideal,
Order No. DQR320200 or DQR320400.

Q: What drilling machines are recommended for drilling the 20mm holes needed for BraceSet™ ?

A: Ramset DynaDrill DD543 will handle the work load well.

For a larger machine ideal for bigger hole sizes as well, the Ramset Dynadrill DD562 should be considered.

Q: Can I use BraceSet™ for fixing the top of the brace to the panel as well as at the base of the brace ?

A: YES !

BraceSet™ will provide the same WLL when used at either end of the brace.

Q: How many sizes is BraceSet™ available in ?

A: BraceSet™ is available in a single, optimal size.



Q: What floor slab thickness can I install BraceSet™ into ?

A: A floor slab of 125mm thick will accept BraceSet™, and will perform in accordance with this information even if the drill breaks through the bottom of the slab!

Q: What wall panel thickness can I install the BraceSet™ into ?

A: A wall panel 150mm thick will accept BraceSet™, the hole should be drilled to a maximum of 120mm deep to prevent the back of the panel blowing out when drilling. If the drill bit accidentally breaks out the back of the panel, BraceSet™ will still perform in accordance with this information !

Q: Is it easy to remove ?

A: ABSOLUTELY !

BraceSet™ is designed to be easily removed. The cone nut has points on it that engage the concrete when installed, ensuring that the cone nut does not spin when undoing the bolt. The kick out spacer can be removed without tools leaving the hole ready to grout up !
No need to hammer in or grind off the anchor before grouting up the hole.

Q: Why is the cone nut grey ?

A: It is coated with a high tech. coating that makes it easier to install and ensures that torque is transferred more reliably to create preload in the concrete.

Q: How long is the anchor ?

A: The total anchor length is 135mm. with 117mm. below the underside of the washer.



Q: What hole depth do I need ?

A: If you are vacuuming or blowing the hole out, use the following rule:

130mm – brace foot thickness

If simply sweeping drilling debris from the surface, use the following rule:

140mm – brace foot thickness

Q: Can I use the BraceSet™ for other jobs on my site ?

A: BraceSet™ has been designed specifically for panel bracing applications and hence is supported for use in that application.

Reid can supply you with a number of other excellent anchoring products suited to your other structural requirements on site.

Q: Is BraceSet™ re – usable ?

A: BraceSet™ is designed for single use, ensuring that you receive the outstanding benefits of BraceSet™ with each panel you brace.

Q: What torque should I apply to BraceSet™ to set it ?

A: 150 Newton – Metres (Nm).

Q: Can I use an impact wrench (rattle gun) to set BraceSet™ ?

A: YES !

BraceSet™ will accept from 150Nm to 200Nm of torque.

Q: Why does Reid BraceSet™ have a Ramset 'R' on the head of the bolt ?

A: BraceSet™ is designed, patented and manufactured by Ramset for Reid.

Q: Is BraceSet™ available in galvanised or stainless steel finish ?

A: As panel bracing is typically a short term application (max. 4 weeks), BraceSet™ is provided in an economical zinc plated finish.