



# Deformable Brackets

## Commonly known as Fire Ties

SpeediBolt® TiltLok® Deformable Brackets provide restraints for tilt-up and precast concrete panels. These life-safety devices allow designers of buildings clad with tilt-up or precast concrete panels to specify components that meet the needs of the Building Code of Australia.

The TiltLok brackets can be used to secure panels to the structure, or to adjacent corner panels, so that in the event of a fire, the likelihood of outward collapse of the panels is minimised.

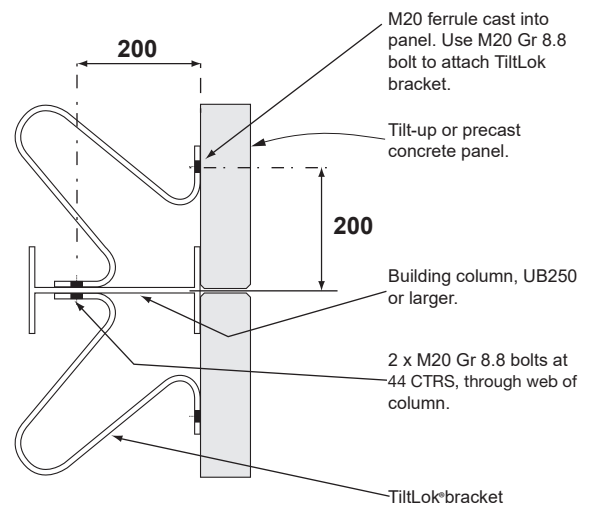
Designed and tested to meet the rigorous requirements of the Building Code of Australia.

## Design requirements and limitations

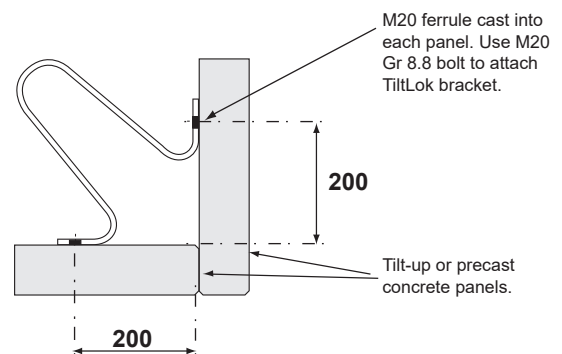
1. TiltLok Deformable Brackets are required to restrain cladding panels for the duration of a fire.
2. TiltLok Deformable Brackets are designed to allow tilt-up or precast concrete panels to hog during a fire, yet prevent the panel from being displaced from a building during the fire.
3. Vertical panel height should not exceed 9.0 m.
4. Support column spacing should not exceed 10.0 m.
5. Vertical panels must be each connected to the supporting columns, or designed such that intermediate non-attached panels are all connected, and served by TiltLok brackets.
6. TiltLok brackets must be located less than 2.0 m from the top of the panel.
7. Panels must be fitted with appropriate cast-in ferrules sized to suit loads. Brackets to be fastened to panels with M20 Grade 8.8 bolts.
8. Standard brackets to be connected to column web with a pair of M20 Grade 8.8 bolts.
9. The smallest column section that can be used with TiltLok brackets is UB250.

10. The Technical Note cited above suggests that for structures having columns with a bending capacity  $\leq 50$  kN.m, deformable brackets need not to be used to connect panels to the columns.
11. The Technical Note also suggests that the temperature of the bolts in the cast-in ferrules remains relatively low due to the concrete wall panel acting as a heat sink.
12. In applications where post-installed masonry anchors are to be used with TiltLok brackets, the capacity of the anchors should be reduced substantially to allow for elevated temperature effects.
13. The use of chemical anchors is not recommended due to elevated temperature effects.

## TiltLok Standard Bracket



## TiltLok Corner Bracket

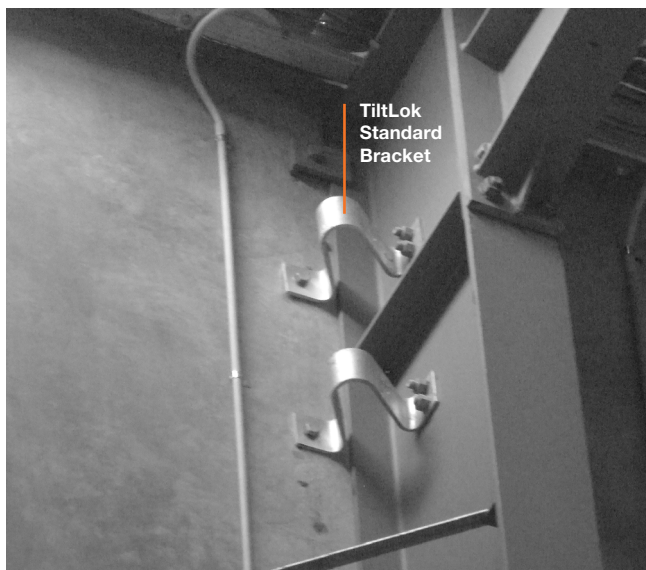


## Product Codes

Part No.	Configuration	Finish	Unit Weight
SBTILTSTDBRKG	Standard	Galvanised	5.0kg
SBTILTCNRBRKG	Corner		



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## Performance Criteria

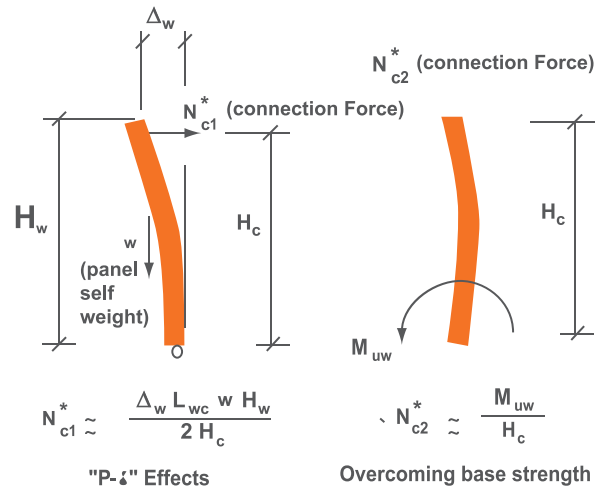
TiltLok Deformable Brackets have been designed and tested to meet the performance criteria of Specification C1.11 of the Building Code of Australia, and the BHP Structural Steel Development Group Technical Note "Single Storey Steel-framed Buildings - Support of External Walls in Fire," Revised February 1997.

Testing carried out by the Structures Laboratory of the University of Queensland has shown ultimate capacity on a pair of TiltLok brackets exceeds 164 kN, limited by Grade 8.8 fastener failure. Deformation at that load was 550 mm.

## TiltLok Features

1. Prefabricated standard components
2. Made from 100 x 10 Grade 300 flat bar
3. Economical, 'off-the-shelf' components
4. Available with a galvanised finish
5. Slotted holes aid alignment
6. Feature podger holes to assist in installation

## Derivation of forces



Total Connection Force,  $N_c^* = N_{c1}^* + N_{c2}^*$

- $H_c$  the height from the base of the wall to the uppermost connection between panel and the supporting structure (m).
- $L_{wc}$  the width of wall panels laterally supported by a connection to a panel (m).
- $M_{uw}^*$  the ultimate moment capacity (excluding  $\phi$  factor) at the base of a vertical panel including consideration of the base connection details but ignoring the effects of axial compression in the panel (kN-m per m), and the cracking moment.
- $N_c^*$  the design load (axial tension) required to be developed at a connection to a panel (kN).
- $\Delta_w$  outwards displacement of the top of the wall (m).
- $w$  the weight of wall panel per unit area (kN/m<sup>2</sup>).
- $H_w$  height of panel.

## TiltLok Corner Bracket

Formed from 100 x 10 Grade 300 flat bar, with 4 slots 22 x 28



## TiltLok Standard Bracket

Formed from 100 x 10 Grade 300 flat bar, with 5 slots 22 x 28

