



**DANLEY**™

**Load Transfer System  
Industrial Slab-On-Ground**

# Flanged Dowel Box Kits

**Product Guide**



**Designed for construction joints in Post Tension  
or large shrinkage specifications**

Refer to the back of this  
product guide for contact information.

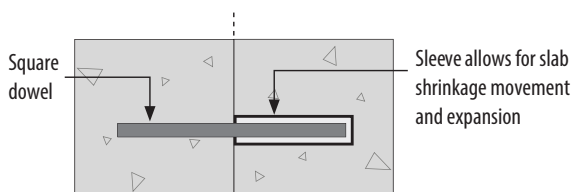
## Product Description

Flanged Dowel Boxes are multi-directional metal sleeves supplied with high capacity square dowels. They are designed for attachment to metal or wooden formwork by use of the integral nailing flange and location marks.

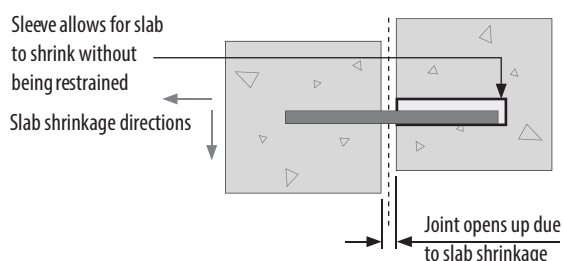
Flanged Dowel Boxes make allowance for initial shrinkage and then provide capacity for the ongoing thermal expansion and contraction of the joint as well as catering for excess lateral movement between adjacent and intersecting slab panels.

Flanged Dowel Boxes are designed for construction joints in both ground and elevated slabs and are available in a number of standard sizes. Custom sizes can be manufactured on request.

### Plan View at Construction Joint - When Poured



### Plan View at Construction Joint - After Shrinkage



## Features

1. Integral nailing flange for fast fit attachment to formwork.
2. Chalk line marks are integrated in the flange to mark centre-line position.
3. Large lateral movement capacity (minimum of 20 mm either side of the dowel).
4. Large expansion joint capacity (20 mm standard) .
5. Supplied in kit form with a friction cut square dowels to AS/NZS 3679.1, Grade 300 .
6. Galvanised box with black or hot dip galvanised dowels .

## Advantages

- Designed for Post Tension joint applications with large shrinkage.
- Allows for movement in two directions in the horizontal plane.
- Reduces risk of restraint .
- Simple nail or screw on installation .
- Eliminates the need to drill or process formwork .
- Reduced likelihood of sleeve knock-off when placing steel reinforcement mesh.

*"Simplifies form removal, can also be integrated into other formwork systems (e.g. ArmourMate™) ."*

## Benefits

### Concreter Benefits

- Eliminates drilling or processing of formwork.
- Integral nailing flange for fast fit attachment to formwork.
- Chalk line marks are integrated in the flange to mark centre-line position.
- Reduces sleeve knock off during mesh placement.
- Lateral movement allowances reduce risk of restraint and cracking.

### Engineering Benefits

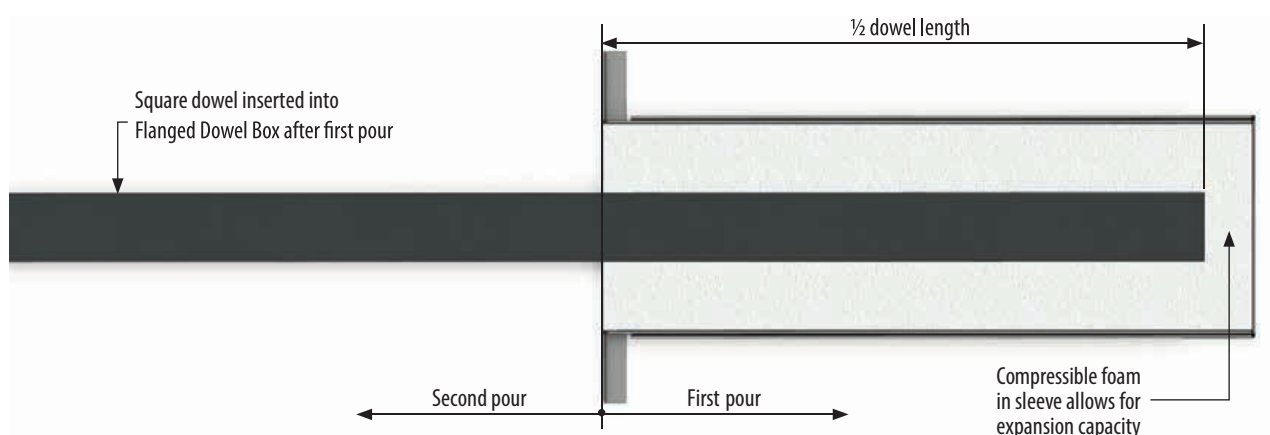
- Allows for large lateral movement.
- Allows for bilateral and diagonal shrinkage at intersections.
- Suits slab on ground and suspended slabs.
- Enables high load carrying capacity.
- Boxes fully enclosed to prevent concrete slurry ingress.
- Grade 300 materials.

### Asset Protection Benefits

- Maintains alignment of slab panels to reduce joint damage
- Reduces floor maintenance and downtime costs over the life-cycle of the facility.
- Reduces wear and tear on tenants materials handling equipment.
- Provides a smoother floor surface at the joints which ensures tenant efficiency.
- Increase tenant satisfaction and return on investment.

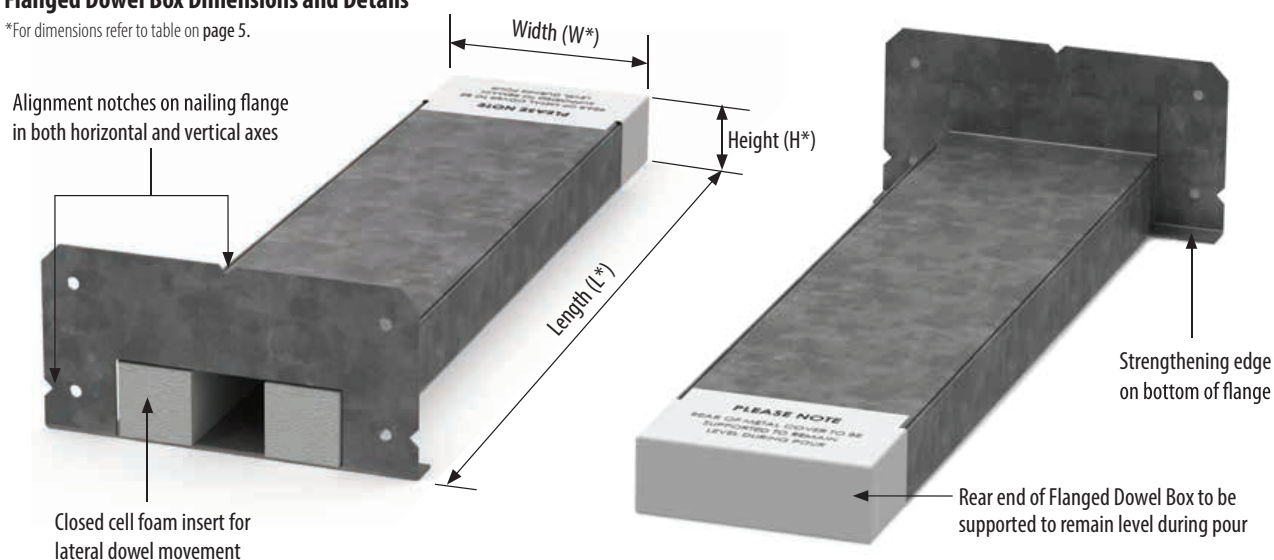


### Flanged Dowel Box (Plan View)



### Flanged Dowel Box Dimensions and Details

\*For dimensions refer to table on page 5.



### Material Technical Data (Standard Components)

| COMPONENT          | DIMENSION (mm) | MATERIAL TYPE | MATERIAL STANDARDS | STEEL GRADE EQUIVALENT | YIELD STRESS (MPa) | TENSILE STRENGTH (MPa) | STANDARDS COMPLIANCE |
|--------------------|----------------|---------------|--------------------|------------------------|--------------------|------------------------|----------------------|
| 16 mm Square Dowel | 16 SQ.M        | ild Steel Bar | AS/NZS 3679.1      | Grade 300              | 340                | 490A                   | S/NZS 3679.1         |
| 20 mm Square Dowel | 20 SQ.M        | ild Steel Bar | AS/NZS 3679.1      | Grade 300              | 360                | 510A                   | S/NZS 3679.1         |
| 25 mm Square Dowel | 25 SQ.M        | ild Steel Bar | AS/NZS 3679.1      | Grade 300              | 335                | 490A                   | S/NZS 3679.1         |
| 32 mm Square Dowel | 32 SQ.M        | ild Steel Bar | AS/NZS 3679.1      | Grade 300              | 349                | 532A                   | S/NZS 3679.1         |
| 40 mm Square Dowel | 40 SQ.M        | ild Steel Bar | AS/NZS 3679.1      | Grade 300              | 320                | 520A                   | S/NZS 3679.1         |
| Flanged Dowel Box  | 0.77           | Galv. G2 Z275 | AS1365             | Grade 300              | 310                | 360A                   | S1397:2011           |

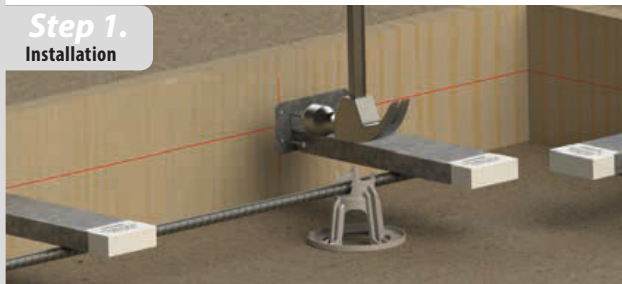


## Installation Process

**TOOLS REQUIRED:** Hammer | Nails | Spirit Level | String Line | Bracing And Stakes As Required

Installation

### Step 1. Installation



- Mark the form for slab centre and Flanged Dowel Box spacing (typically 450 mm to 600 mm). Place the Flanged Dowel Boxes over the first set of marks, lining up the location notches on the flange with the marks. Using the 4 nails, attach the base to the form. Ensure nailing plate is parallel top the top of the slab.

### Step 3. Installation



- Strip the form. This is best accomplished by starting at one end and working along the form.

### Step 2. Installation



- Pour concrete. Edge of slab must be vibrated to consolidate concrete around the Flanged Dowel Box (avoid contact with the sleeve and vibrator shaft).  
*Note: It may be necessary to support the outbound end of the boxes – use bar chairs or tie to reinforcing bars supported by bar chairs.*

### Step 4. Installation



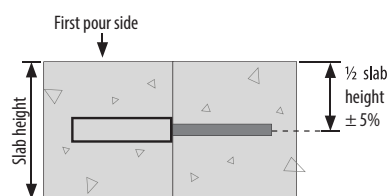
- Insert the Square dowel into the sleeve (through the flange face into the body of the box) within 36 hours of the concrete pour. The second pour can now be made.

## Installation Tolerances

1.

Location =  $\frac{1}{2}$  x slab thickness  $\pm 5\%$  e.g. for 200 mm thick slab, location is 100 mm  $\pm 10$  mm from top of slab.

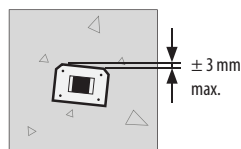
**This positions the dowel in the most effective location in the concrete, maximising shear load transfer.**



2.

Parallel to top of slab - one end of the nailing plate to be no more than 3 mm higher than the other end.

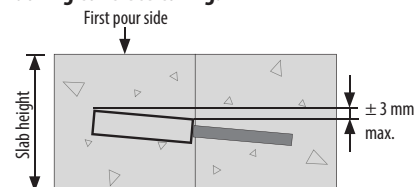
**If the dowel is severely misaligned parallel to the top edge of the slab, the dowel would restrict the slabs from moving parallel (i.e. laterally) to each other.**



3.

Perpendicular to the face of the dowel joint - the top of the sleeve at the end should be no more than 3 mm higher or lower than the face of the sleeve behind the nailing flange.

**Misalignment here is normally considered to be worst case as this restricts joint opening during concrete curing.**



## Limitations

Square dowel must be inserted in sleeve as soon as possible after pouring concrete and stripping formwork, and no later than 36 hours after pouring concrete. To maximise the efficiencies offered by Flanged Dowel Boxes and Square Dowels, use in those applications where joint opening is expected to be less than two times the dowel thickness. *Please take care when using Flanged Dowel Boxes on joints with expansion material.*

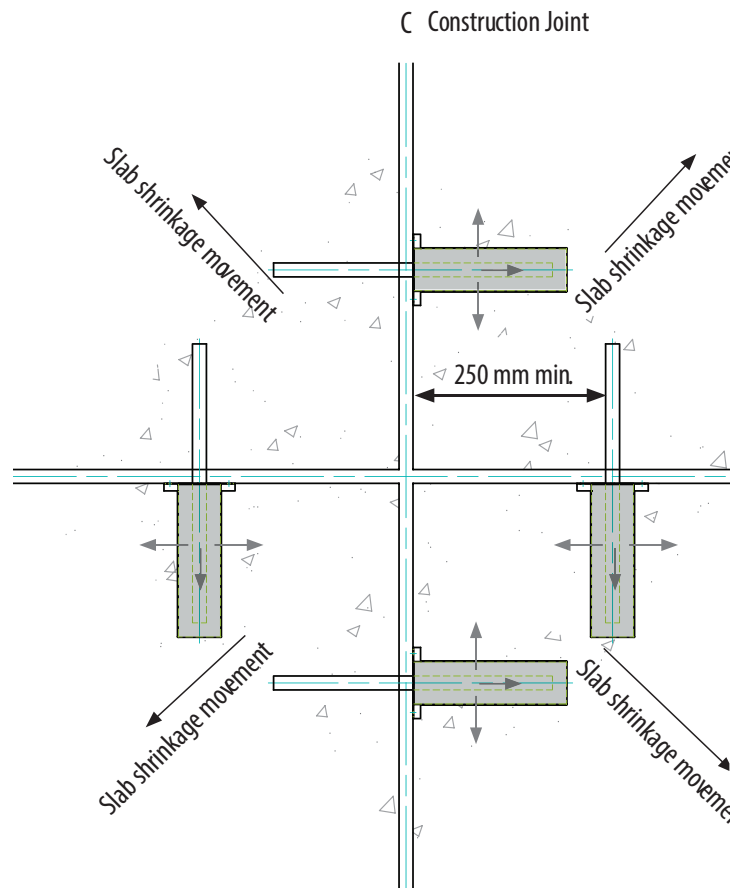
### Why Use Flanged Dowel Boxes and Square Dowels?

Slabs shrink away from the corners during curing. Shrinkage is diagonal from the intersection of joints. Adjacent slabs shrink at different rates.

Two way (lateral) movement must be allowed during the early stages of rapid drying shrinkage to reduce risk of cracking due to restraint. Flanged Dowel Boxes allow for free horizontal movement of the concrete without restraint.

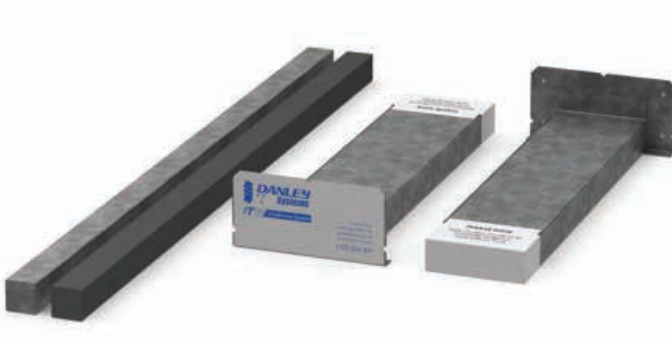
In addition to transferring vertical loads between adjacent slabs, Flanged Dowel Boxes:

- Minimise vertical differential movement between slabs.
- Allow horizontal slab movement normal to the joint.
- Allow differential horizontal slab movement parallel to the joint.
- Are efficient load transfer devices compared to other dowel systems.
- Allow for expansion.

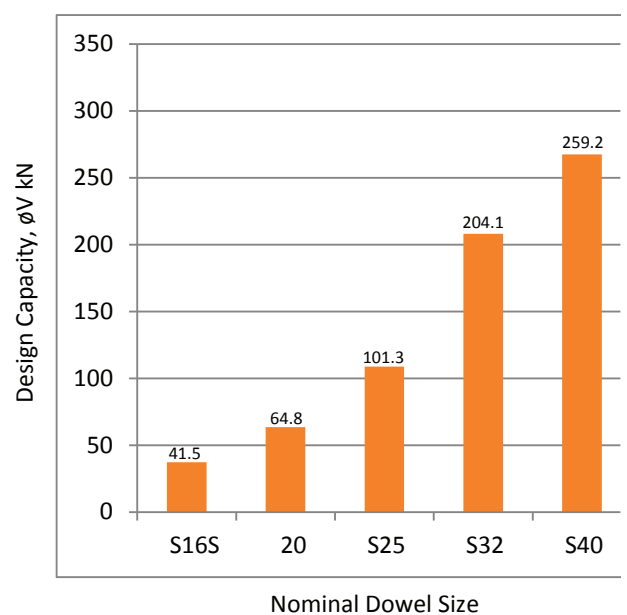


### Dowel Performance Data

**Note:** The loads shown in the graph are the design strength of the steel in the dowels alone with a load reduction factor,  $\phi = 0.9$ . However, they do not take into account the capacity of the concrete adjacent to the dowels, the dowel spacing's, or if there is a need for supplementary reinforcing in the concrete to accommodate these loads. A structural engineer must review the load transfer requirements to ensure the appropriate capacity of both the steel and concrete has been determined.



### Dowel Strength at 10 mm Joint Width



## How to write a (custom) Specification

Product specification for Flanged Dowel Box consists of:

**PRODUCT CODE, DOWEL THICKNESS, SLEEVE LENGTH and FINISH (Black or Galvanised)**

e.g: **DWLFLKIT16X220B**

### REQUIRED INFORMATION

For quoting or manufacturing the following formation is required:



Specification

Danley™ Flanged Dowel Box Kit

16 mm Dowel

220 mm Length

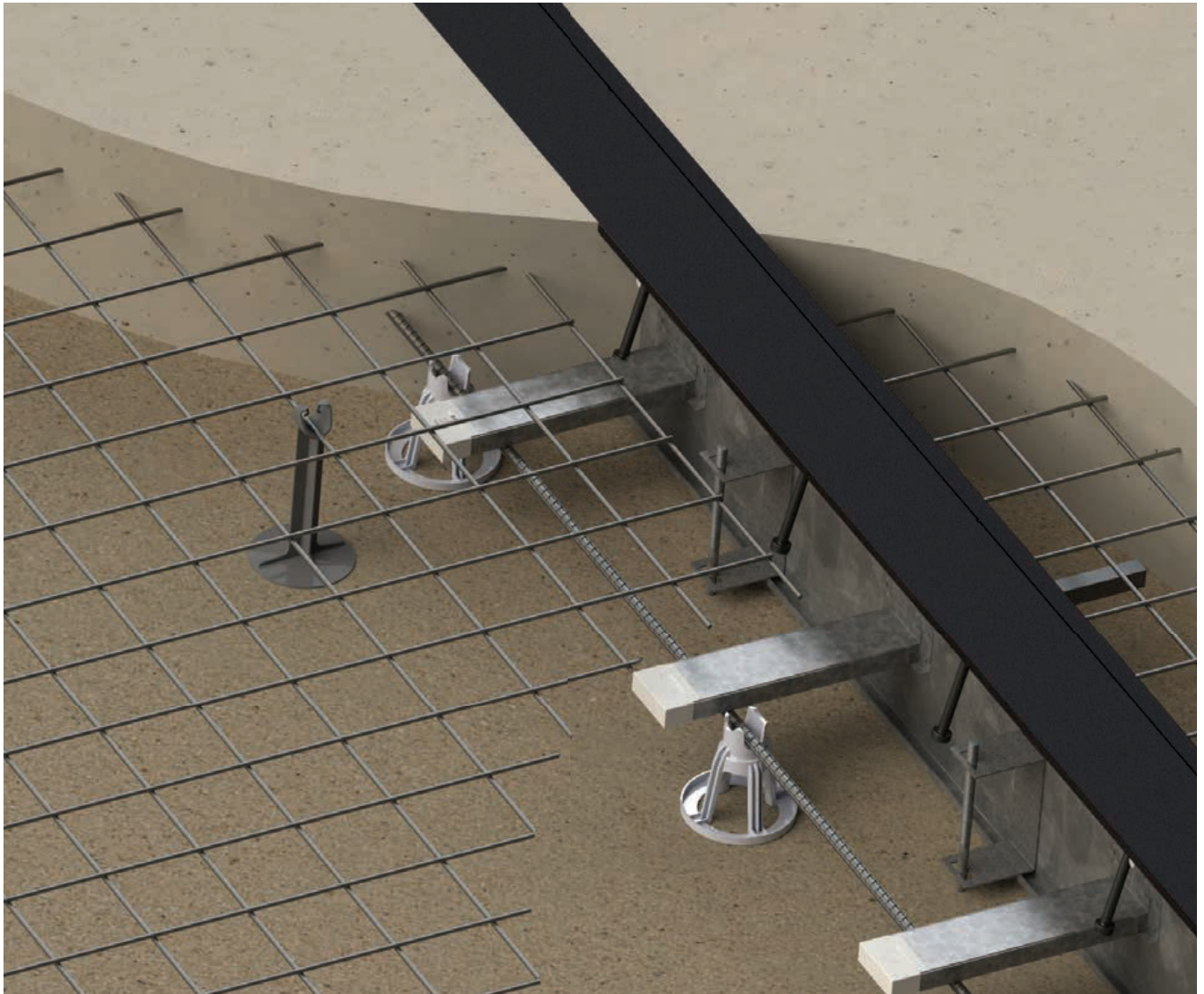
Black

**D W L F L K I T 1 6 X 2 2 0 B**

### Available Standard Sizes

| PRODUCT CODE    | DOWEL SIZE | DOWEL LENGTH (mm) | DOWEL FINISH | DOWEL WEIGHT (kg) | COVER LENGTH 'L' (mm) | COVER WIDTH 'W' (mm) | COVER HEIGHT 'H' (mm) | LATERAL MOVEMENT (mm) | EXPANSION (mm) | COVER WEIGHT (kg) |
|-----------------|------------|-------------------|--------------|-------------------|-----------------------|----------------------|-----------------------|-----------------------|----------------|-------------------|
| DWLFLKIT16X220B | 16 SQ.     | 400               | Black        | 0.81              | 220                   | 56                   | 16                    | 20                    | 20             | 0.27              |
| DWLFLKIT16X220G | 16 SQ.     | 400               | Galv.        | 0.82              | 220                   | 56                   | 16                    | 20                    | 20             | 0.27              |
| DWLFLKIT20X220B | 20 SQ.     | 400               | Black        | 1.26              | 220                   | 60                   | 20                    | 20                    | 20             | 0.3               |
| DWLFLKIT20X220G | 20 SQ.     | 400               | Galv.        | 1.27              | 220                   | 60                   | 20                    | 20                    | 20             | 0.3               |
| DWLFLKIT20X270B | 20 SQ.     | 500               | Black        | 1.58              | 270                   | 60                   | 20                    | 20                    | 20             | 0.37              |
| DWLFLKIT20X270G | 20 SQ.     | 500               | Galv.        | 1.59              | 270                   | 60                   | 20                    | 20                    | 20             | 0.37              |
| DWLFLKIT25X220G | 25 SQ.     | 400               | Galv.        | 1.99              | 220                   | 65                   | 25                    | 20                    | 20             | 0.34              |
| DWLFLKIT32X220G | 32 SQ.     | 400               | Galv.        | 3.25              | 220                   | 92                   | 32                    | 30                    | 20             | 0.51              |
| DWLFLKIT32X270G | 32 SQ.     | 500               | Galv.        | 4.05              | 270                   | 92                   | 32                    | 30                    | 20             | 0.63              |
| DWLFLKIT40X220G | 40 SQ.     | 400               | Galv.        | 5.06              | 220                   | 110                  | 40                    | 35                    | 20             | 0.58              |

\* Foam width either side of the dowel, determines lateral movement in sleeve.



### Danley™ Flanged Dowel Box Panel Layout

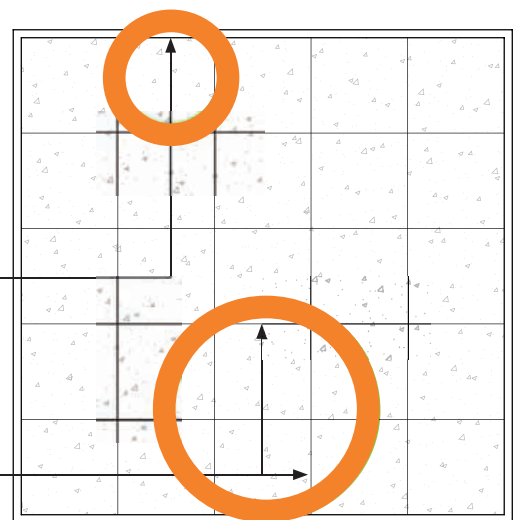
#### Construction Joints

ArmourMate™ or loose dowels (Flanged Dowel Box) positioned around the perimeter of each concrete pour.



#### Contraction Joints

Square Dowel Cradles positioned at the soffit joint lines.



Typical 30 x 30 meter slab panel.

## Product Compliance

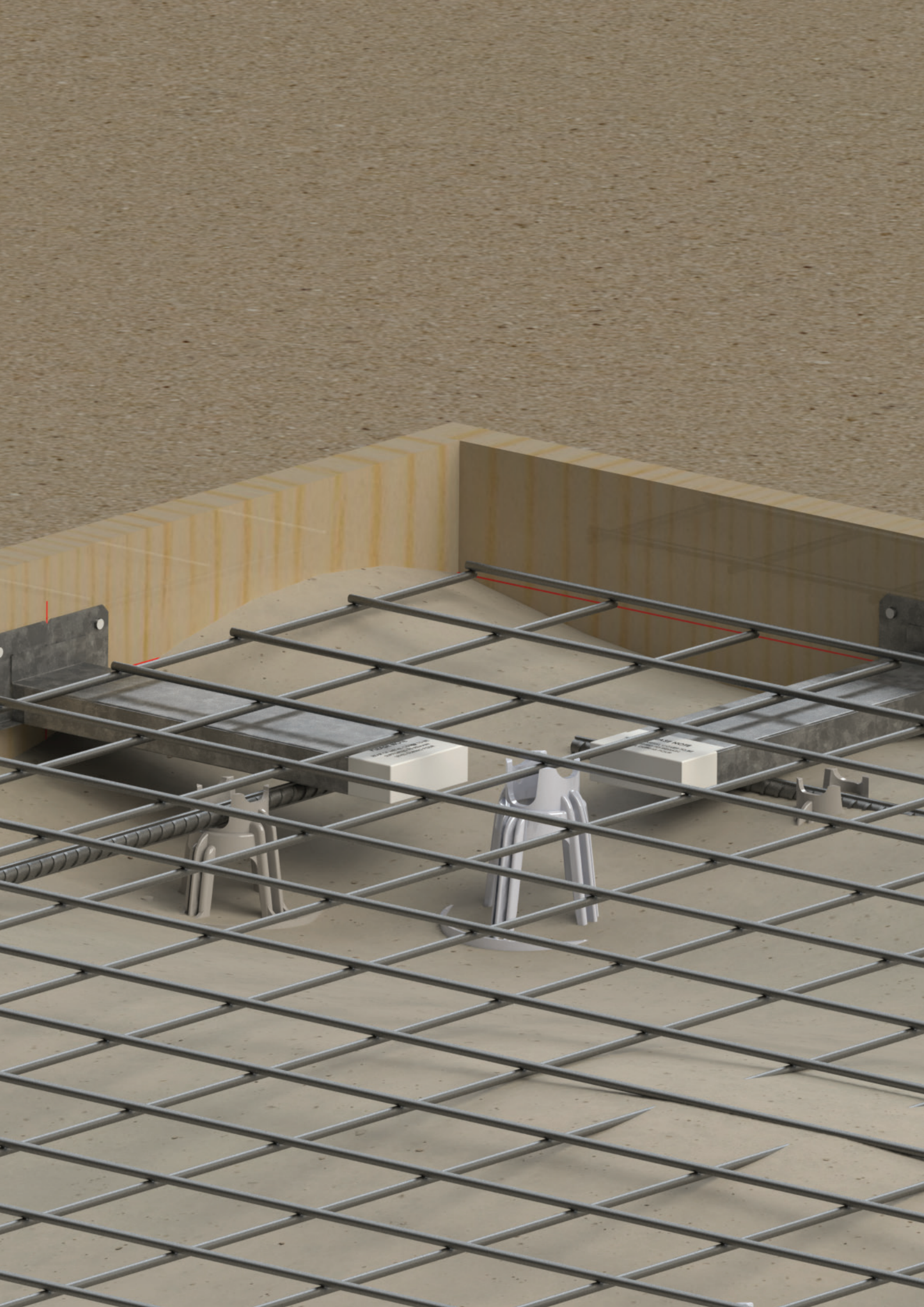
### Compliance statement

Danley™ Flanged Dowel Box Kits comply with the New Zealand Building Code clauses identified below.

### Compliance details: NZBC

| NZBC Clause          | Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Compliance Status                                                                     |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>B1 Structure</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                       |
| B1.3.1               | Buildings, building elements and sitework shall have a low probability of rupturing, becoming unstable, losing equilibrium, or collapsing during construction or alteration and throughout their lives.                                                                                                                                                                                                                                                                                                                                                                                                      |    |
| B1.3.2               | Buildings, building elements and sitework shall have a low probability of causing loss of amenity through undue deformation, vibratory response, degradation, or other physical characteristics throughout their lives, or during construction or alteration when the building is in use.                                                                                                                                                                                                                                                                                                                    |   |
| B1.3.3               | Account shall be taken of all physical conditions likely to affect the stability of buildings, building elements and sitework, including: (b) imposed gravity loads arising from use (d) earth pressure (c) temperature (j) impact (m) differential movement (p) equipment, services, non-structural elements and contents (q) time dependent effects including creep and shrinkage.                                                                                                                                                                                                                         |  |
| B1.3.4               | Due allowances shall be made for: a. the consequences of failure, b. the intended use of the building, c. effects of uncertainties resulting from construction activities, or the sequence in which construction activities occur, d. variation in the properties of materials and the characteristics of the site, and e. accuracy limitations inherent in the methods used to predict the stability of buildings                                                                                                                                                                                           |  |
| <b>B2 Durability</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                       |
| B2.3.1               | Building elements must, with only normal maintenance, continue to satisfy the performance requirements of this code for the lesser of the specified intended life of the building, if stated, or: (a) the life of the building, being not less than 50 years, if: i. those building elements (including floors, walls, and fixings) provide structural stability to the building, or ii. those building elements are difficult to access or replace, or iii. failure of those building elements to comply with the building code would go undetected during both normal use and maintenance of the building. |  |
| B2.3.2               | Individual building elements which are components of a building system and are difficult to access or replace must either: (a) All have the same durability, or (b) Be installed in a manner that permits the replacement of building elements of lesser durability without removing building elements that have greater durability and are not specifically designed for removal and replacement.                                                                                                                                                                                                           |  |







## Customer Service

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