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April 2023

Connolly Dowel Cradles

for slab-on-ground applications

Connolly

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Connolly Dowel Cradles

An effective load transfer system for saw cut contraction joints.

Connolly Dowel Cradles are produced with either round, square or plate dowels. All Dowel Cradles are supplied with a de-bonding sleeve to one half of the dowel to allow for contraction. Square and plate dowel cradles also allow for lateral movement. They are a welded wire assembly that ensures the horizontal and vertical alignment of dowels at the correct spacing and height. Maintaining the correct alignment of dowels across the joint is recognised as being the most important aspect of forming a dowelled joint.

Connolly Dowel Cradles are manufactured in 3 metre lengths from 6mm wire. They are available in a wide range of configurations to suit a variety of slab thicknesses and load requirements. They form a rigid assembly capable of withstanding the harsh treatment they frequently encounter during construction activities. They are easy to transport, handle and install, saving both time and money for the contractor. Dowel Cradles can also be custom manufactured to suit any specific configuration.

Features

- Ensures dowel alignment is maintained during concrete placement
- Fully customisable to suit engineer's requirements
- Quicker set up time on dowel installation
- Enables continuous pours
- Eliminates the need to tie dowels
- Dowels available in black steel, galvanised mild steel and stainless steel
- Can be used in conjunction with Connolly Ground Crack Inducers

Manufactured in an ISO accredited factory

Made in Australia

Cost-effective solution

Nationwide distribution network

Dedicated sales and technical support

Standard items available ex-stock

Dowel Cradle Specifications

The table below provides specifications for Connolly Dowel Cradles.
Please contact us to discuss any project specific requirements.

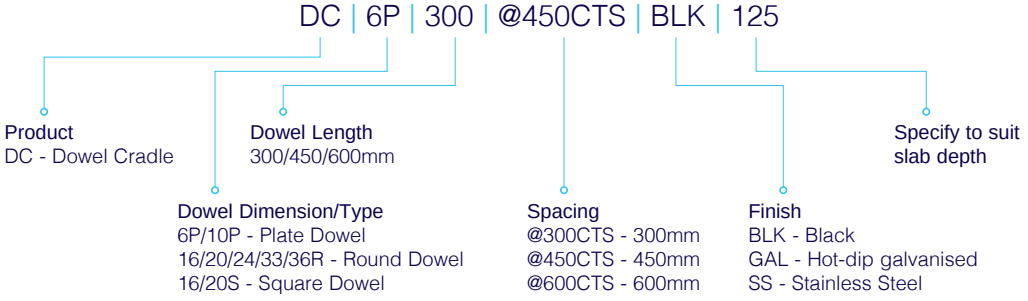
Product	DCP Plate Dowel Cradles	DCR Round Dowel Cradles	DCS Square Dowel Cradles
	Cradle Properties		
Height	Made to suit 1/2 slab depth as standard		
Length	DC6P & DC10P: 3000mm DCP20: 1600mm	DC12R to DC24R: 3000mm DC33R & DC36R: 1200mm	3000mm
	Dowel Properties		
Size	6 x 50mm 10 x 50mm 20x50mm	12-36mm dia. Other sizes available on request	16 and 20mm dia. Other sizes available on request
Length	300mm	450mm standard lengths. Other lengths are available on request.	450mm standard lengths. Other lengths available on request
Dowel Spacing (Custom spacings available on request)	DC6P & DC10P: 450mm DCP20: 400mm	300mm standard spacing	450mm standard spacing
Material	Grade 300 mild steel to AS/NZS 3679.1 Galvanised mild steel to AS/NZS 4680 Stainless Steel to ASTM A276		
	Sleeve Properties		
Sleeve Type	Plate Dowel Sleeve	DC12R to DC24R: UDS DC33R & DC36R: Plastic heat shrink wrap	UDS*
Material	Polypropylene	UDS: Polypropylene PHSW: Polyethylene	Polypropylene
Lateral Movement	DC6P & DC10P: +/- 5mm DCP20: +/- 8mm	nil	+/- 3mm

* Connolly Universal Dowel Sleeves

Standard Range

Item Code	Description	Dowel Size (mm)	Dowel Spacing (mm)	Recommended Slab Depth (mm)	Dowel Finish
DC6P300@450CTSBLK150	Dowel Cradle 50x6x300mm centres to suit 150mm slab depth - Black	50x6x300	450	150	Black
DC6P300@450CTSGAL150	Dowel Cradle 50x6x300mm centres to suit 150mm slab depth - HDG	50x6x300	450	150	HDG
DC10P300@450CTSBLK180	Dowel Cradle 50x10x300mm centres to suit 180mm slab depth - Black	50x10x300	450	180	Black
DC10P300@450CTSGAL180	Dowel Cradle 50x10x300mm centres to suit 180mm slab depth - HDG	50x10x300	450	180	HDG

Part Number Identification



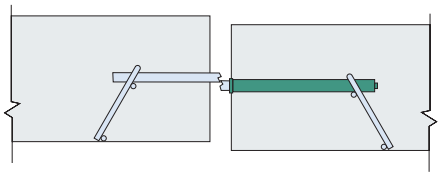
Dowel Cradle Design Capacities

The use of Connolly Dowel Cradles ensures that shear loads are safely transferred across the joint through dowels. We recommend referring to *TR34 – Fourth Edition – Concrete Industrial Ground Floors,* published by The Concrete Society, to determine the dowel capacity.

Section 6.5 of TR34 provides guidance on the calculation of dowel capacities for the following failure modes.

Dowel Shear Capacity

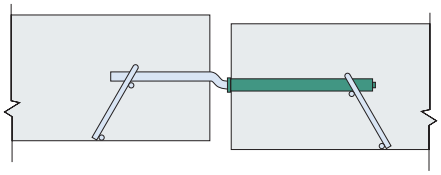
The table below shows the shear capacity of available dowels and finishes. The capacity values have been calculated using equation 16 and 18 of TR34, respectively.



Dowel	Dowel Heights mm	Finish	Shear Area (0.9 · A) mm^2	Capacity (P_{sh}) kN
DCP 6x50	6	Black/HDG	270	45.0
DCP 6x50	6	Stainless	270	28.9
DCP 10x50	10	Black/HDG	450	75.1
DCP 10x50	10	Stainless	450	48.1
DCP 20x50	20	Black/HDG	900	131.5
DCP 20x50	20	Stainless	900	96.3
DCR 33	33	Black/HDG	770	120.5
DCR 33	33	Stainless	770	82.3
DCR 36	36	Black/HDG	916	143.4
DCR 36	36	Stainless	916	98.0
DCS 16	16	Black/HDG	230	36.1
DCS 16	16	Stainless	230	24.7
DCS 20	20	Black/HDG	360	56.3
DCS 20	20	Stainless	360	38.5

In most situations, at the point of ultimate load, the concrete would typically fail before the dowel.

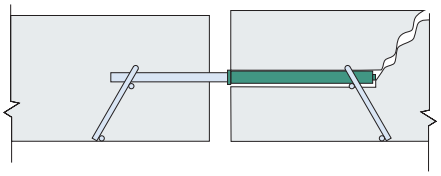
Dowel Bearing/Bending Capacity



Bearing/Bending is a combined failure mode that checks the bending capacity of the dowel as well as the bearing capacity of the surrounding concrete. Equations 17 and 19 of TR34 define the bearing/bending capacity of a dowel.

Please find the dowel bearing/bending capacities for different conditions in the combined capacity tables on pages 7 to 9.

Punching Shear (Bursting Forces)



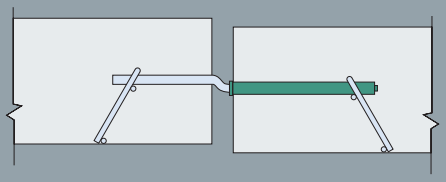
Section 6.5.3 of TR34 recommends calculating the bursting load of the concrete by adapting the EC2 approach for punching failure, using an effective depth of 0.75 times the depth between the dowel and the surface of the concrete slab. Smaller dowel spacings might cause a reduction in the punching capacity. Any overlap between the punching shear perimeter of neighbouring dowels reduces the punching capacity. The spacing factor is included in the design capacities provided in this brochure.

Please find the punching shear capacities for different conditions in the combined capacity tables on pages 7 to 9.

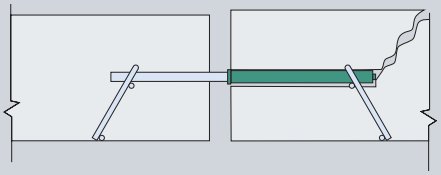
Dowel Cradle Design Capacities

The following tables provide single dowel capacities and the shear capacity per linear metre of selected Connolly Dowel Cradles, calculated in accordance with TR34 for various joint widths and concrete compressive strengths. The capacities provided in the table are minimum values from the failure modes: dowel shear, dowel bearing/bending and punching/bursting. Colour coding indicates the governing failure mode.

Dowel bearing/bending failure mode



Punching failure mode



Design Shear Capacity of Connolly 6x50x300mm Plate Dowel Cradle

Dowel Centres 450mm

Slab Depth 'D' (mm)	Joint Width (mm)	Concrete Strength (Mpa)			Concrete Strength (Mpa)		
		25	32	40	25	32	40
		Single Dowel Design Capacity (kN)			Design Capacity per linear metre (kN/m)		
125	5	13.70	15.50	17.33	30.45	34.45	38.52
	10	13.48	15.25	17.05	29.96	33.90	37.90
150	5	18.16	20.54	22.97	40.35	45.65	51.04
	10	15.47	16.52	17.44	34.38	36.71	38.76
180	5	19.54	21.42	23.19	43.42	47.59	51.54
	10	15.47	16.52	17.44	34.38	36.71	38.76
200	5	19.54	21.42	23.19	43.42	47.59	51.54
	10	15.47	16.52	17.44	34.38	36.71	38.76

Design Shear Capacity of Connolly 10x50x300mm Plate Dowel Cradle

Dowel Centres 450mm

Slab Depth 'D' (mm)	Joint Width (mm)	Concrete Strength (Mpa)			Concrete Strength (Mpa)		
		25	32	40	25	32	40
		Single Dowel Design Capacity (kN)			Design Capacity per linear metre (kN/m)		
150	5	17.41	19.69	22.02	38.68	43.76	48.93
	10	17.15	19.40	21.69	38.11	43.11	48.20
180	5	23.37	26.44	29.56	51.93	58.75	65.69
	10	23.05	26.08	29.16	51.23	57.96	64.80
200	5	27.78	31.43	35.14	61.73	69.84	78.08
	10	27.43	31.03	34.69	60.95	68.95	77.09
250	5	35.92	39.85	43.69	79.82	88.57	97.09
	10	31.04	33.82	36.41	68.97	75.16	80.92

Dowel Cradle Design Capacities

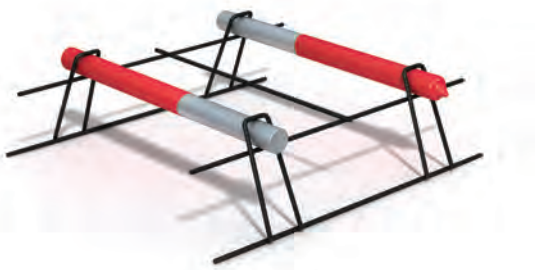
Design Shear Capacity of Connolly 20x50x300mm Plate Dowel Cradle

Dowel Centres 400mm

Slab Depth 'D' (mm)	Joint Width (mm)	Concrete Strength (Mpa)			Concrete Strength (Mpa)		
		25	32	40	25	32	40
		Single Dowel Design Capacity (kN)			Design Capacity per linear metre (kN/m)		
250	5	37.65	42.60	47.62	94.13	16.49	119.06
	10	37.22	42.11	47.08	93.06	105.28	117.71
300	5	51.96	58.78	65.72	108.25*	122.47*	136.92*
	10	51.44	58.20	65.07	107.16*	121.24*	135.55*
350	5	68.45	77.45	86.59	121.00*	136.90*	153.06
	10	67.84	76.75	85.81	119.92*	135.67*	151.69*
400	5	72.02	80.63	89.19	133.76*	151.33*	169.19*
	10	66.51	73.71	80.69	132.68*	150.11*	167.82*

**Revised capacity, see the note below.*

Note: According to TR34.4 section 6.5, where the dowel spacing is such that the critical shear perimeters overlap, the shear capacity of the slab along a perimeter encompassing the loaded dowels must be checked. For more detailed information, Please contact the Leviat technical team on 1300 304 320 or email technical.au@leviat.com

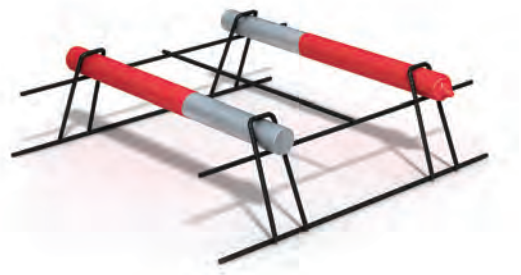


Design Shear Capacity of Connolly Dowel Cradle Round 33x450mm

Dowel Centres 300mm

Slab Depth 'D' (mm)	Joint Width (mm)	Concrete Strength (Mpa)			Concrete Strength (Mpa)		
		25	32	40	25	32	40
		Single Dowel Design Capacity (kN)			Design Capacity per linear metre (kN/m)		
250	5	33.18	37.53	41.97	110.59	125.12	139.88
	10	32.84	37.15	41.54	109.47	123.85	138.46
300	5	37.80	42.76	47.81	126.00	142.55	159.37
	10	37.46	42.38	47.38	124.85	141.26	157.93
350	5	42.35	47.91	53.57	141.16	159.70	178.55
	10	42.00	47.52	53.13	140.00	158.40	177.09
400	5	46.85	53.01	59.26	156.17	176.69	197.54
	10	46.50	52.61	58.82	155.01	175.37	196.07

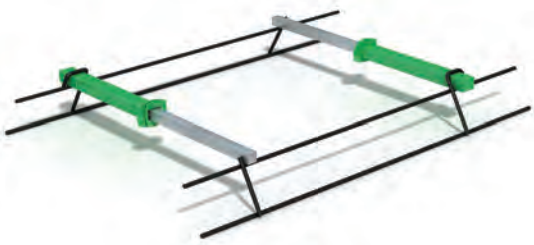
Design Shear Capacity of Connolly Dowel Cradle Round 36x450mm



Dowel Centres 300mm

Slab Depth 'D' (mm)	Joint Width (mm)	Concrete Strength (Mpa)			Concrete Strength (Mpa)		
		25	32	40	25	32	40
		Single Dowel Design Capacity (kN)			Design Capacity per linear metre (kN/m)		
250	5	32.72	37.02	41.39	109.07	123.39	137.96
	10	32.39	36.64	40.97	107.97	122.13	136.55
300	5	37.37	42.27	47.26	124.55	140.91	157.55
	10	37.03	41.89	46.83	123.42	139.63	156.11
350	5	41.93	47.44	53.04	139.77	158.13	176.80
	10	41.59	47.05	52.60	138.62	156.83	175.34
400	5	46.45	52.55	58.75	154.82	175.16	195.84
	10	46.10	52.15	58.31	153.66	173.85	194.37

Design Shear Capacity of Connolly Dowel Cradle Square 16x450mm



Dowel Centres 450mm

Slab Depth 'D' (mm)	Joint Width (mm)	Concrete Strength (Mpa)			Concrete Strength (Mpa)		
		25	32	40	25	32	40
		Single Dowel Design Capacity (kN)			Design Capacity per linear metre (kN/m)		
125	5	10.70	12.10	13.53	23.78	26.90	30.07
	10	10.70	12.10	13.53	23.78	26.90	30.07
150	5	14.62	16.54	18.39	32.49	36.75	40.87
	10	13.35	14.65	15.89	29.66	32.56	35.31
180	5	15.00	16.71	18.39	33.33	37.13	40.87
	10	13.35	14.65	15.89	29.66	32.56	35.31
200	5	15.00	16.71	18.39	33.33	37.13	40.87
	10	13.35	14.65	15.89	29.66	32.56	35.31

Design Shear Capacity of Connolly Dowel Cradle Square 20x450mm

Dowel Centres 450mm

Slab Depth 'D' (mm)	Joint Width (mm)	Concrete Strength (Mpa)			Concrete Strength (Mpa)		
		25	32	40	25	32	40
		Single Dowel Design Capacity (kN)			Design Capacity per linear metre (kN/m)		
150	5	15.60	17.64	19.73	34.66	39.21	43.84
	10	15.60	17.64	19.73	34.66	39.21	43.84
180	5	21.29	24.09	26.93	47.32	53.54	59.85
	10	21.29	24.09	26.31	47.32	53.54	58.46
200	5	23.99	26.81	29.60	53.32	59.58	65.78
	10	21.84	24.12	26.31	48.54	53.60	58.46
250	5	23.99	26.81	29.60	53.32	59.58	65.78
	10	21.84	24.12	26.31	48.54	53.60	58.46

Accessories

Ground Crack Inducers

Connolly Ground Crack Inducers are designed to induce controlled cracking at specific points in concrete slabs. The rigid PVC profile is held in place with the supplied pins and commonly used below Connolly Dowel Cradles. They can be used with a saw cut or Connolly Crack Inducer at the top of the concrete slab.

Features

- Easy installation
- Secures easily to the ground using PC pins to prevent movement during pours
- Lightweight and durable
- Ideally suited for use with Connolly Dowel Cradles
- Can save money by helping reduce slab cutting depth

Crack Inducers

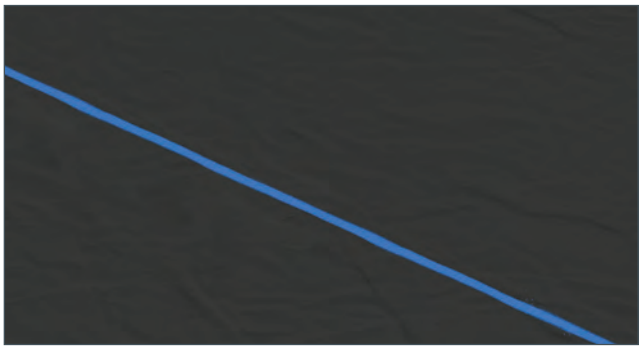
Connolly Crack Inducers are an economical surface crack control strip for small pours and decorative concrete applications. Installed in wet concrete, Connolly Crack Inducers eliminate the need for tooled or sawn joints and protect the joint against the ingress of foreign particles.

Connolly Crack Inducers are a roll-formed galvanised steel section available in 3 metre lengths. They are available in 25mm and 45mm heights and can be supplied with or without a permanent, flexible PVC capping. The permanent PVC capping is available in black or grey and comes with a tear-off-strip to allow for a slurry-free finish.

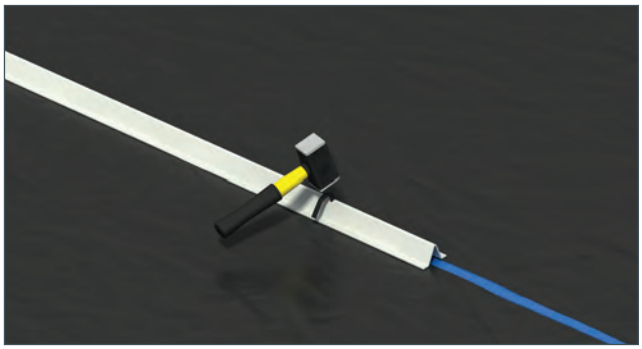
Features

- Permanent capping with tear-off strip
- Replaces saw cuts
- Available in black or grey
- Allows for a slurry-free finish

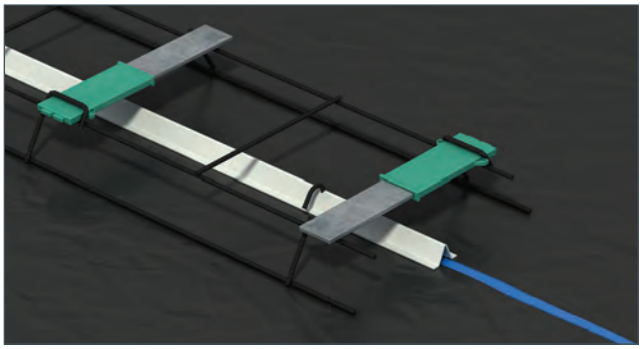
Installation Guide



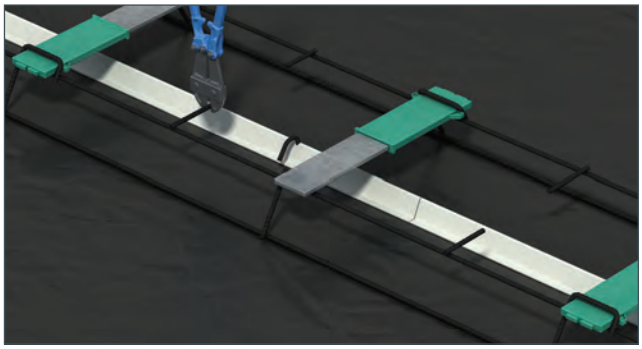
Step 1
Mark the joint line, specified by the engineer, on the ground and make sure the lines are extended on the formwork to find the exact location of cut.



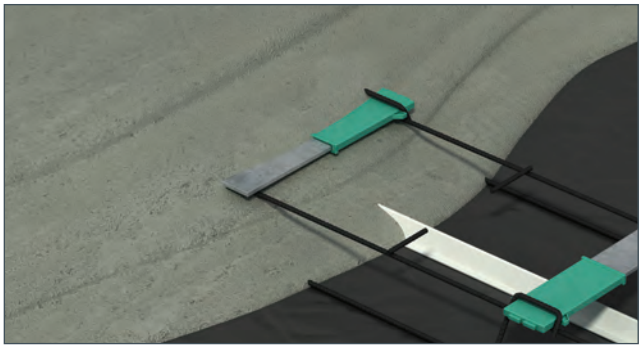
Step 2
Place the Connolly Ground Crack Inducer, as specified by the engineer, on the joint line. Secure Ground Crack Inducer by driving the supplied pins through the holes in the profile.



Step 3
Connolly Dowel Cradles should be placed in position centrally along the joint line over the Ground Crack Inducers.



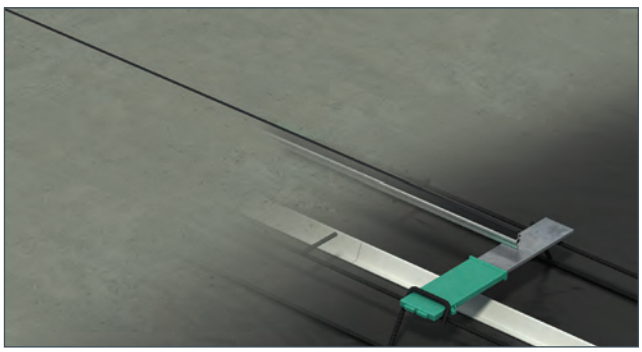
Step 4
Cut the travel bars using a bolt cutter or angle grinder.
Please note, failure to carry out this step will prevent the joint from functioning correctly.



Step 5
Pour and finish the concrete.

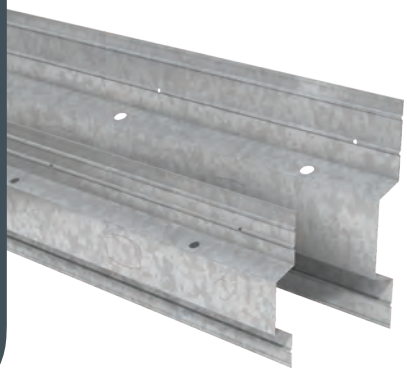
Important Notes:
Ensure dowel alignment is maintained during concrete placement.

If the saw cut is not completed in the time frame specified by the slab designer, uncontrolled cracking can occur.



Step 6
Either saw cut to engineer's specification along the centre line of the Dowel Cradle or, immediately after screeding concrete to the finished level, lay the Connolly Crack Inducer along the proposed joint line.
Please refer to Crack Inducer installation guide for further information.

Connolly Product Range



Key Joint

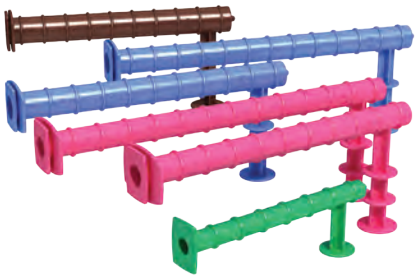
Connolly Key Joints are a continuous pour solution for contraction joints in slab on ground applications. Key Joints are a roll formed galvanised steel section used as a leave-in-place formwork to control shrinkage induced cracking. The profile is fixed in place using our patented peg and wedge system. Key Joints are available in 3 and 6m lengths for slab thicknesses from 100mm to 300mm.

Biscuit Dowel Plates

Connolly Biscuit Plate Dowels are designed to transfer loads across construction joints in slab-on-ground applications, allowing for expansion, contraction and lateral movement at the joint. The plastic sleeve encases one half of the plate dowel to de-bond the dowel from the concrete. Biscuit Plate Dowels are available in 6mm and 10mm thicknesses in black, hot-dip galvanised or stainless steel finish.

Expansion Joint System

The Connolly Expansion Joint System is a continuous pour solution for expansion joints in slab-on-ground applications. They are a roll formed galvanised steel section with 10mm cross linked foam to provide a leave-in-place formwork that allows for joint expansion. The profile has pre-drilled holes that allows it to be used in conjunction with Connolly Universal Dowel Sleeves. The expansion joint profile is available in 3 metre lengths for slab thicknesses from 100mm to 200mm. Custom lengths and heights are available on request.



Universal Dowel Sleeves

Connolly Universal Dowel Sleeves are available for round and square dowels allowing load transfer across joints in slab-on-ground applications. The sleeve encases one half of the dowel to de-bond the dowel from the concrete. All universal dowel sleeves allow for expansion and contraction at the joint with the square variety also allowing for lateral movement.

Safety Caps

Connolly Safety Cushion Caps are designed to reduce the risk of injury on-site. Made from recyclable plastic, the safety caps are suitable for steel reinforcing bars N12–N32mm, as well as Star Pickets.

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Innovative engineered products and construction solutions that allow the industry to build safer, stronger and faster.

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