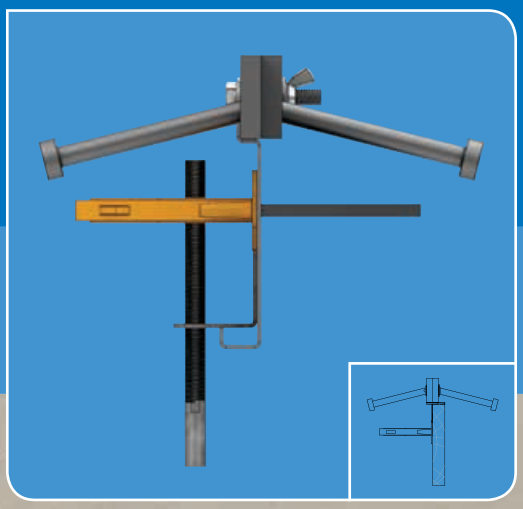
DANLEY™ Systems



Hyper ArmourMate™

Joint Edge Protection

INDUSTRIAL SLAB ON GROUND

- ✓ Full system edge protection
- ✓ Prevents concrete spalling at construction joints
- ✓ High FF and FL tolerances
- ✓ Extends the life-cycle of the floor and the asset
- ✓ Provides superior impact protection at the joint

TW Construction Systems

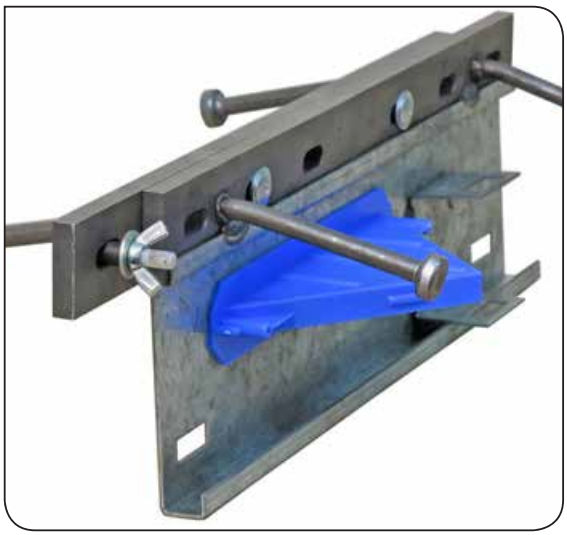
Product Description

Hyper ArmourMate™ is a premium armour edging solution and is designed for applications where the concrete edge and wear surface must withstand materials handling traffic with small hard-wheels carrying high-loads on a daily basis, in particular semi-automated and automated materials handling environments. The **Hyper ArmourMate™** system is manufactured from high-quality, Cold Drawn Steel rails to provide superior impact protection and is recommended for use when the floor requires the highest level of protection performance over the longest possible life-cycle.

Hyper ArmourMate™ systems are designed in two formats being the Top Rail System or the Full Joint System, the Full Joint system being the format that provides a total joint system solution by incorporating the cast in steel rail edge protection system, the Diamond™ Dowel to provide control over differential deflection of the adjacent slab panels as well as providing load transfer across the joint and the galvanised formwork plate as the sacrificial formwork that takes place of the traditional formboard. **Hyper ArmourMate™** is available in a number of slab height configurations with the primary 'A' Grade systems being available in most cases for immediate delivery off the shelf and then the non-standard configurations being manufactured on demand to the customers specification.

Range Options

- Top Rail or Full Joint Systems specifications
- Black or hot-dip galvanized steel to AS/NZS 4680 or stainless steel options available by request
- 6 mm or 10 mm Diamond™ Dowel
- Infill lengths available on request
- Intersections available on request
- Standard systems or custom configurations available



Features

1. Rails manufactured from high-quality, precision Cold Drawn Steel.
2. Solid flat bar rail 40 x 10 mm.
3. Flatness Tolerance = ±0.5 mm/600 mm (±1.0 mm per 3000 mm length).
4. Patented Diamond™ Dowel.
5. Patented twist and lock stake bracket system.
6. Patented nailing plate for top rail installations on timber formwork available.
7. All dowel systems are Grade 300.
8. Galvanised formwork plate on all systems.

Advantages

- Reduces labor associated with processing timber formboards.
- Reduces risk by eliminating "Hot Work" on site.
- Provides deflection and load transfer control.

Hyper ArmourMate™ provides slab edge protection to prevent concrete spalling.

Benefits

Concreter Benefits

- Full System configuration eliminates formboards.
- Staking systems eliminates hot work (on site welding).
- Twist and turn stake systems provide fine height adjustment.
- Provides a straight edge and screed rail.
- Top Rail System includes the patented nailing plate for attachment when formboards are used.

Asset Protection Benefits

- Reduces concrete spalling damage at the joints.
- Provides a safer operating environment for tenant employees.
- Reduces floor maintenance and downtime costs over the life-cycle of the facility.
- Extends the life-cycle of the asset by protecting the floor.
- Provides a level of future proofing for environment and layout changes.
- Increases tenant satisfaction and return on investment.

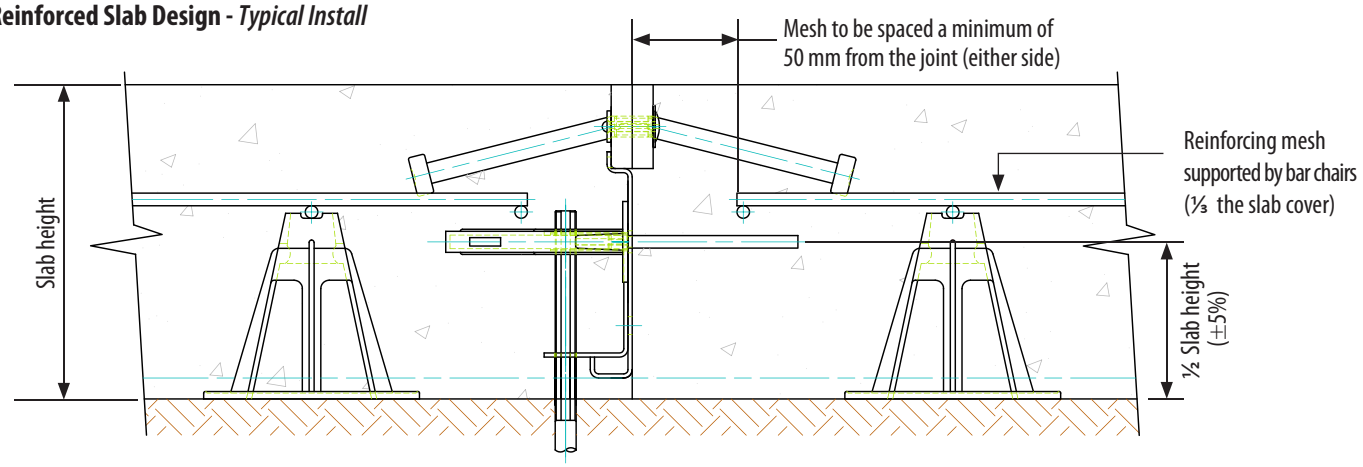
Engineering Benefits

- Galvanised formwork plate is standard with all systems.
- Cold drawn rail materials provide highest impact resistance and straightness tolerances.
- Is in compliance with ACI recommendations, highest FF and FL tolerances.
- Diamond™ Dowel ensures the minimum risk of restraint due to lateral and diagonal shrinkage.
- Accuracy of dowel placement height and centres ensures the most effective load transfer performance.

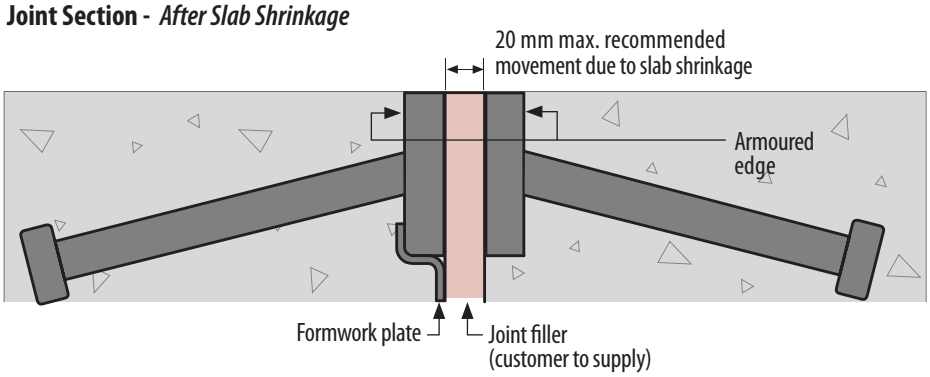
Correct Mesh Placement - *The following points are recommended when placing mesh at the joint*

1. **Placement of the mesh to be located under the end of the stud anchors, never on top.**
2. **The mesh should be supported by bar chairs to rest approximately ⅓ of the slab height.**
3. **The mesh should never rest on the dowel or the dowel cover.**
4. **The mesh edge should be located approximately 50 mm from the formwork plate (on either side).**
5. **Continuous mesh wire should be broken at the edge of the sheet to prevent cracking. Failing to do so may induce a crack in-line with the edge of the mesh.**

Mesh Reinforced Slab Design - *Typical Install*



Joint Section - *After Slab Shrinkage*



QUALITY GUARANTEE - *Danley™ ArmourMate™* is manufactured using the highest quality materials and components as well as being manufactured in compliance with our ISO9001 Quality Systems to ensure a consistent standard of quality.

Material Technical Data

Component	Dimension (mm)	Material Type	Material Standards	Steel Grade Equivalent	Yield Stress (MPa)	Tensile Strength (MPa)	Standards Compliance
Hyper Rail	40 x 10	Bright Steel Cold Drawn	DIN 1.040 C22	1020	340-610	430-790	AS1443
Shear Stud	100 x 10	Cold Drawn	DIN 1.040 C22	1010	415	520	AS1443
Formwork	1.95	Galv G2 Z275	AS1365	≥ Grade 300	340	370	AS1397
Diamond™ Dowel	110 x 110	Mild Steel Bar	AS/NZS 3679.1	≥ Grade 300	300	440	AS/NZS 3679.1

Manufacturing Tolerances
(standard sizes)

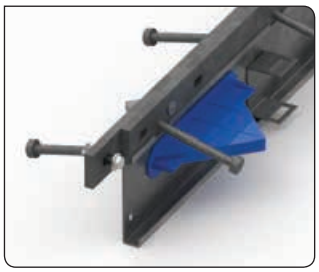
Overall Length	± 2 mm	**Overall Height**	± 1 mm

Flatness Tolerance Of Top Rails At The Floor Surface
(i.e. FF Values)

± 0.5 mm/600 mm (1.0mm per 3000 mm)

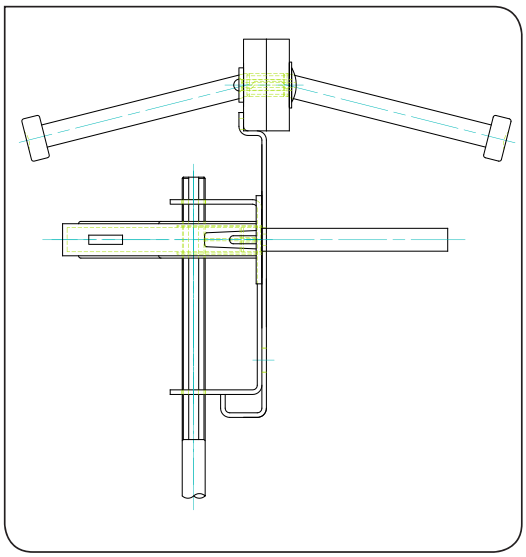
Full Joint System

Hyper ArmourMate™ Full Joint Systems are designed to provide the total joint system solution by incorporating three systems in the one solution with Hyper ArmourMate™ steel rails as the armour edging, Diamond™ Dowel as the load transfer system and the galvanised separation plate as the sacrificial formwork that takes place of the traditional formboard. Hyper ArmourMate™ full systems are available in the sizes and configurations listed below.



Standard Finish:
Black Steel with a galvanised formwork plate.

Standard Specification:
Includes (DD10) 10 mm Diamond™ Dowel

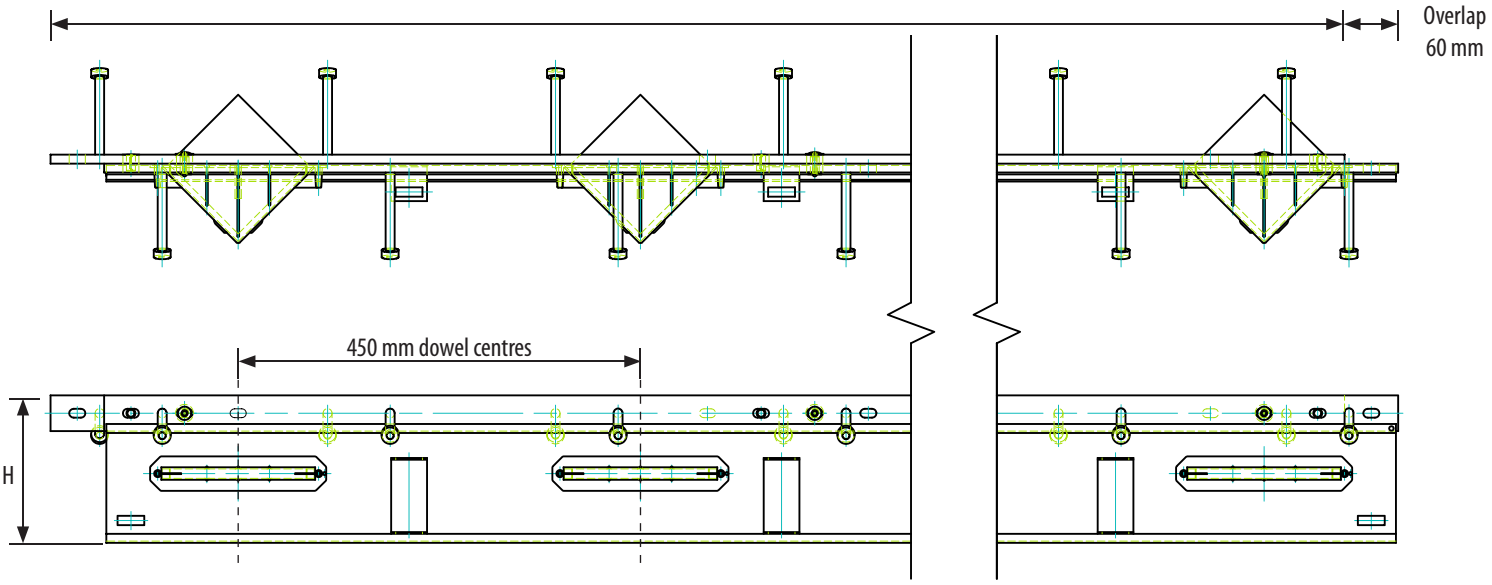


Sectional View:
Full Joint System with stakes

Hyper ArmourMate™ Standard Sizes *(Full Joint Systems)*

PRODUCT CODE	SLAB HEIGHT (mm)	UNIT HEIGHT (H) (mm)	LENGTH (mm)	DOWEL TYPE	DOWEL CENTRES (mm)	WEIGHT PER LENGTH (kg)	LENGTHS PER PACK	WEIGHT PER PACK (kg)*
AMHY135FJS	140-150	135	3000	DD10	450	28	35	1313
AMHY165FJS	170-180	165	3000	DD10	450	30	35	1383
AMHY180FJS	185-200	180	3000	DD10	450	32	35	1453

Hyper ArmourMate™ Dimension Details *(Full Joint Systems)*

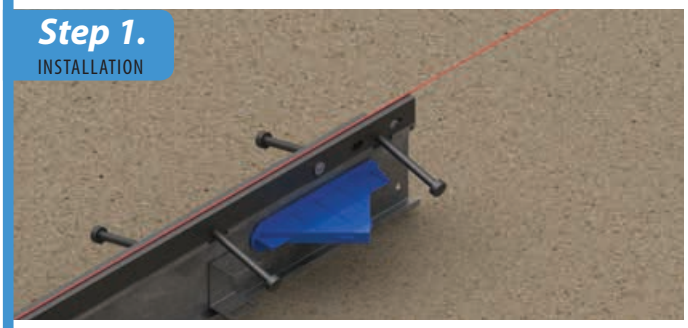


Installation

Full Joint System Installation Process

TOOLS REQUIRED: Danley™ Stakes (six per length) | Hammer Small Shifter | Spirit Level | String Line | Extra bracing and stakes as required (customer to supply)

Step 1.
INSTALLATION

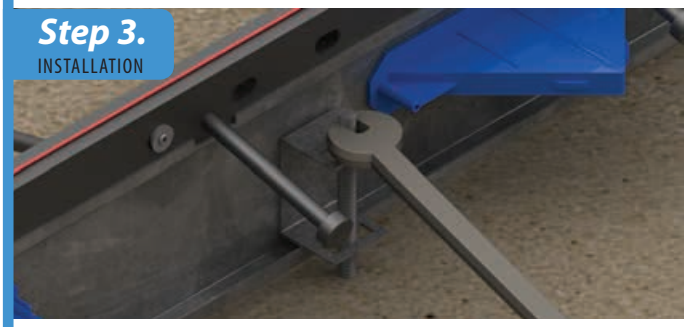


- Check sub-grade for levelness and grade.
- Set string line along the joint path and position the first length of ArmourMate™.
- Ensure the plastic sleeves go on the side where the first concrete pour will occur.

Step 2.
INSTALLATION

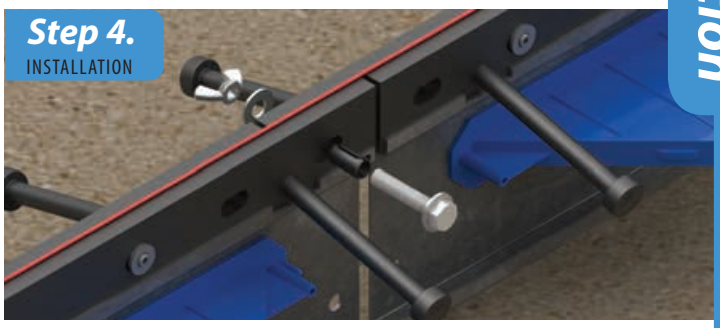
- Insert stakes (six per length) through the stake brackets attached to the ArmourMate™ separation plate.
- Hammer the stakes into ground until they are 50 mm below the top of the joint.
- Additional staking and bracing may be required to keep sections steady during the concrete pour.

Step 3.
INSTALLATION



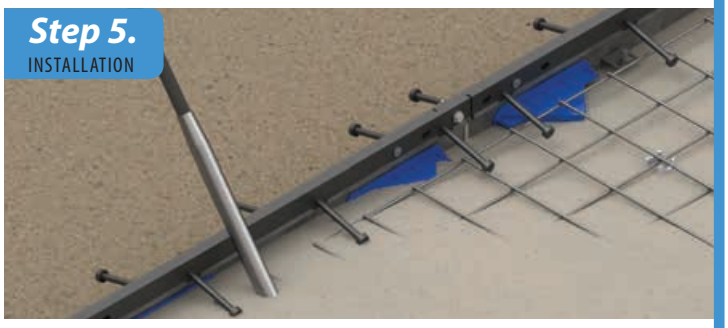
- Adjust the height of the joint until it is level and at the required slab depth.
- Turn the stakes 90 degrees using a shifter to lock the joint in place.

Step 4.
INSTALLATION



- The ArmourMate™ length has a 60 mm lap joint at either end used to bolt the separate lengths together.
- Ensure a 3 mm gap is left between each length. This allows for the lateral movement of the joint. Repeat the process for each section until the desired length is achieved.

Step 5.
INSTALLATION



- Install any required concrete reinforcing.
- Pour the concrete ensuring vibration along the joint at regular intervals.
- The top of the ArmourMate™ rails can be used to screed along.

Step 6.
INSTALLATION

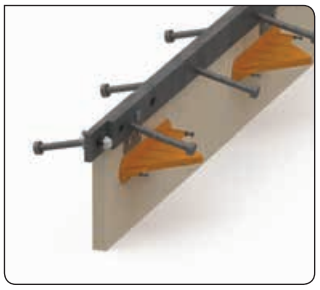
- After the first pour has set remove any additional staking.
- Place the dowels through the separation plate slots into the sleeves in the first pour before pouring the second pour.
- Dowels should be placed within 36 hours of the first pour.

Field and Product Support

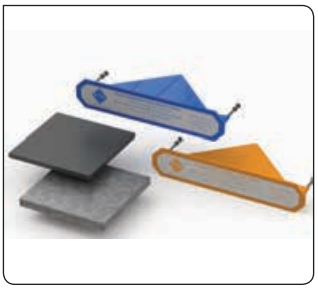
We pride ourselves on our ability to provide on-site product and installation support. Our field sales and support teams are available to advise and work side by side with the industry when on-site clarification or problem solving is required.

Top Rail Configuration

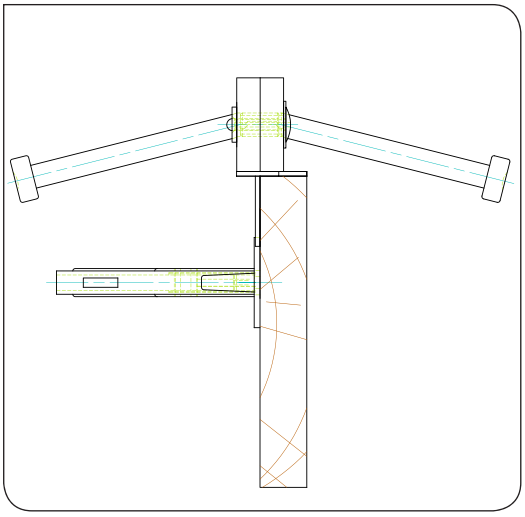
Hyper ArmourMate™ Top Rail System is used when traditional formboard is at the perimeter of the pour, the Top Rail System incorporates a quick nail plate system to attach the Hyper ArmourMate™ Top Rail System to the formboard.



Standard Finish:
Black steel with a galvanised formwork plate.



Diamond™ Dowel
6 mm or 10 mm *(Sold Separately)*.

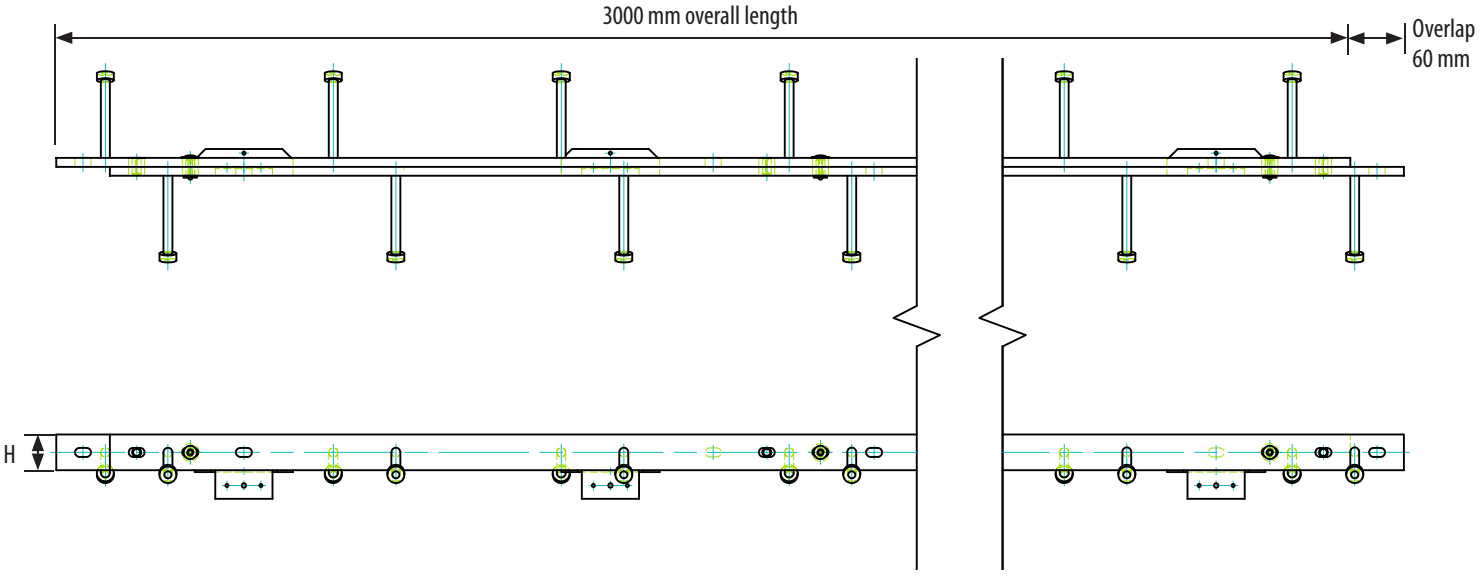


Sectional View:
Top Rail System with Diamond Dowel™

Hyper ArmourMate™ Standard Sizes *(Top Rail Systems)*

PRODUCT CODE	FINISH CODE	RAIL HEIGHT (H) (mm)	LENGTH (mm)	DIAMOND™ DOWEL 6 mm OR 10 mm	WEIGHT PER LENGTH (kg)	LENGTHS PER PACK (mm)	WEIGHT PER PACK (kg)*
AMHYPTOPASSB	Black Steel	40	3000	Sold Separately	22	50	1100
AMHYPTOPASSG	Galvanised	40	3000	Sold Separately	22	50	1100

Hyper ArmourMate™ Dimension Details *(Top Rail Systems)*



Installation

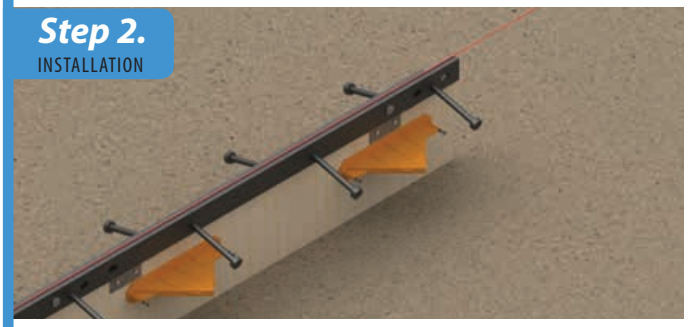
Top Rail Installation Process

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

Step 1.
INSTALLATION

- Nail the top rail ArmourMate™ to wooden formwork using the attached formwork brackets. Nail the required dowel sleeves at the specified centres and at ½ the required slab height along the formwork.
- The 40 mm rails need to be allowed for when calculating the sleeve positions.

Step 2.
INSTALLATION



- Ensure sub-grade is level.
- Set string line along the joint path and position the first length of wooden formwork with ArmourMate™ and dowel sleeves.
- Ensure the sleeves go on the side where the first concrete pour will occur.
- Adjust the height of the joint until it is level and at the required slab depth.

Step 3.
INSTALLATION

- The ArmourMate™ length has a 60 mm lap join at either end. This is used to bolt the separate lengths together.
- Use separately supplied Nylon bolts to fix the sections together and repeat the process for each section until the desired length is achieved.
- Ensure a 3 mm gap is left between each length. This allows for the lateral movement of the joint. Repeat the process for each section until the desired length is achieved.

Step 4.
INSTALLATION

- Install any required concrete reinforcing.
- Pour the concrete ensuring it is vibrated along the joint at regular intervals.
- The top of the ArmourMate™ rails can be used to screed along.

Step 5.
INSTALLATION

- After the concrete has set, strip the wooden formwork from the joint (being careful not to damage the top rails).

Step 6.
INSTALLATION

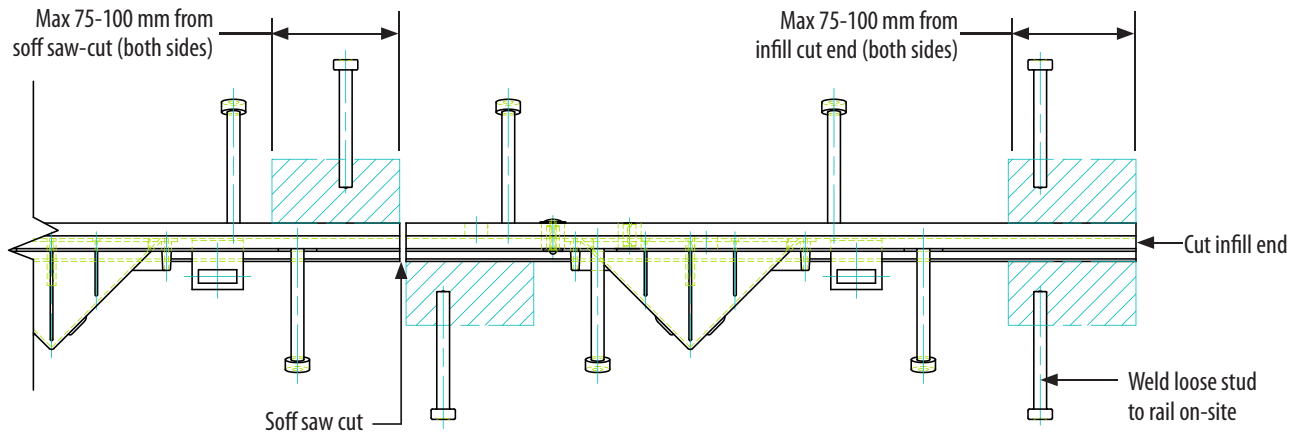
- Place the dowels into the sleeves in the first pour before pouring the second pour.
- Dowels should be placed within 36 hours of the first pour.

IMPORTANT - Replacing anchors on-site cut lengths

If Danley™ ArmourMate™ rails are cut to length on site, and the remaining anchors on the rails are in excess of 100 mm from the cut, it is the responsibility of the contractor to secure an anchor or anchors onto the rail to be cast into the concrete, before pouring concrete. The replacement anchor or anchors may be removed from the off-cut, or a device similar to the anchor on the off-cut may be used; and should be tack welded to the rail within 75 mm of the cut end.

Similarly, it is the responsibility of the contractor, when setting out the ArmourMate™ rails prior to pouring concrete, to examine the location of any saw-cut contraction joint that may pass through the ArmourMate™ rails, and add additional anchors within 75 mm each side of the proposed saw-cut on each side of the rail. Both these actions will ensure that the ends of the Danley™ ArmourMate™ rails are anchored appropriately when the concrete is poured.

Hyper ArmourMate™ Typical Stud Placement (Plan View)



Durability Testing

Our in-house test rig is on the job consistently running cycle testing for durability of our Hyper ArmourMate™.

APPLICATION	HYPER	PLATE 60	INSERT PLATE	BETA
Small, hard wheeled traffic (pallet jacks)	✓	✓	✓	
Cushioned wheel traffic (forklifts & trucks)	✓	✓	✓	✓
Heavy loads	✓	✓	✓	
Warehouse internal slabs	✓	✓	✓	
External slabs, pavements & carparks	✓	✓	✓	✓
Large slab shrinkage & movement at joint (PT)		✓	✓	
High FF & FL floors	✓			

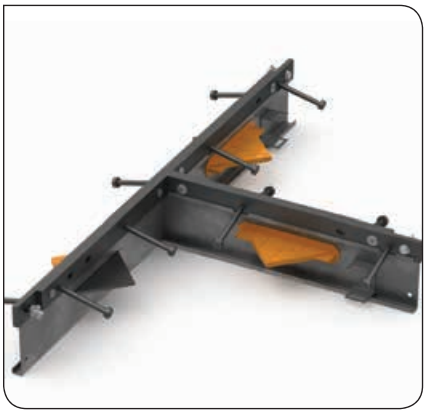
JOINT	STOCKED	POUR THROUGH	EXPANSION JOINTS	POST TENSIONING	DIAMOND™ DOWEL	FLANGED DOWEL BOX	INFILLS	INTERSECTIONS
Hyper Armourmate™ (Full Joint)	✓	✓	✓		✓	✓	✓	✓
Hyper Armourmate™ (Top Rail)	✓	✓	✓		✓	✓	✓	✓
Plate 60 Armourmate™		✓		✓		✓	✓	✓
Insert Plate Armourmate™		✓		✓	✓	✓	✓	
Beta Armourmate™		✓	✓		✓	✓	✓	

Hyper ArmourMate™ Pre-Fabricated Intersections

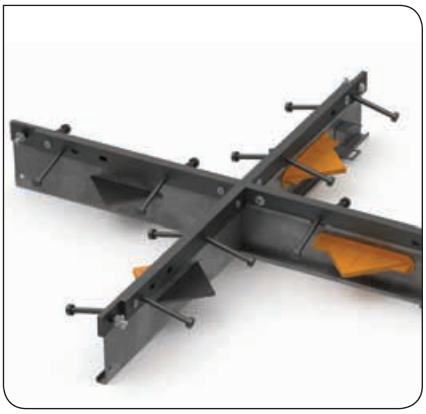
Hyper ArmourMate™ is available in prefabricated intersections for easy on site installation and uninterrupted joints. Manufactured to suit the slab height and dowel specification of the connecting Hyper ArmourMate™ joint. The design of the intersection allows it to be placed in any direction on site removing the risk of incorrect placement. Available in three standard configurations, 2-Way, 3-Way and 4-Way the intersections can be a great labour saving component to any project.

2-Way Intersection

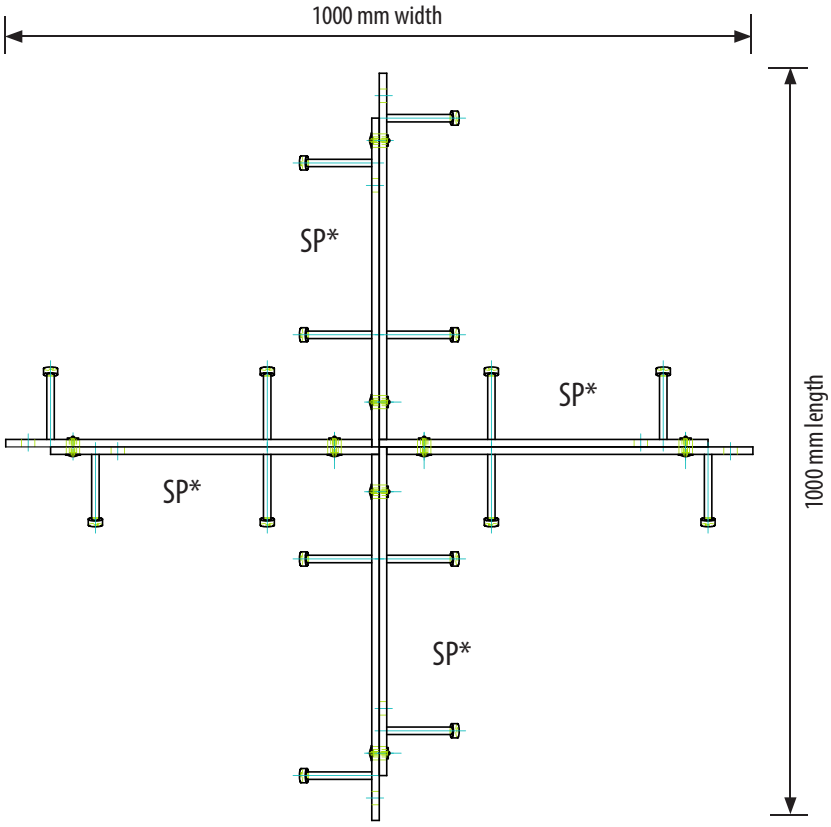
3-Way Intersection



4-Way Intersection



Plan View At Intersection



Please Note: SP* refers to separation plate side

On-site Butted Intersections

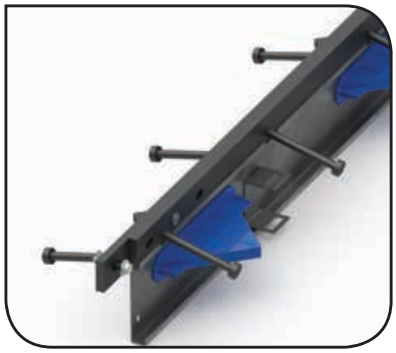
On-site butted intersections can be used when a prefabricated intersection is not required or cost effective. It is the process of forming an intersection with standard 3 m lengths on-site by running a soff saw-cut through the joint. The rail section of the ArmourMate™ must be cut to allow the joint to open up effectively on all sides of the intersection.

Caution must be taken not to cut too deep, cutting into the dowels (load transfer system) will weaken the joint.

Studs should be no further than 100 mm from the cut to effectively anchor the separate pieces. If this is not the case a stud will need to be welded onto the rail on-site within this range.

Specification

How to write a (custom) specification



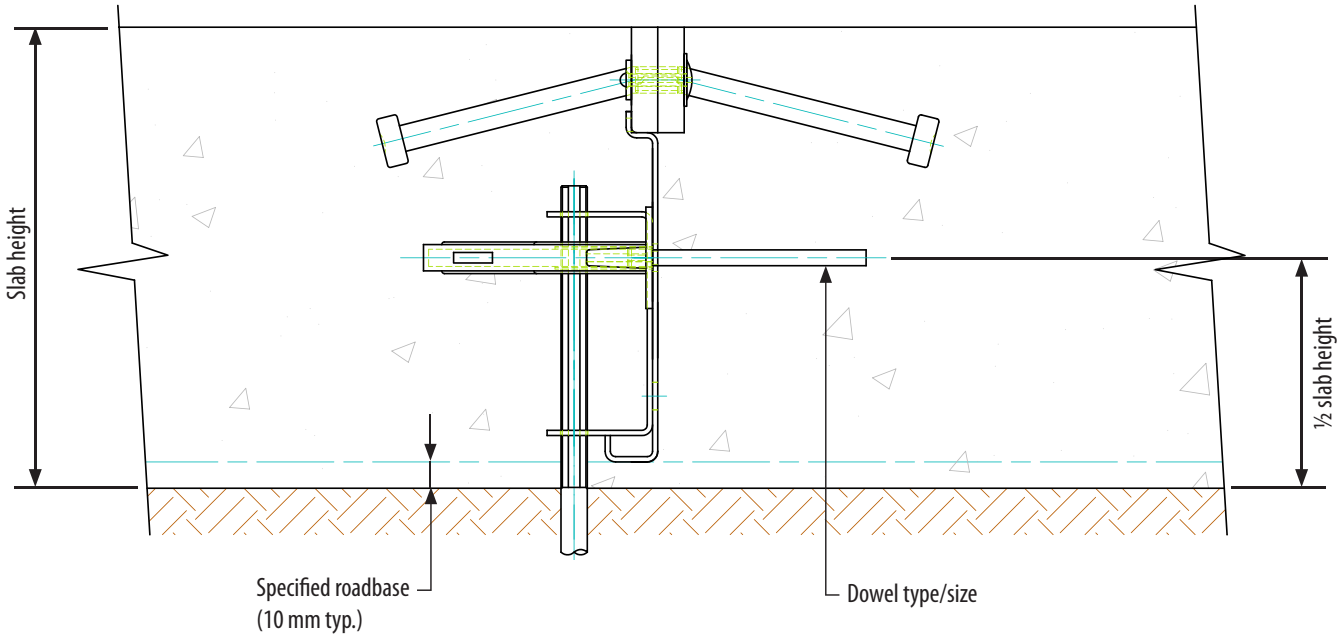
Product specification for custom Insert Hyper ArmourMate™ consists of a standard full joint system.

In order for Danley™ to help with your project requirements please have the following information available for when you contact your sales representative.

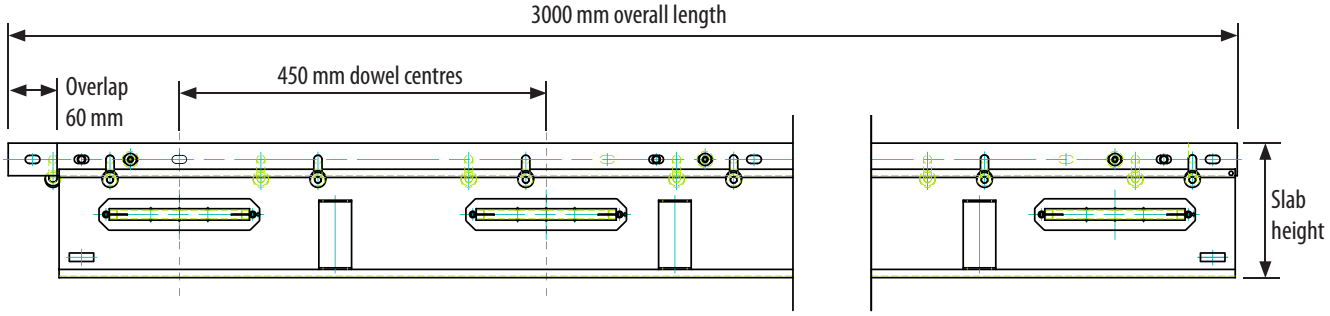
REQUIRED INFORMATION FOR QUOTATION

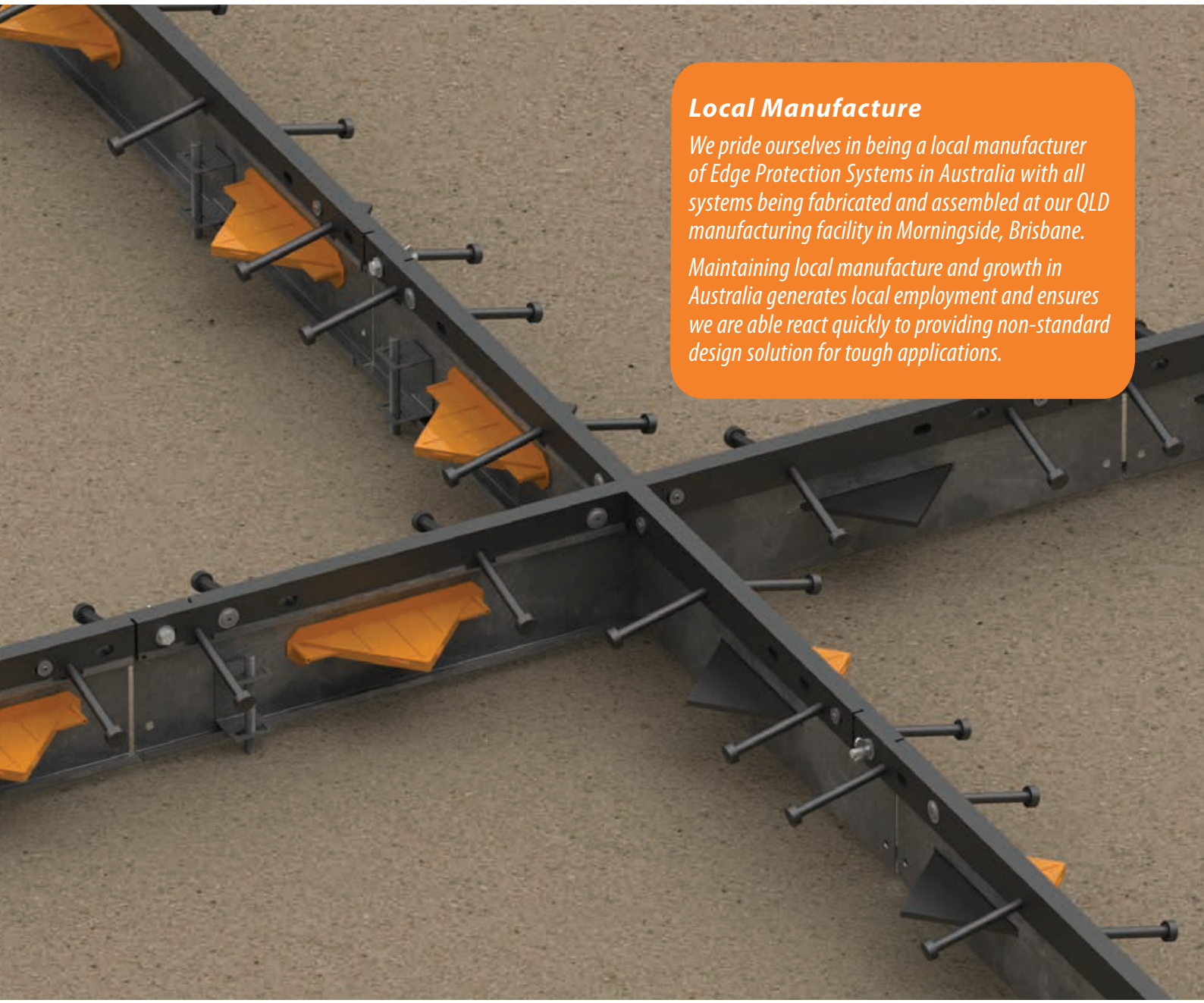
Slab Height	Joint Finish *(Blk/Galv.)*	Dowel Type	Dowel Size	Dowel Centres	Stand or Stakes	*(If Required)* QTY & Type Of Pre-Fabricated Intersections
X	X	X	X	X	X	X

Section At Joint - *When Poured*



Hyper ArmourMate™ Dimension Details (Full Joint Systems)





Local Manufacture

We pride ourselves in being a local manufacturer of Edge Protection Systems in Australia with all systems being fabricated and assembled at our QLD manufacturing facility in Morningside, Brisbane.

Maintaining local manufacture and growth in Australia generates local employment and ensures we are able react quickly to providing non-standard design solution for tough applications.

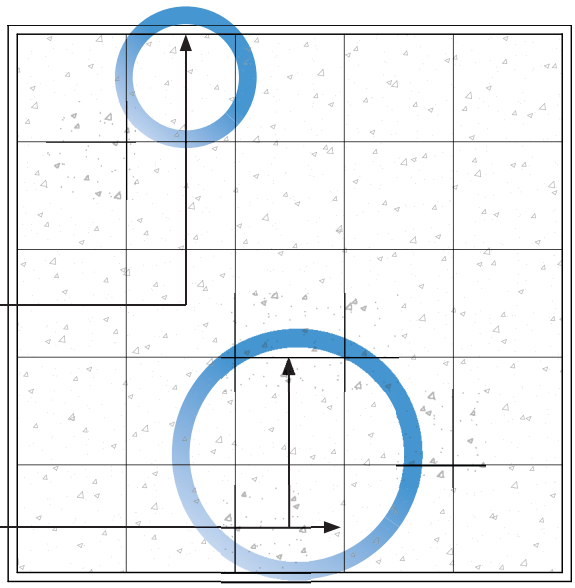
Danley™ Hyper ArmourMate™ Panel Layout

Construction Joints

ArmourMate™ or loose dowels (Diamond™ Dowels) positioned around the perimeter of each concrete pour.

Contraction Joints

PD³™ Dowel Cradles positioned at the soffcut joint lines.



Typical 30 x 30 meter slab panel.

Companion Products

1. Diamond™ Dowel

For edge protection of construction joints, Danley™ ArmourMate™ provides a range of solutions to best prevent damage and joint spalling associated with impact from materials handling equipment and other traffic. Joint edge protection systems can be incorporated into Danley™ full joint solutions with sacrificial formwork and load transfer systems.

2. PD³™ Dowel Cradle

PD³™ Dowel Cradles are designed to provide a total contraction joint system solution by incorporating two systems in the one solution. The tapered dowels act as the load transfer system which provides lateral and longitudinal movement capabilities and reduces the risk of restraint. The wire cage acts as a chair and spacer to ensure the dowels are aligned and maintained at the correct height and spacing during the pouring of the slab.

3. Crack-A-Joint™

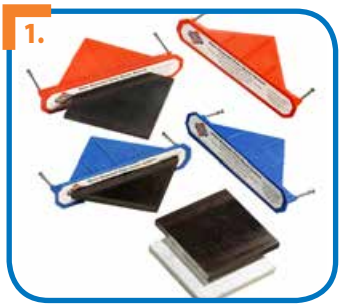
As an option to saw cutting, place Crack-A-Joint™ into the wet concrete along the joint line (above the centre of the PD³™ Dowel Cradle), to induce a crack for the full depth of the concrete. The Crack -A-Joint™ is available in standard 3 m lengths formed from galvanised sheet steel to a height of 25 mm. It can be supplied as a plain joint or with a permanent Rip-A-Strip™ capping in three different colour options (Black, Grey or Sandstone).

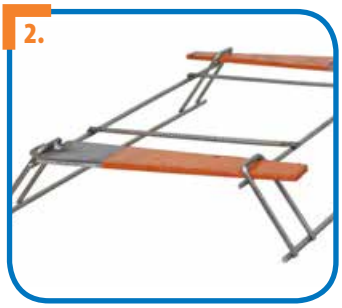
4. Ground Crack Inducer

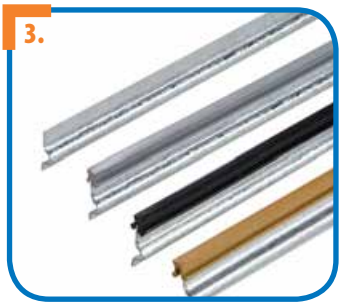
An inverted V-shaped PVC extrusion, 3 m long and available in 25 mm and 50 mm heights. It is positioned on the sub-grade before the PD³™ Dowel Cradles are placed. It produces a weakening in the slab that initiates a crack from the bottom up. Ground Crack Inducer is optional and should only be used when Crack-A-Joint™ is used, or when saw cuts are to made in the slab on the same day as the slab is poured.

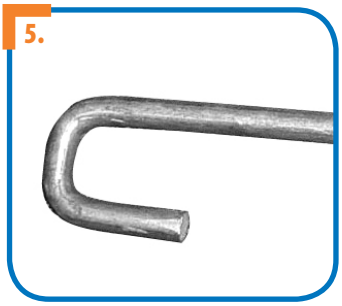
5. Cradle Hold Down Hook

A small optional wire hook that allows you to anchor the base of your Cradles into the site sub-base. It prevents the Dowel Cradles from moving during the pour process. They hook over the bottom wire of the Cradles securing them to the ground.









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