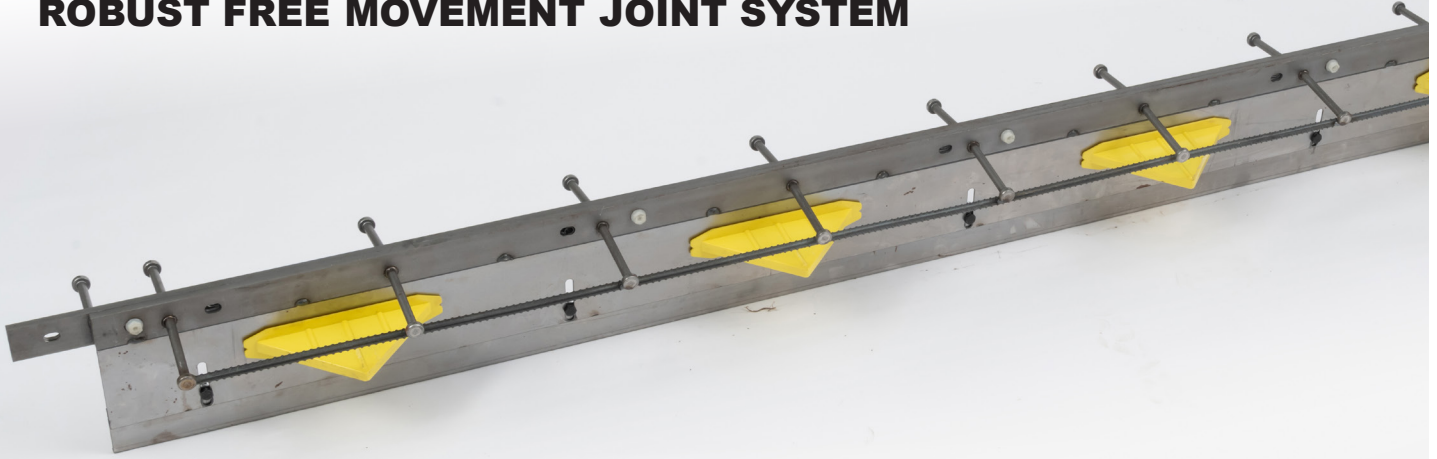


QuicDiamond Edge Steel

ROBUST FREE MOVEMENT JOINT SYSTEM



- Prefabricated leave-in-place free movement joint system
- Load transfer mechanisms to suit all floor loadings
- Heavy Duty performance with 1.5" x 3/8" cold drawn steel for extreme armoring of joint arises.
- Suitable for the high flatness category floors and superflat floor construction.
- Fast track installation with a selection of fixing methods and accessories.
- All materials used in the construction of this product are 100% recyclable..

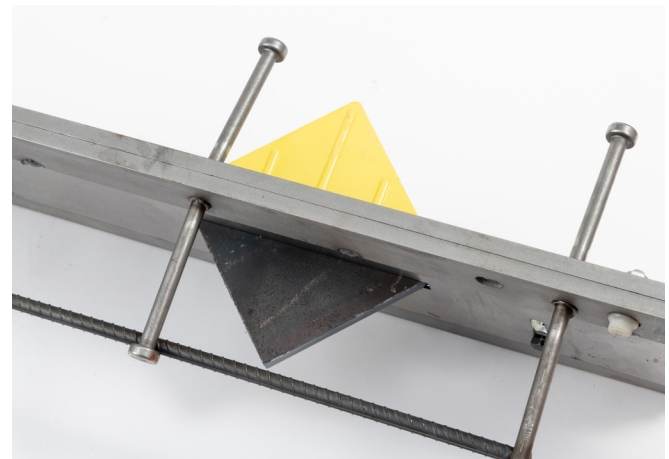
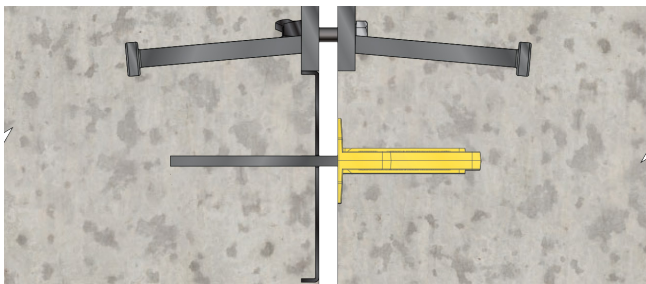
QuicDiamond Edge is the industry standard for prefabricated heavy duty movement joint systems, suitable for all large area construction methods for ground bearing and pile supported concrete floors. The cold drawn steel rails provide extremely durable

protection to the slab edges, making it ideal for floors in a heavy traffic environment.

The system ensures reliable load transfer in formed free movement joints with openings of up to .75" wide, and suitable for slab depths from 4" to 12".

Available in Plain Steel, Hot Dip Galvanized finish or Stainless-Steel versions, which means that the QuicDiamond Edge[®] system offers a solution for all operational environments.

The QuicDiamond Edge[®] system range includes a selection of prefabricated intersections, including "T" sections, "X" sections and rounded sections.



QuicDiamond Edge Steel®

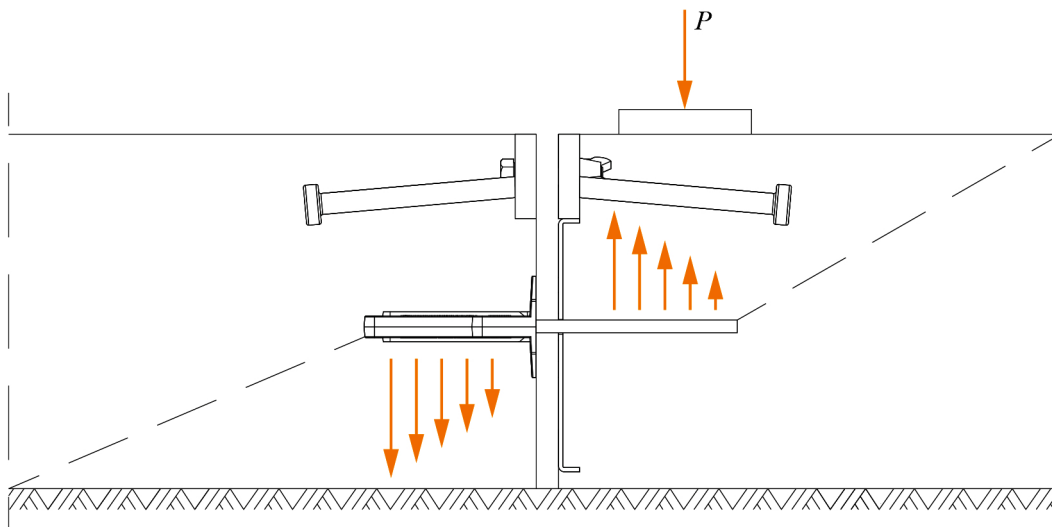
1. Product Properties

QuicDiamond Edge® is a prefabricated leave in place joint system designed to construct formed contraction free movement joints, consisting of heavy duty edge armouring, permanent formwork, and a load transfer system. The edge armouring is provided by 1.5x.375" cold drawn steel profiles, which are connected by yield able plastic bolts. The profiles are anchored into the slab by means of a number of .375x4" welded shear connectors, and one of the profiles is welded onto the steel divider plate, which has the load transfer system positioned and attached to it. QuicDiamond Edge® is also offer in a timber form mounted design. The load transfer system is attached to the timber form during installation.

QuicDiamond Edge® is installed into position on the sub base by a variety of methods, at the correct height, before the slab is cast. Once the concrete is placed, the shrinkage forces generated by the drying concrete slabs, during the cure process, shears the plastic bolts connecting the two steel profiles together, which cause the joint to open.

QuicDiamond Edge® permits minor free slab movements, caused by drying shrinkage and thermal variations in both longitudinal and perpendicular directions of the slab plane as required. QuicDiamond Edge® transfers vertical loads between adjacent slabs and minimize vertical displacement of the slabs. The load transfer system utilizes high strength steel QuicDiamond plate dowels, moving within ABS plastic sleeves. QuicDiamond Edge® steel is supplied with QD-10MM, for contraction free movement joints. QuicDiamond Edge® "wood" can be installed with any of BoMetals QuicDiamond sleeve, QD-025, QD-038, QD-075. The limiting factor of load transfer in most cases, is the punching shear resistance of the concrete, these resistances can be found in Section 2. It is recommended that no more than 50% of the applied load should be transferred by the load transfer system, the slab itself should be designed to carry the rest of the load.

Figure 1. Load Transfer.



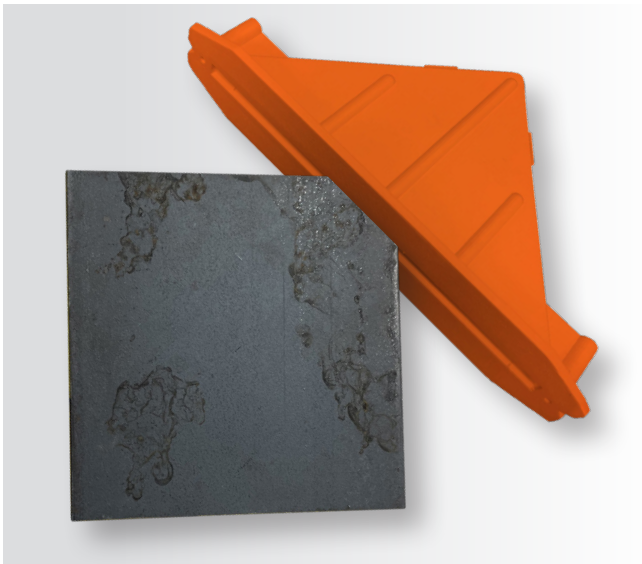
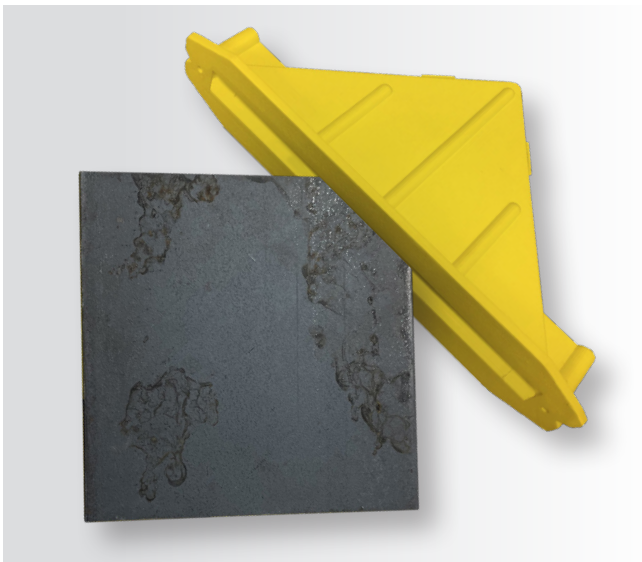
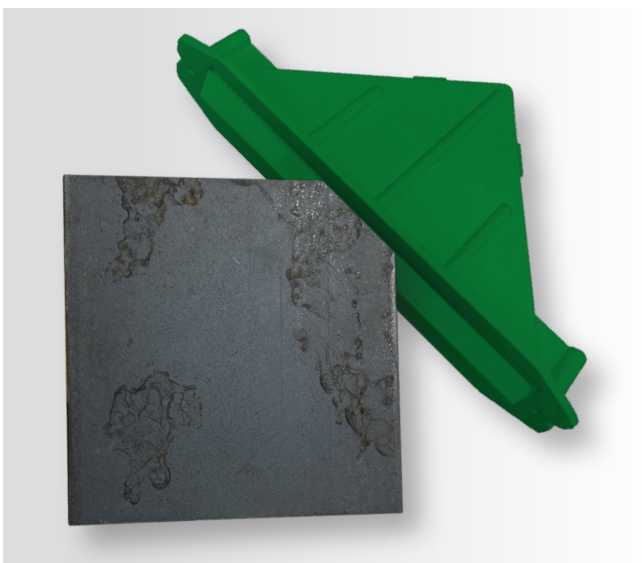


Table 1: *QuicDiamond – Dowel*

Dowel Type	QuicDiamond 025"
Thickness	1/4"
Dimensions w x l	4.5" x 4.5"
Sleeve Color	Orange
Adjustable Joint Opening	0 - .75"



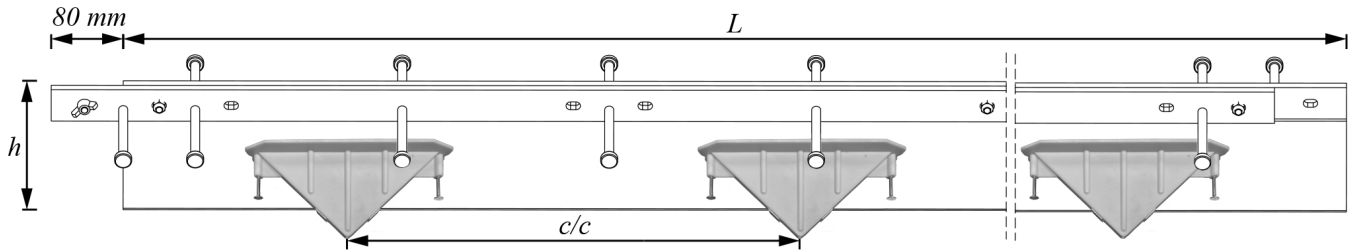
Dowel Type	QuicDiamond 03.75"/18mm
Thickness	3/75"/10mm
Dimensions w x l	4.5" x 4.5"
Sleeve Color	Yellow
Adjustable Joint Opening	0 - .75"



Dowel Type	QuicDiamond .75"
Thickness	.75"
Dimensions w x l	4.5" x 4.5"
Sleeve Color	Green
Adjustable Joint Opening	0 - .75"

Dimensions

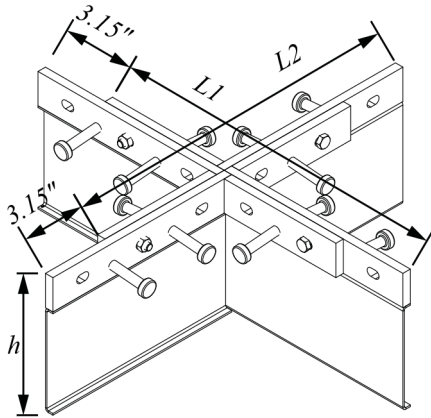
Table 5. Dimensions of QuicDiamond Edge Steel



Type	Height h	Dowel Type	Dowel Centers c/c	Length L	Weight [LB]	Adjustable Slab Depth *	Sleeve Color
QDE-WOOD	1.625"	ADJUSTABLE	ADJUSTABLE	118"/3000MM	46	ADJUSTABLE	YELLOW
QDE-WOOD-HDG	1.625"				46	ADJUSTABLE	
QDE-STEEL	5.875"	QD-10	19-5/8"	118"/3000MM	66	6"-8"	
QDE-STEEL-HDG	5.875"	QD-10	19-5/8"	118"/3000MM	66	6"-8"	

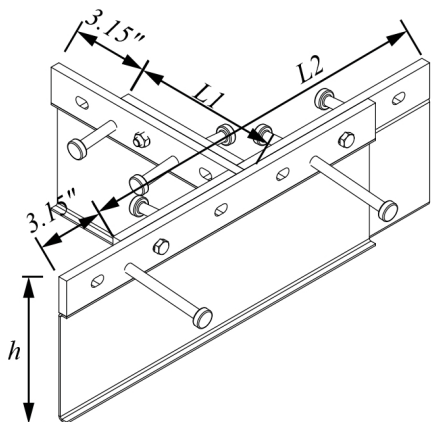
Note: QuicDiamond Edge® Wood can be installed with any of BoMetals' QuicDiamond sleeve products and at any pavement height. All QuicDiamond edge products can be manufacturing out of stainless steel. Please contact BoMetals to discuss your projects unique needs.

Table 6. Dimensions of QuicDiamond Edge Steel - X-Intersection



Type	Height h min	Width $L1$	Width $L2$	Weight [Lb]
QDE-STEEL-X	5.875"	15.75"	15.75"	16

Table 7. Dimensions of QuicDiamond Edge Steel - T-Intersection



Type	Height h	Width $L1$	Width $L2$	Weight [Lb]
QDE-STEEL-T	5.875"	6.3"	15.75"	13

2. Resistances.

The resistances of the QuicDiamond Edge Wave dowels are determined based on ACI 302.1R-15 and ACI 318-19 for U.S. applications, as well as TR34.4 (UK Concrete Society, August 2013) for European standards.

All calculated design resistances apply to single plate dowels and assume plain concrete without additional reinforcement. The same approach can be extended to steel and macro-synthetic fiber reinforced concrete, but final performance must be verified by a qualified engineer.

These calculations are for reference only and should not replace site-specific structural engineering analysis. Actual performance may vary based on concrete properties, construction methods, and applied loads. It is the responsibility of the designer or engineer to verify all calculations and ensure compliance with local building codes and project-specific requirements.

Dowel Type	Joint Opening x	Shear Psh	P Max Plate
QD-025	.75"	22,553 lbf / 100.3 kN	5,290 lbf / 23.5 kN
QD-038	.75"	33,829 lbf / 150.5 kN	7,935 lbf / 35.3 kN
QD-075	.75"	67,658 lbf / 301.0 kN	15,870 lbf / 70.6 kN

Table 10. Punching shear resistances are calculated based on ACI 302.1R-15 and TR34.4, assuming plain concrete without additional reinforcement. The values provided apply to slabs using 10mm diamond dowels with a .75" joint opening. These calculations serve as a reference and should be verified by a qualified engineer to ensure compliance with project-specific requirements and local building codes. Actual performance may vary based on construction methods, joint openings, and applied loads.

Slab Thickness	Punching C25/30 (3,625 psi)	Punching C32/40 (5,000 psi)	Punching C40/50 (5,800 psi)
4 inch	23,487 lbf / 104.5 kN	26,831 lbf / 119.3 kN	29,251 lbf / 130.2 kN
6 inch	35,231 lbf / 156.7 kN	40,246 lbf / 179.1 kN	43,861 lbf / 195.2 kN
8 inch	46,974 lbf / 208.9 kN	53,661 lbf / 238.5 kN	58,481 lbf / 260.3 kN
10 inch	58,718 lbf / 261.2 kN	67,077 lbf / 298.0 kN	73,102 lbf / 325.4 kN

Selecting QuicDiamond Edge Wave®

QuicDiamond Edge Wave® is selected according to following criteria:

- **Slab depth.** It is recommended that the joint depth is at least .125" shallower than the slab depth. Advisable slab depths are stated in Table 5.
- **Environment.** For internal floors we would suggest the basic steel plain QuicDiamond Edge® version. When corrosion resistance is required, QuicDiamond Edge® HDG (Hot Dipped Galvanized) version is recommended, and for a more aggressive external environment or high hygienic requirement, QuicDiamond Edge® in Stainless Steel is recommended.
- **20 mm designed joint opening.** This refers generally to 160 x 160 ft slab size limiting dimensions of jointed floors, and a 115 x 115Ft of jointness floors. A wider joint opening is possible, but resistances must be reduced accordingly, however, this is not practical due to the increase of dynamical impact during joint transition. If there is a design requirement for wider joint openings, BoMetals can offer suitable solution from its extensive flooring product range.
- **Joint aspect ratio.** Individual slabs should ideally have an aspect ratio of 1:1, this may not always be possible, but the ratio should never exceed 1:1.5.
- A further recommendation is to minimize slab restraint and reduce the risk of cracking, all fixed elements should be isolated from the slab using a flexible compressible foam filler of at least ¾ inch thick, allowing for natural shrinkage movement. Slab layouts should be designed to eliminate re-entrant corners, which act as stress concentration points that can lead to uncontrolled cracking. Additionally, point loads should not be placed directly on slab joints, as concentrated forces can cause spalling, joint failure, and excessive wear. If point loads at joints are unavoidable, load transfer reinforcement, such as doweled joints or embedded steel plates, should be used to evenly distribute forces across the slab.

Installing QuicDiamond Edge Steel® Free Movement Joint

Installation tolerances

Joints should be installed as precisely vertical as possible and checked with a level to ensure proper function of the dowels during slab movement. The levelness and straightness of the joint installation should be according to the relevant requirements of the floor slab design, and again checked using a standard laser level device or optical sight level.

Installation

STEP 1. SUB-BASE LEVEL

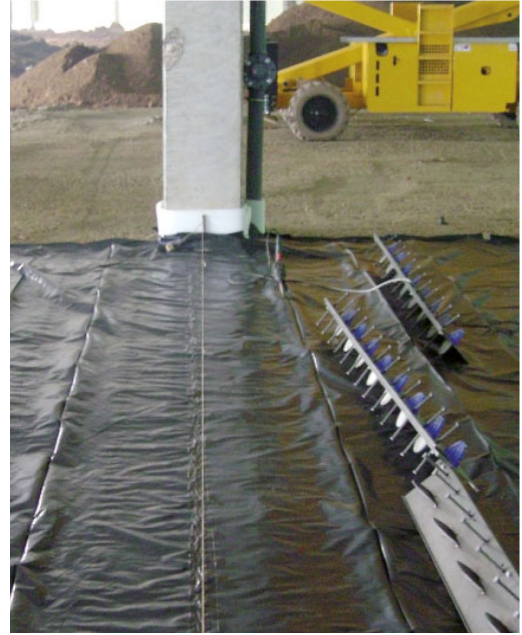
The sub-base must be made as accurate and level as possible to the requirements on the slab drawing. The tolerance of the level must be considered when ordering joints. Typically, the Joint height will be .125-.75" less than the slab depth.

STEP 2. JOINT LOCATION

The required layout, position and height of the joints will be specified on the floor slab drawing which must be followed closely. String lines are placed to identify the position of joints according to the slab layout dimensioned drawings.

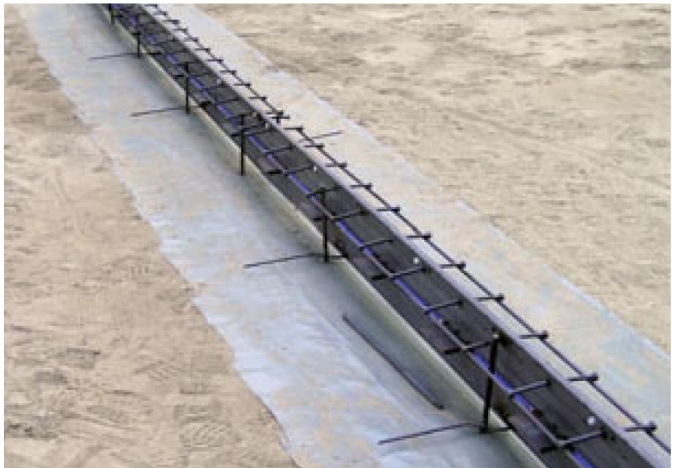
STEP 3. JOINT INSTALLATION

1. Joints are placed sequentially away from intersection pieces or from vertical column/wall.
 - a. If intersection pieces are used the first joint is connected to the junction piece at the overlap section using a dowel bush, plastic bolt and steel nut.
 - b. If intersection pieces are not used the first joint is placed adjacent to column or wall allowing for isolation material, the connection overlap is cut away.
2. The joints are placed in the correct position according to the string line, and the height is adjusted. The height should be verified by laser level or similar at both ends, and the joint should be set vertical using a spirit level which can be placed across the top edges. The QuicDiamond Edge® installation jack can be used to precisely adjust the joint.



-
3. The joint can then be fixed in position using cut rebar or nail stake. The rebar or nail stake should be driven into the ground deep enough to provide a firm foundation while pouring. For slabs up to 8" deep 4 pins per joint are required, (up to 12in 6 pins per joint) Alternate pins should be placed vertically and fixed approximately half-way along the length of the studs, and at an angle of approximately 30 degrees to the vertical, away from the joint and fixed at the end of the studs. This ensures excellent stability. Once the joint has been secured. The non pinned side of the joint may be poured. Once side 1 concrete has cured. The temporary support pins may be cut and side 2 concrete placed, failure to remove the temporary support may cause poor joint performance. Pins should always be placed so that they finish level with the stud, and if necessary any excess pin above the level of the stud should be removed prior to pouring.

Make small adjustments to the leveling jacks to achieve proper vertical alignment. Adjust the leveling jacks individually by turning their knobs to raise or lower the joint as needed.



4. Subsequent joints are aligned, fixed at the overlap using dowel bushes, plastic bolts and nuts, adjusted and fixed in the same manner. The joints should be fixed so that the ends of adjacent top strips are not touching but have a clearance gap of between .02-.04" to allow for longitudinal movement.
5. The final joint in any run will usually require being cut to length. The gap between the column/wall and the penultimate joint is measured taking account of suitable isolation material. The final joint is cut to length and installed in the same manner as previous joints.
6. If the joint layout requires a run of joints between two intersection pieces and the distance between them is not a full multiple of 3000mm, then there will need to be a cut joint in the run. Joints should be placed running from the intersection pieces, to some point approximately equidistant from both when the gap is less than 3m. The gap should be measured accurately between the top strips. The final joint should have a section cut from the center equal to the distance between the joints, keeping both overlap sections at the ends intact. The two pieces are then installed in the usual manner to each side of the gap and simply butt-welded together at the joint.
7. If required by the design 'X' or 'T' intersection should be placed according to the required layout and set to the correct height using a laser level or equivalent.
The intersection pieces are placed in the correct position and the height is adjusted. The height should be verified by laser level and the intersection should be set horizontal using a spirit level in two perpendicular directions. The intersection pieces can then be fixed in position using pins as described in section 3. 'X' junctions require 4 pins and 'T' intersection 3 pins.
8. As an alternative and if pins are not available then the joints and intersection pieces can be positioned and held in place by concrete 'dabs'. The joints and intersections must be positioned accurately and supported. The dabs should be placed at 3ft spacing along the joint lengths or at the center of the intersection pieces. Dabs should be sufficient to support the rails during pouring and leveling of the concrete ideally conical in shape and poured up to at least half the depth of the rail. Dabs should be allowed to harden sufficiently before removing support.

STEP 4. POURING CONCRETE

Once rails are correctly positioned pouring of concrete can commence. Concrete should be poured to the level of the rails with attention to consolidation around the dowels and sleeves. All plate type dowels require close attention to filling around the dowels to eliminate the possibility of air entrapment. This should be done with a suitable vibrating poker. Both sides of joints can be poured at the same time if so required.

