Lockable Dowels and Locking Pins for Temporary Movement Joints

Ancon® Lockable Dowels and Locking Pins for Temporary Movement Joints

April 2015 (Version 4)
We are one team. We are Leviat.

Leviat is the new name of CRH’s construction accessories companies worldwide.

Under the Leviat brand, we are uniting the expertise, skills and resources of Ancon and its sister companies to create a world leader in fixing, connecting and anchoring technology.

The products you know and trust will remain an integral part of Leviat’s comprehensive brand and product portfolio. As Leviat, we can offer you an extended range of specialist products and services, greater technical expertise, a larger and more agile supply chain and better, faster innovation.

By bringing together CRH’s construction accessories family as one global organisation, we are better equipped to meet the needs of our customers, and the demands of construction projects, of any scale, anywhere in the world.

This is an exciting change. Join us on our journey.

Read more about Leviat at Leviat.com
Our product brands include:

- Ancon
- Connolly
- HALFEN
- HELIFIX
- ISEDIO
- PLAKA


60 locations

sales in
30+ countries

3000 people worldwide

Leviat.com
Lockable Dowels and Locking Pins

Contents

The ‘Lockable’ Range  4
Advantages & Applications  4-5
Range of Lockable Dowels & Locking Pins  6-8
Typical Combined Applications  9
Performance Data, Spacings, Reinforcement Details & Dimensions  10-14
Installation Procedures  15-16
Projects  17
Other Ancon Products  17

The ‘Lockable’ Range

Lockable Dowels and Locking Pins are unique, patented products. They were developed by Leviat for use at temporary movement joints, most commonly found in post-tensioned concrete frames. They allow initial shrinkage of the concrete to take place and are then locked in position, by mechanical and chemical means, to prevent further movement taking place.

They also provide many advantages over the site-assembled arrangement of carbon steel reinforcing bar, galvanised or plastic ducting, vent tubes and a non-specific grout, which is sometimes used by contractors.

Lockable Dowels transfer shear load in both their locked and unlocked state which reduces slab propping times and accelerates the rate of construction.

Locking Pins are ideal for applications where there is little or no shear load.

When used together, or in combination with other Ancon shear load connectors these unique ‘lockable’ products provide a cost-effective and practical fixing solution. Contact us with your project details.

Advantages

The use of Lockable Dowels can save a significant amount of time and materials over other construction methods. Concrete shrinkage has traditionally been accommodated by leaving gaps in the slab called ‘pour strips’ or ‘closure strips’. These strips are filled once movement has stabilised, however until they are filled the slabs must be propped, restricting site access and delaying site progress. Gaps in the slab also create a trip hazard for site workers, use additional formwork and can leave the soffit face marked.

Lockable Dowels improve site access, minimise formwork requirements and accelerate the rate of construction. With a Lockable Dowel, there is less requirement for the slabs to be propped or a support corbel to be constructed, as shear load is transferred by the dowel. The time saved by early removal of slab props can be significant.

In addition, engineers have found the Ancon Lockable Dowel to be the preferred design solution for pin-ended joints. Although it is customary for practical reasons to use U-bars or other rebar continuity systems at these connections, these options do not truly act as hinges and so rotation of the slab under load can induce cracking at the wall-to-slab interface with potential integrity issues.

The Lockable Dowel is closer to a true pin-ended joint and, being manufactured from stainless steel, provides additional corrosion protection over systems using carbon steel reinforcement.

The design capacities shown on page 10 are backed by independent test data and the unique void former allows inspection of the dowel before the joint is locked.

Standard Ancon systems are available for use at slab joints and retaining / core walls.

✓ Eliminate pour strips
✓ Reduce propping times
✓ Reduce formwork
✓ Improve site access
✓ Faster, safer construction
✓ Proven performance
✓ Simple installation
✓ Guaranteed alignment allows movement
✓ Allow inspection before locking

The performance of site assembled systems can be unreliable
Pour Strips restrict site access, cause a trip hazard and delay progress on site
The Lockable Dowel eliminates the need for Pour Strips, accelerating the speed of construction and improving site safety

Ancon Lockable Dowel

Ancon Locking Pin

Tel: 1300 304 320 www.ancon.com.au
Applications

In most cases, Ancon Lockable Dowels can be used to replace pour strips at temporary movement joints in post-tensioned concrete frames. Standard Ancon systems are available for use at slab joints and retaining / core walls.

“The consulting design engineer wanted a one metre wide pour strip to be left open for 90 days which wasn’t acceptable to Hansen Yuncken. Using the Ancon Lockable Dowel system allowed earlier formwork stripping and work to continue with our services, thereby reducing overall construction time.”

Brent Courtney, Senior Site Manager, Hansen Yuncken QLD

“The Lockable Dowel is a very clean system. If you have encountered pour strips before, the Lockable Dowel is a no-brainer.”

Mahmoud Farawi, Skanska USA

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Additional formwork, trip hazard and restricted access
Slabs propped for several weeks

Minimal formwork
Improved site access
Reduced propping time

Restricted access
Slabs propped for several weeks

Improved site access
Reduced propping time

Various site-assembled components
Unreliable performance
Blind installation

Proven performance
Controlled installation
Lockable Dowels and Locking Pins

Range of Lockable Dowels
A Lockable Dowel allows initial shrinkage of the concrete to take place and then, after a pre-determined time period (generally 3-4 weeks), is locked in position with a mechanical plate and a controlled amount of epoxy resin. The range comprises three products; ESDQ-L20, HLDQ-L30 and ESDQ-L20W.

Slab-to-Slab Lockable Dowels
ESDQ-L20
The dowel component is manufactured from 30mm diameter stainless steel; one end features two fixed overlapping anchor discs and the other has a series of grooves to accept the Locking Plate. The cylindrical sleeve which accepts the dowel component is contained within a box-section to allow lateral, longitudinal and some rotational movement. The epoxy resin is poured into the L-shaped void former. This product has a design capacity of up to 71kN. See pages 10-13 for full technical details.

HLDQ-L30
The HLDQ-L30 is a high load Lockable Dowel with a design capacity of up to 136kN. See pages 10-13 for full technical details.

Example Specification Clause
Delete/Amend blue text as appropriate

<Ancon ESDQ-L20 or Ancon HLDQ-L30> lockable shear load connector comprising dowel, sleeve and locking components to be installed at the temporary movement joint between two slabs. Product to be positioned at <insert centres>mm horizontal centres at <the centre line of the slab or XXXmm from the top of the slab>. The dowel is to be locked in position after <insert time period> using the locking plate and resin supplied. System should be installed in accordance with Ancon lockable dowel instructions and engineer’s drawings.
Slab-to-Wall Lockable Dowel
ESDQ-L20W

The dowel component is manufactured from 30mm diameter stainless steel, but is shorter than the ESDQ-L20 dowel. One end of the dowel is designed to fix into the stainless steel Ancon SKS24 Threaded Anchor cast into the face of the concrete and the other end features a series of grooves to accept the Locking Plate. The sleeve component is the same as used in the ESDQ-L20. See pages 10-13 for full technical details.

Example Specification Clause
Delete/Amend blue text as appropriate
Ancon ESDQ-L20W lockable shear load connector comprising dowel, sleeve, threaded anchor and locking components to be installed at the temporary movement joint between slab and wall. Product to be positioned at <insert centres> mm horizontal centres at <the centre line of the slab> or <XXXmm from the top of the slab>. The dowel is to be locked in position after <insert time period> using the locking plate and resin supplied. System should be installed in accordance with Ancon lockable dowel instructions and engineer’s drawings.

Epoxy Resin
Each dowel is locked after a pre-determined time period (generally 3-4 weeks) with a high quality, two-part epoxy resin. The resin is mixed and poured into the L-shaped void former. Each dowel requires 1,500g of resin. Users are required to take note of storage conditions and mixing instructions given on the packaging.
Lockable Dowels and Locking Pins

Range of Locking Pins
A Locking Pin allows initial shrinkage of the concrete to take place and then, after a pre-determined time period (generally 3-4 weeks), is locked in position with a mechanical plate and a controlled amount of Ancon high strength, cementitious, non-shrink grout. The range comprises the ALP19 for slab-to-slab applications and the ALP19W for slab-to-wall applications.

Slab-to-Slab Locking Pin
ALP19
The pin component is manufactured from 500MPa coil bar which comprises a constant rolled thread. One end of the pin features a hot forged head which increases its resistance to tensile forces; the size of this head complies with the AUS/NZ standard for headed reinforcement. The other end of the pin features a notch to accept the Ancon locking plate.

When installed in the heavy duty injection moulded sleeve, the pin component is suspended in a tube; a locating bush and pinch points cradle the bar to ensure even distribution of the grout. The sleeve allows lateral and some rotational movement of the pin, in addition to longitudinal movement, prior to locking. The sleeve is ribbed on the outside for increased bond with the concrete and features indentations on the inside to maximise grout bond. The sleeve features the standard Ancon void former. A blue lid allows easy identification on site, differentiating it from a Lockable Dowel in a cast slab.

Slab-to-Wall Locking Pin
ALP19W
For walls, the pin component is manufactured from 500MPa coil bar like in the slab-to-slab system but is shorter in length. One end of the pin screws directly into a threaded anchor (product ref. ALP19TA) that is cast into the face of the concrete wall and the other end features a notch to accept the proprietary Locking Plate. The sleeve component is the same as used in the standard slab-to-slab ALP system.

High Strength Grout
In combination with the mechanical locking plate, the Pin is locked with Ancon high strength, cementitious, non-shrink grout. We recommend the grout is mixed to a flowable consistency which, at a normal curing temperature (20°C), achieves a compressive strength of 20MPa in 24 hours and 75MPa in 28 days. Users should refer to storage and mixing instructions supplied with the product.
Typical Combined Applications

ESDQ-L20 Lockable Dowels and High Load HLDQ-L30 Lockable Dowels, in combination with ALP Locking Pins, provide a cost-effective solution at slab/band beams locations.

When used in combination, Lockable Dowels and Locking Pins provide a cost-effective alternative to pour strips.
Lockable Dowel Design Strengths

**ESDQ-L20 Lockable Dowels (slab-to-slab)**

<table>
<thead>
<tr>
<th>Slab Thickness (mm)</th>
<th>Tension along line of dowel (kN)</th>
<th>Vertical Design Resistance (kN) at Various Design Joint Widths (mm) in 32MPa Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>160</td>
<td>45</td>
<td>12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0</td>
</tr>
<tr>
<td>180</td>
<td>65</td>
<td>25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0</td>
</tr>
<tr>
<td>200</td>
<td>80</td>
<td>40.0 40.0 40.0 40.0 40.0 40.0 40.0 40.0</td>
</tr>
<tr>
<td>220</td>
<td>100</td>
<td>53.6 53.6 53.6 53.6 53.6 53.6 53.6 53.6</td>
</tr>
<tr>
<td>240</td>
<td>100</td>
<td>62.2 62.2 62.2 62.2 62.2 62.2 62.2 62.2</td>
</tr>
<tr>
<td>260 and above</td>
<td>100</td>
<td>71.4 69.9 66.6 63.5 60.6 57.8 55.2 55.2</td>
</tr>
</tbody>
</table>

**ESDQ-L20W Lockable Dowels (slab-to-wall)**

<table>
<thead>
<tr>
<th>Slab Thickness (mm)</th>
<th>Tension along line of dowel (kN)</th>
<th>Vertical Design Resistance (kN) at Various Design Joint Widths (mm) in 32MPa Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>160</td>
<td>45</td>
<td>12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0</td>
</tr>
<tr>
<td>180</td>
<td>65</td>
<td>25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0</td>
</tr>
<tr>
<td>200</td>
<td>80</td>
<td>40.0 40.0 40.0 40.0 40.0 40.0 40.0 40.0</td>
</tr>
<tr>
<td>220</td>
<td>80</td>
<td>53.6 53.6 53.6 53.6 53.6 53.6 53.6 53.6</td>
</tr>
<tr>
<td>240</td>
<td>80</td>
<td>62.2 62.2 62.2 62.2 62.2 62.2 62.2 62.2</td>
</tr>
<tr>
<td>260 and above</td>
<td>80</td>
<td>71.4 69.9 66.6 63.5 60.6 57.8 55.2 55.2</td>
</tr>
</tbody>
</table>

**HLDQ-L30 Lockable Dowels (slab-to-slab)**

<table>
<thead>
<tr>
<th>Slab Thickness (mm)</th>
<th>Tension along line of dowel (kN)</th>
<th>Vertical Design Resistance (kN) at Various Design Joint Widths (mm) in 32MPa Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>240 and above</td>
<td>100</td>
<td>136.0 136.0 136.0 136.0 136.0 136.0 136.0 136.0</td>
</tr>
</tbody>
</table>

**ESDQ-L20 Example**

Slab thickness = 240mm
Joint width = 20mm
Concrete strength = 32MPa
Characteristic permanent action (dead load) = 45kN/m $\lambda_G = 1.2$
Characteristic variable action (imposed load) = 50kN/m $\lambda_Q = 1.5$
Design load $= 1.2 \times 45 + 1.5 \times 50 = 129kN/m$
Vertical design resistance $= 62.2kN$ (240mm slab 20mm joint)
Therefore centres for vertical load $= 62.2 / 129 = 0.482m$ use 450mm centres

Each dowel will in addition provide a design resistance across the joint of 100kN (for slab to wall this is 80kN), therefore the total design resistance in the direction of the dowel = 100 / 0.45 = 222kN (for slab to wall 80 / 0.45 = 177kN).
If this is insufficient, the dowel centres can be reduced to a minimum of 1.5 x slab thickness to increase the design capacity across the joint, in this example it would increase to 100 / 0.36 = 277kN (for slab to wall 80 / 0.36 = 222kN).

**Joint Filler / Fire Protection**

We can provide information on a suitable joint filler and also recommend fire resistant material which could be used as part of an overall fire protection system.

**Reinforcement Details**

Local reinforcement is required around each Ancon Lockable Dowel to guarantee that the forces are transferred between the connectors and the concrete. See page 12 for full details.
Edge Distance and Spacings

For connectors working at or near their maximum capacity, the minimum spacing should be 1.5 times the slab thickness. Where the design load of the connector could be used in a thinner slab, a spacing of 1.5 times the thinner slab thickness can be used. The minimum end distance is always 0.5 times the spacing.

### ESDQ-L20 Example

- **Slab thickness** = 300mm
- **Maximum width of joint** = 20mm
- **Concrete strength** = 32MPa
- **Design resistance/connector** = 63.5kN (based on slabs 260mm and above)

**Spacing for max. load**

\[
300 \times 1.5 = 450\text{mm}
\]

**End distance for max. load**

\[
450 \times 0.5 = 225\text{mm}
\]

**Design resistance/metre**

\[
63.5 / 0.45 = 141.1\text{kN/m}
\]

As an ESDQ-L20 can be used in a 220mm slab for a design resistance per connector of up to 53.6kN, the spacing can be based on a 220mm slab. Therefore:

**Reduced spacing**

\[
220 \times 1.5 = 330\text{mm}
\]

**Reduced end distance**

\[
330 \times 0.5 = 165\text{mm}
\]

**Design resistance/metre**

\[
53.6 / 0.33 = 162.4\text{kN/m}
\]
Lockable Dowels and Locking Pins

Reinforcement Details
Local reinforcement is required around each Ancon Lockable Dowel to guarantee that the forces are transferred between the connectors and the concrete. Correct detailing in accordance with appropriate design codes and the recommendations provided here will ensure the dowels attain their full capacity. The tables show the main reinforcement required, together with details of reinforcement above and below the connectors. Although only the sleeve components are illustrated, the same reinforcement is required around the dowel component.

Options for Main Reinforcement

<table>
<thead>
<tr>
<th>Lockable Dowel Ref.</th>
<th>No. of U-bars each side</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESDQ-L20</td>
<td>2</td>
</tr>
<tr>
<td>HLDQ-L30</td>
<td>4 3</td>
</tr>
<tr>
<td>ALP19</td>
<td>1*</td>
</tr>
</tbody>
</table>

* L and J bars can be lieu of U-bar for the ALP19

Options for Longitudinal Reinforcement

<table>
<thead>
<tr>
<th>Lockable Dowel Ref.</th>
<th>No. of bars top and bottom</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESDQ-L20</td>
<td>2</td>
</tr>
<tr>
<td>HLDQ-L30</td>
<td>2 2</td>
</tr>
<tr>
<td>ALP19</td>
<td>3 2</td>
</tr>
</tbody>
</table>

Main reinforcement each side
Longitudinal reinforcement above
Longitudinal reinforcement below

ESDQ-L20

HLDQ-L30

ALP19

SKS24 Threaded Anchor, part of ESDQ-L20W

Threaded Anchor
Reinforcement around the Ancon Threaded Anchor should be a minimum diameter of 12mm, installed at maximum 200mm vertical and horizontal centres.

Tel: 1300 304 320 www.ancon.com.au
**Dimensions**

**ESDQ-L20 Components**
- **Dowel Component**

**ESDQ-L20W Components**
- **SKS24 Threaded Anchor**
- **Dowel Component**

**HLDQ-L30 Components**
- **Sleeve Component**

**HLDQ-L30 Sleeve Component**

**ESDQ-L20W Components**
- **SKS24 Threaded Anchor**
- **Dowel Component**

**Sleeve Component**

Max. +/-20.5mm lateral movement
Lockable Dowels and Locking Pins

Locking Pin Performance & Dimensions

Locking Pins are ideal for use in applications where tension loads are high but there is little or no shear load or where the shear load is accommodated elsewhere for example either by a support corbel, double column or an alternate Ancon shear load connector.

The Ancon Locking Pin offers many advantages over the site-assembled arrangement of carbon steel reinforcing bar, PT ducting, vent tubes and a non-specific grout, which is sometimes used by concrete contractors. Locking Pins are a reliable engineered solution that offers ease of installation and proven performance.

Independent Testing

Tested at the Centre for Advanced Structural Engineering at the University of Sydney.

The 19mm diameter pin component exceeds the tensile resistance of a standard 16mm reinforcing bar. It offers the added benefit of forming an independently verified, easy-to-install Ancon system.

<table>
<thead>
<tr>
<th>Product Ref.</th>
<th>Design* Resistance</th>
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</thead>
<tbody>
<tr>
<td>ALP19</td>
<td>80kN</td>
</tr>
<tr>
<td>ALP19W</td>
<td>80kN</td>
</tr>
</tbody>
</table>

*min. 180mm slab, min. 30MPa concrete

Dimensions

<table>
<thead>
<tr>
<th>Pin Component</th>
<th>Sleeve Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>SL</td>
</tr>
<tr>
<td>PD</td>
<td>SH</td>
</tr>
<tr>
<td>PL</td>
<td></td>
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<table>
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<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>ALP19</td>
<td>50mm</td>
<td>19mm</td>
<td>201mm</td>
<td>1000mm</td>
<td>510mm</td>
<td>170mm</td>
<td>180 x 80mm</td>
<td>+/-20mm</td>
</tr>
<tr>
<td>ALP19W</td>
<td>150mm</td>
<td>19mm</td>
<td>215mm</td>
<td>543mm</td>
<td>506mm</td>
<td>170mm</td>
<td>180 x 80mm</td>
<td>+/-20mm</td>
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</tbody>
</table>

Threaded Anchor

ALP19TA

<table>
<thead>
<tr>
<th>Product Ref.</th>
<th>Anchor Length L</th>
<th>External Pin Diameter PD</th>
<th>Net Cross Sectional Area of pin</th>
<th>Pin Length PL</th>
<th>Sleeve Length SL</th>
<th>Sleeve Height SH</th>
<th>Nailplate</th>
<th>Pin Lateral Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALP19W</td>
<td>150mm</td>
<td>19mm</td>
<td>215mm</td>
<td>543mm</td>
<td>506mm</td>
<td>170mm</td>
<td>180 x 80mm</td>
<td>+/-20mm</td>
</tr>
</tbody>
</table>
Installation: Lockable Dowels

Slab-to-Slab

Although installation is shown for the ESDQ-L20, the procedure is the same for the HLDQ-L30.

1. Nail the sleeve to the formwork either central in the slab or for slab depths over 300mm so the top of the void former is level with the top of the slab. Do not remove the label over the nailing plate as this prevents ingress of concrete into the sleeve. Fix the local reinforcement, as specified on engineer’s drawings.

2. Pour the concrete, and when of sufficient strength, strike the formwork. Puncture the label to reveal the cylindrical sleeve only and insert the dowel until it is approximately 20mm from the back of the void former.

3. Fix the local reinforcement around the dowel component and pour the concrete.

4. After a predetermined time period (generally 3-4 weeks), when movement between the slabs has stabilised and the joint between the slabs has been filled, the dowel is ready to be locked.

5. Mix the two-part epoxy resin and pour into the void former. It is essential the resin flows along the stainless steel box section towards the joint and reaches the notches on the locking plate, which indicate minimum resin depth. Joint must be filled before resin is installed.

6. After 24 hours the void former can be filled with cementitious material, level with the top of the slab, to complete the installation. The locked dowel continues to transfer vertical load between the slabs, but movement can no longer take place.

Notes: Where deep concrete pours are proposed, the installation will require further consideration. More robust fixing of the sleeve and dowel components will be necessary, to avoid displacement during casting of the concrete.
Lockable Dowels and Locking Pins

Installation: Locking Pin

Locking Pins provide many advantages over a site-assembled arrangement of carbon steel reinforcing bar, PT ducting, vent tubes and a non-specific grout, including ease of installation and proven performance.

1. Nail the sleeve to the formwork either central in the slab or for slab depths over 300mm so the top of the void former is level with the top of the slab. Do not remove the label over the nailing plate as this prevents ingress of concrete into the sleeve. Fix the local reinforcement.

2. Pour the concrete, and when of sufficient strength, strike the formwork. Puncture the label to reveal the cylindrical sleeve only and insert the pin until it is approximately 10mm from the back of the void former.

3. Mix the grout using a mechanical mixer (refer to separate installation instructions on grout packaging) and pour into the void former, ensuring it flows along the box section towards the joint, until level with the top of the slab. Joint must be filled before grout is installed.

4. After a predetermined time period (generally 90-120 days) when movement between the slabs has stabilised and the joint between the slabs has been filled, the pin is ready to be locked. Fit the Locking Plate on the groove at the end of the pin in the void former. The fan-shaped Locking Plate allows the pin to be locked in any position.

5. Mix the grout using a mechanical mixer (refer to separate installation instructions on grout packaging) and pour into the void former, ensuring it flows along the box section towards the joint, until level with the top of the slab. Joint must be filled before grout is installed.

6. After 24 hours, check the void former is fully filled level with the top of the slab, top up with more of the cementitious grout material if required, to complete the installation.

Slab-to-Wall

1. Nail the Anchor to the formwork so the pin will be central in the adjoining slab or within 150mm of the top of slabs over 300mm. Fix the local reinforcement as specified on engineer’s drawings and cast the concrete.

2. When concrete reaches sufficient strength, strike the formwork and remove nailing plate. Screw the pin into the anchor.

3. Puncture the label of the sleeve to reveal the cylindrical sleeve only. Push the sleeve over the pin until it is flush with the concrete. Tie sleeve to reinforcement and pour concrete.

See Steps 4 to 6 above to complete installation.
Other Ancon Products

**DSD/Q Shear Load Connectors**
Ancon DSD and DSDQ double-dowel connectors are used to transfer shear across movement joints in suspended concrete slabs. They are more effective at transferring load and allowing movement than standard single dowels and can be used to eliminate double columns at structural movement joints in buildings. The Q version features a rectangular box section to allow lateral and some rotational movement.

**Plate Dowel Systems**
Ancon MultiJoint is a plate dowel system for use in ground bearing concrete floor slabs. It is an all-in-one solution to load transfer, concrete contraction, armoured edge protection and formwork. Individual plate dowels are also available.

**Punching Shear Reinforcement**
Ancon Shearfix is used within a slab to provide additional reinforcement from punching shear around columns. The system consists of double-headed steel studs welded to flat rails and is designed to suit the load conditions and slab depth at each column using our free calculation software.

**Reinforcing Bar Couplers**
The use of reinforcing bar couplers can provide significant advantages over lapped joints. Design and construction of the concrete can be simplified and the amount of reinforcement can be reduced. The Ancon range includes BT parallel-threaded and MBT mechanically-bolted couplers.

**Reinforcement Continuity Systems**
Reinforcement Continuity Systems are an increasingly popular means of maintaining continuity of reinforcement at construction joints in concrete. The Ancon Keybox system eliminates the need to drill shuttering and can simplify formwork design, thereby accelerating the construction process. It is available in both standard units and special configurations. Ancon KSN Anchors eliminate the need for on-site bar straightening and are available as standard to accept 12mm, 16mm and 20mm diameter rebar. The system is also available with a re-useable rebate former.

**Stainless Steel Reinforcement**
Leviat supplies stainless steel plain and ribbed bar in a variety of grades, including high proof strength material, direct from stock. Bar diameters range from 6mm to 50mm and can be cut to length, bent and threaded to suit any application. Stainless steel BT couplers are also available to suit bars from 12mm diameter.
Worldwide contacts for Leviat:

Australia
Leviat
98 Kurrajong Avenue,
Mount Druitt Sydney, NSW 2770
Tel: +61 - 2 8808 3100
Email: info.au@leviat.com

Austria
Leviat
Leonard-Bernstein-Str. 10
Saturn Tower, 1220 Wien
Tel: +43 - 1 - 259 6770
Email: info.at@leviat.com

Belgium
Leviat
Industrielaan 2
1740 Ternat
Tel: +32 - 2 - 582 29 45
Email: info.be@leviat.com

China
Leviat
Room 601 Tower D, Vantone Centre
No. A6 Chao Yang Men Wai Street
Chaoyang District
Beijing · P.R. China 100020
Tel: +86 - 10 5907 3200
Email: info.cn@leviat.com

Czech Republic
Leviat
Business Center Šafránkova
Šafránkova 1238/1
155 00 Prague 5
Tel: +420 - 311 - 690 060
Email: info.cz@leviat.com

Finland
Leviat
Vädersgatan 5
412 50 Göteborg / Sweden
Tel: +358 (0)10 6338781
Email: info.fi@leviat.com

France
Leviat
6, Rue de Cabanis
FR 31240 L’Union
Toulouse
Tel: +33 - 5 - 34 25 54 82
Email: info.fr@leviat.com

Germany
Leviat
Liebigstrasse 14
40764 Langenfeld
Tel: +49 - 2173 - 970 - 0
Email: info.de@leviat.com

India
Leviat
309, 3rd Floor, Orion Business Park
Ghodbunder Road, Kapurbawdi,
Thane West, Thane,
Maharashtra 400607
Tel: +91 - 22 2589 2032
Email: info.in@leviat.com

Italy
Leviat
Via F.lli Bronzetti 28
24124 Bergamo
Tel: +39 - 035 - 0760711
Email: info.it@leviat.com

Malaysia
Leviat
28 Jalan Anggerik Mokara 31/59
Kota Kemuning, 40460 Shah Alam
Selangor
Tel: +603 - 5122 4182
Email: info.my@leviat.com

Netherlands
Leviat
Oostermaat 3
7623 GS Borne
Tel: +31 - 74 - 267 14 49
Email: info.nl@leviat.com

New Zealand
Leviat
2/19 Nuttall Drive, Hillsborough,
Christchurch 8022
Tel: +64 - 3 376 5205
Email: info.nz@leviat.com

Norway
Leviat
Vestre Svanholmens 5
4313 Sandnes
Tel: +47 - 51 82 34 00
Email: info.no@leviat.com

Philippines
Leviat
2933 Regus, Joy Nostalg,
ADB Avenue
Ortigas Center
Pasig City
Tel: +63 - 2 7957 6381
Email: info.ph@leviat.com

Poland
Leviat
Ul. Obornicka 287
60-691 Poznan
Tel: +48 - 61 - 622 14 14
Email: info.pl@leviat.com

Singapore
Leviat
14 Benoi Crescent
Singapore 629977
Tel: +65 - 6266 6802
Email: info.sg@leviat.com

Spain
Leviat
Polígono Industrial Santa Ana c/ Ignacio Zuloaga, 20
28822 Rivas-Vaciamadrid
Tel: +34 - 91 632 18 40
Email: info.es@leviat.com

Sweden
Leviat
Vädersgatan 5
412 50 Göteborg
Tel: +46 - 31 - 98 58 00
Email: info.se@leviat.com

Switzerland
Leviat
Grenzstrasse 24
3250 Lyss
Tel: +41 - 31 750 3030
Email: info.ch@leviat.com

United Kingdom
Leviat
President Way, President Park,
Sheffield, S4 7UR
Tel: +44 - 114 275 5224
Email: info.uk@leviat.com

United States of America
Leviat
6467 S Falkenburg Rd.
Riverview, FL 33578
Tel: (800) 423-9140
Email: info.us@leviat.us

For countries not listed
Email: info@leviat.com

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