Leviat®
A CRH COMPANY

Connolly

Connolly Expansion Joint Systems

Structural Connections
Floor Joint Systems

Leviat®
A CRH COMPANY

We imagine, model and make engineered products and innovative construction solutions that help turn architectural visions into reality and enable our construction partners to build better, safer, stronger and faster.

Leviat is a world leader in connecting, fixing, lifting and anchoring technology.

From the build of new schools, hospitals, homes and infrastructure, to the repair and maintenance of heritage structures, our engineering skills are making a difference around the world.

We provide technical design assistance at every stage of a project, from initial planning to installation and beyond.

Our technical support services range from simple product selection through to the development of a fully customised project-specific design solution.

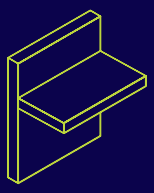
Every promise we make locally, has the commitment and dedication of our global team behind it. We employ almost 3,000 people at 60 locations across North America, Europe and Asia-Pacific, providing an agile and responsive service worldwide.

Leviat, a CRH company, is part of the world's leading building materials business.

>3,000
People

60+
Locations

~20
Countries

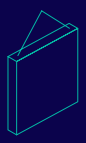


Structural Connections

Systems to form robust, efficient connections, and continuity of concrete reinforcement as necessary, between walls, slabs, columns, beams and balconies, providing structural integrity as well as enhanced thermal and acoustic performance.

- Insulated balcony connectors
- Reinforcing bar couplers
- Concrete Connections
- Reinforcement continuity systems
- Punching shear reinforcement
- Shear load connectors
- Floor Joint Systems
- Precast / Reinforced Columns
- Infrastructure Products
- Precast Connections
- Acoustic dowels and bearings
- Prestress

Other areas of expertise:

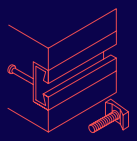


Lifting & Bracing

Systems for the safe and efficient transportation, lifting and temporary bracing of cast concrete elements and tilt-up panels before permanent structural connections are made.

Façade Support & Restraint

Systems for the safe and thermally-efficient fixing of the external building envelope, including brick and natural stone, insulated sandwich panels, curtain walling and suspended concrete façades, and also the repair and strengthening of existing masonry installations.

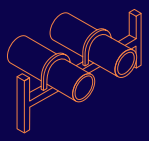


Anchoring & Fixing

Systems for fixing secondary fixtures to concrete, including anchor channels, bolts and inserts; also tension rod systems for roofs and canopies.

Formwork & Site Accessories

Non-structural accessories that complement our engineered solutions and help keep your construction environment operating safely and efficiently, including moulds for casting standard and special concrete elements and construction essentials such as reinforcing bar spacers.



Industrial Technology

Mounting channels, pipe clamps and other versatile framing systems that provide safe fixing in a wide range of industrial applications.

Leviat product ranges:

Ancon | Aschwanden | Connolly | Halfen | Helifix | Isedio | Meadow Burke | Modersohn | Moment | Plaka | Scaldex | Thermomass

Expansion Joint System

A steel backed expansion joint with an integrated dowel system used for forming expansion joints in continuous pours.

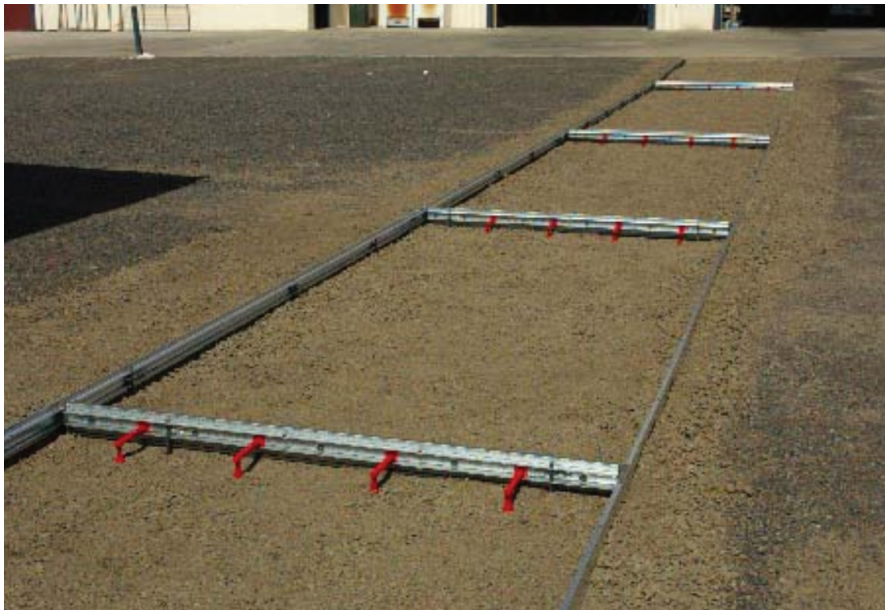
Slab on ground pavements come in various forms, from a council footpath right through to a container handling facility, however the fundamental challenge of controlling expansion, while guaranteeing load transfer, is the same in both situations.

The Connolly Expansion Joint System is a continuous pour solution for expansion joints in slab on ground applications.

Connolly Expansion Joints 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 is fixed using our patented peg and wedge system.

The steel profile has pre-formed holes which allow it to be used in conjunction with Connolly Universal Dowel Sleeves. Universal Dowel Sleeves are installed in the steel section using our patented twist-fix feature.

The expansion joint profile is available in 3m lengths for slab thicknesses from 100mm to 200mm. Custom heights and lengths are available on request.



Connolly Expansion Joint System in use on a concrete footpath

In some situations, the Expansion Joint System can also be used vertically.

Underpass using shotcrete stabilisation

- Enables continuous pours
- Allows up to 10mm expansion
- 3 different profile heights
- Provides expansion capacity over the full depth of the slab
- Strong connection between Expansion Joint and Connolly Universal Dowel Sleeves through patented twist-fix feature
- Patented wedge fixing mechanism allows fast and accurate height adjustment
- Additional stiffening ribs (EXJ150 and EXJ200) to ensure straighter joints
- Galvanised coating for corrosion protection
- Can be used to screed off which makes getting the right level quick and easy

Manufactured in an ISO accredited factory

Cost-effective solution

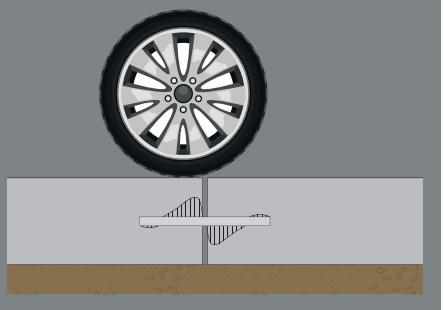
Dedicated sales and technical support

Standard items available ex-stock

Transferring loads through expansion joints

The Expansion Joint System:

- Transfers shear loads through integrated dowels
- Allows for expansion and contraction in the joint
- Minimises differential deflection between adjoining slabs



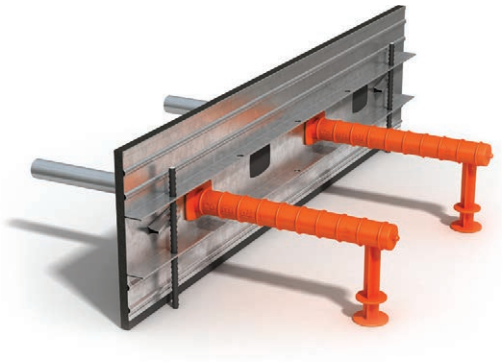
Expansion Joint System

The Connolly Expansion Joint System is available in three standard sizes to suit slab thicknesses from 100 to 200mm.

All systems include one galvanised steel profile with a length of 3000mm, 4 pegs, 4 wedges and Connolly Universal Dowel Sleeves complete with hot-dip galvanised dowels as specified in the 'System Dimensions' table.

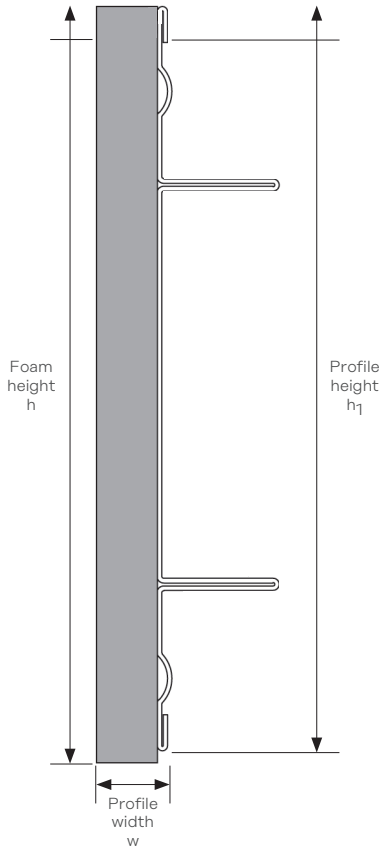
Systems are packed in boxes of 10 for EXJ100/150 and boxes of 6 for EXJ200.

Custom lengths (up to 3 metres), heights and dowel configurations are available on request.



System Dimensions

System	For Slab Thickness (mm)	Dowel Diameter (mm)	Dowel Length (mm)	Number of Dowels / Centres (mm)	Foam Height h (mm)	Profile Height h1 (mm)	Profile Width w (mm)
EXJ100	100	12	300	9/335	100	87.5	11
EXJ150	150	16	450	7/450	150	142	11.4
EXJ200	200	16	450	10/300	200	190	11.4

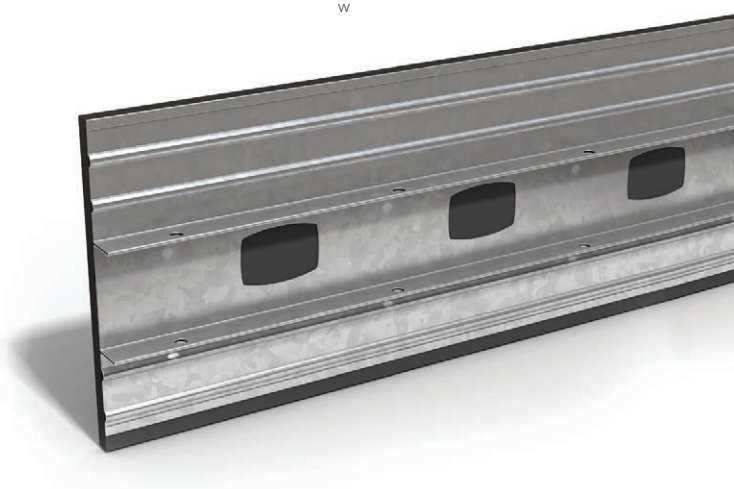


Steel Profile

The galvanised steel profile is available in three standard heights. All standard profiles are 3 metres long and feature a 10mm layer of closed cell PE foam on one side. Profiles have pre-punched holes that allow the installation of 12mm Universal Dowel Sleeves (100mm slab thickness), or Universal Dowel Sleeves with Connolly's patented twist-fix system (150 – 200mm slab thickness).

Joiners are available to connect multiple profiles in situations where the joint is longer than 3 metres.

Part No.	Slab Thickness h (mm)	Pre-Punched Holes
EXJ10030-BOX	100	Round holes to fit 12mm dowel every 335mm
EXJ15030-BOX	150	Connolly pre-punched holes every 150mm
EXJ20030-BOX	200	



Universal Dowel Sleeves

The system is compatible with the full range of Connolly Universal Dowel Sleeves (UDS), which feature a unique, patented twist-fix flange ensuring quick and easy installation.
As standard, each system is supplied with round sleeves as shown in the table below.
For variations on this, please contact us.

Part No.	Dowel Diameter (mm)	Colour
EXJDS12Rx150	12	Green
EXJDS16Rx225	16	Purple

Dowels

Hot-dip galvanised dowels are supplied with each system as standard. Dowels in black steel, stainless steel and custom length dowels are available on request.

Part No.	Dowel Diameter (mm)	Dowel Length (mm)
DBHDG12Rx300	12	300
DBHDG16Rx450	16	450

Pegs and Wedges

Each system includes a set of 4 pegs and wedges. The finish of the peg is black steel.

Part No.	Description	Diameter (mm)	Peg Length (mm)
PW1504	Set of 4 pegs and wedges	8	390

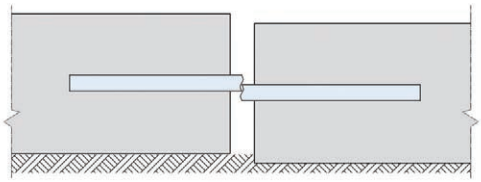
Expansion Joint System

Use of the Connolly Expansion Joint System ensures that shear loads are safely transferred across the joint through dowels. We recommend referring to **TR34, Fourth Edition – Concrete Industrial Ground Floors** 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 shear capacity of the steel profile for round dowels included in the Expansion Joint System is as follows:



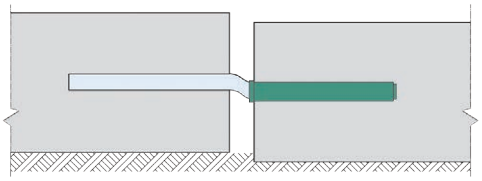
Round - Dowel Shear Capacity

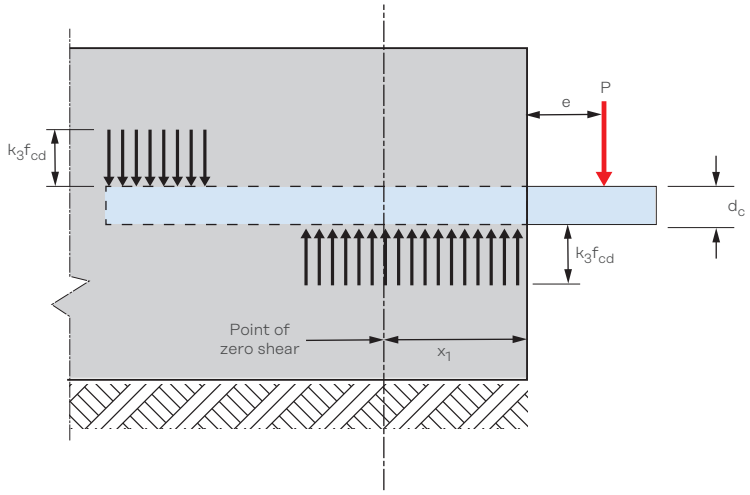
Expansion Joint	Dowel Diameter d_d (mm)	Finish	Shear Area (0.9 . A) (mm^2)	Capacity ($P_{sh\ plate}$) (kN)
EXJ100	12	Black/HDG	101.8	15.93
EXJ150, EXJ200	16	Black/HDG	181.0	28.32

For the standard configurations of the Expansion Joint System, the dowel shear strength will never govern the capacity of the joint.

Dowel Bearing/Bending Capacity

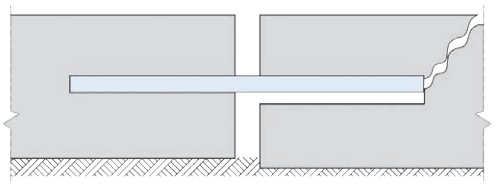
Bearing/Bending is a combined failure mode that checks the bending capacity of the dowel as well as the bearing capacity of the surrounding concrete. Equation 17 of TR34 defines the bearing/bending capacity of a dowel connection. The formula is based on the load distribution as shown in the image below.





Punching Shear (Bursting Forces)

TR34 section 6.5.3 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.



Combined Design Capacities

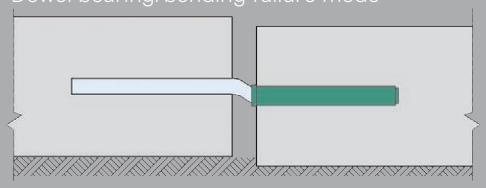
The following table provides single dowel capacities calculated in accordance with TR34, along with system capacities per linear metre for various joint widths and concrete compressive strengths. The capacities provided in the table are minimum values from dowel shear, dowel bearing/bending and punching/bursting capacity.

Colour coding indicates which capacities are based on dowel bearing/bending and which on punching shear.

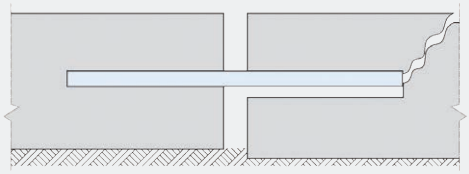
Design Capacity

System	Slab Thickness (mm)	Dowel Dia. (mm)	Dowel Spacing (mm)	Joint Width (mm)	25 MPa		32 MPa		40 MPa	
					V_{Rd}/Dowel (kN)	V_{Rd}/Metre (kN)	V_{Rd}/Dowel (kN)	VRd/Metre (kN)	V_{Rd}/Dowel (kN)	V_{Rd}/Metre (kN)
EXJ100	100	12	335	10	6.72	20.06	7.57	22.59	8.13	24.28
				15	6.01	17.93	6.43	19.19	6.80	20.31
				20	5.23	15.62	5.53	16.49	5.78	17.24
EXJ150	150	16	450	10	13.35	29.66	14.65	32.56	15.89	35.31
				15	11.91	26.48	12.90	28.68	13.81	30.69
				20	10.68	23.73	11.43	25.40	12.09	26.88
EXJ200	200	16	300	10	13.35	44.49	14.65	48.84	15.89	52.97
				15	11.91	39.72	12.90	43.01	13.81	46.04
				20	10.68	35.60	11.43	38.10	12.09	40.32

Dowel bearing/bending failure mode



Punching failure mode



Dowel Properties

Steel Grade: 300

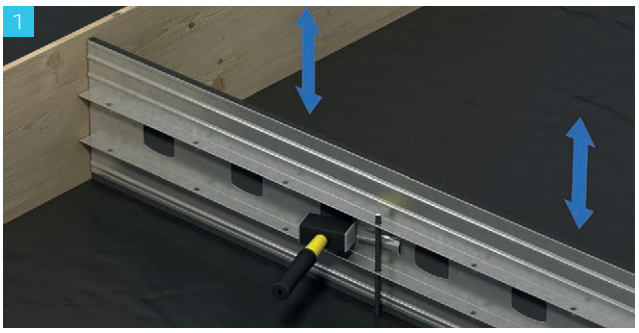
Material Standard: BS EN 10025:2004

Material Finish: Hot-dip galvanised

Expansion Joint System

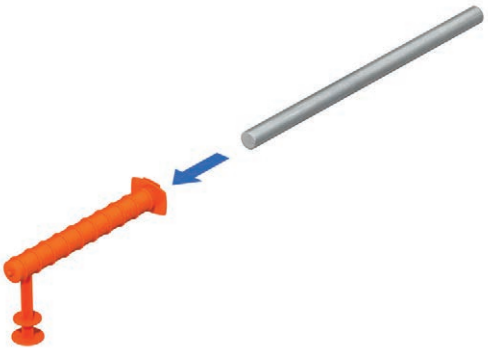
Installation Guidance

1



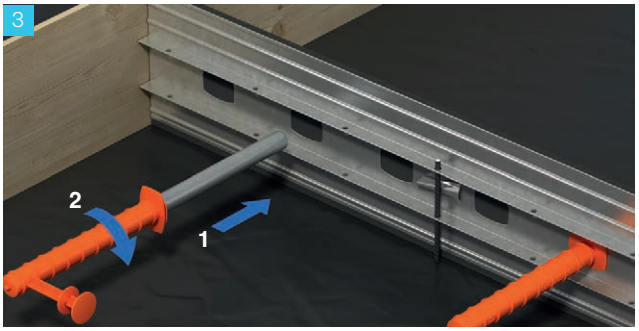
Adjust the profile to the correct height and secure by tapping in the supplied wedges.

2



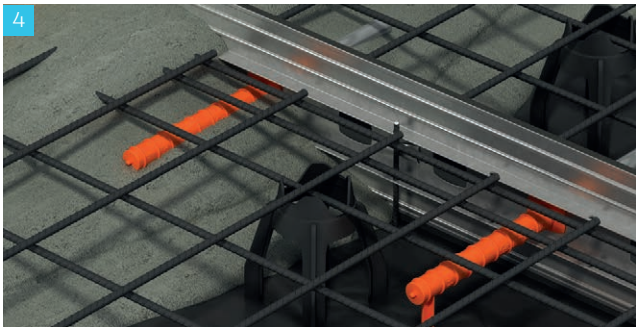
Insert dowels into the Universal Dowel Sleeves by pressing all the way to the end of the sleeve.

3



Install the Universal Dowel Sleeve in the profile by pushing the dowel through the foam at the centre of the pre-punched holes and twist the sleeve 90 degrees to fix in place.

4



Place reinforcement and pour concrete evenly to both sides of the expansion joint at the same time. Finish surface and ensure top of joint is clear of any concrete.

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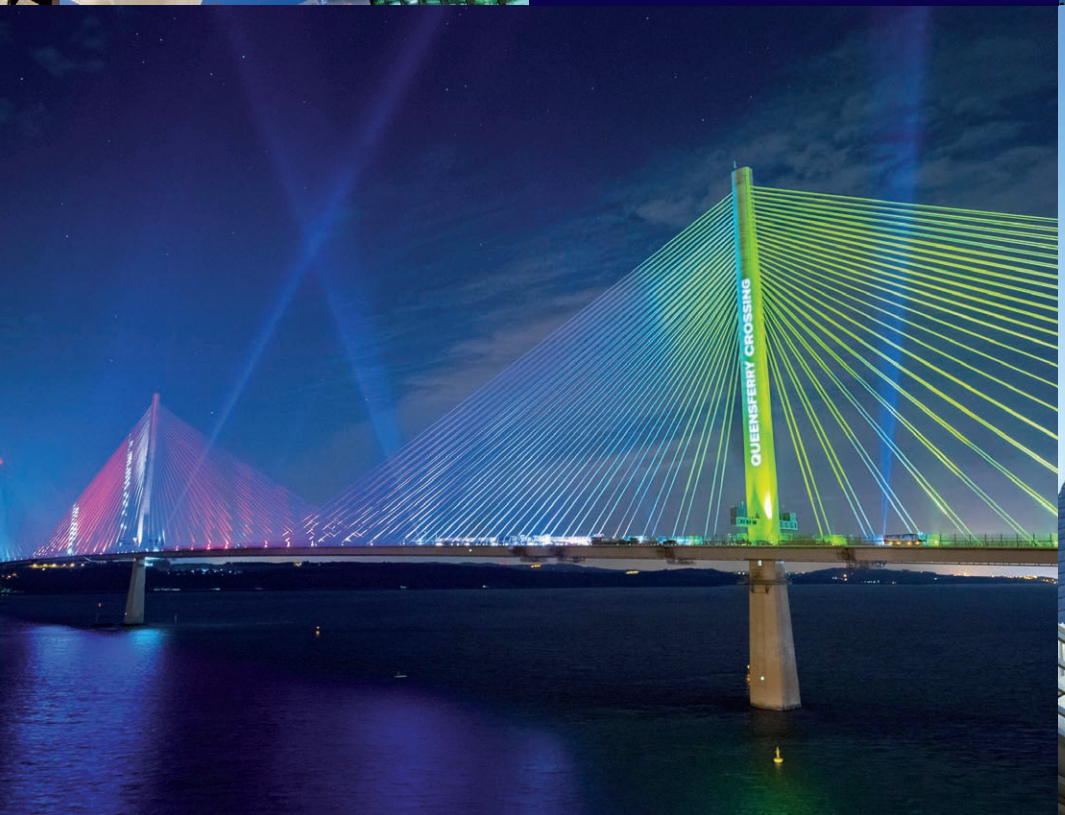
Innovative engineered products and construction solutions that allow the industry to build safer, stronger and faster.



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