LESA

ENGINEERED CONCRETE FLOOR SYSTEMS

DOMINATOR PLATE DOWEL
Medium capacity plate dowel for joint widths to 25mm

HI-MOVE PLATE DOWEL
High capacity plate dowel for joint widths to 35mm

DOMINATOR SQUARE DOWEL
Traditional square dowel, 16mm, 20mm and 25mm with rectangular sleeves for lateral movement

DOMINATOR ROUND DOWEL
Traditional round dowel without lateral movement for short joint lengths

HI-MOVE METAL DOWEL
Bespoke sleeve and dowel for very high movement

DIAMOND DOWEL
Medium capacity plate dowel for narrow joints (12mm)

DOWEL CRADLE / BASKET
Dowels, most versions, pre-assembled and self supporting for easy use

DOWEL LADDER / TRACK
Dowels, most versions, pre-assembled requiring bar chair support

SHEAR LOAD CONNECTOR
High capacity, stainless steel dowels/twin dowels for heavy load situations

▸ LESA SYSTEMS DOWEL RANGE

LESA SYSTEMS DOWEL PRODUCT RANGE OVERVIEW

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Shear Load Connector

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▶ HI-MOVE PLATE DOWEL

▶ SQUARE DOWEL

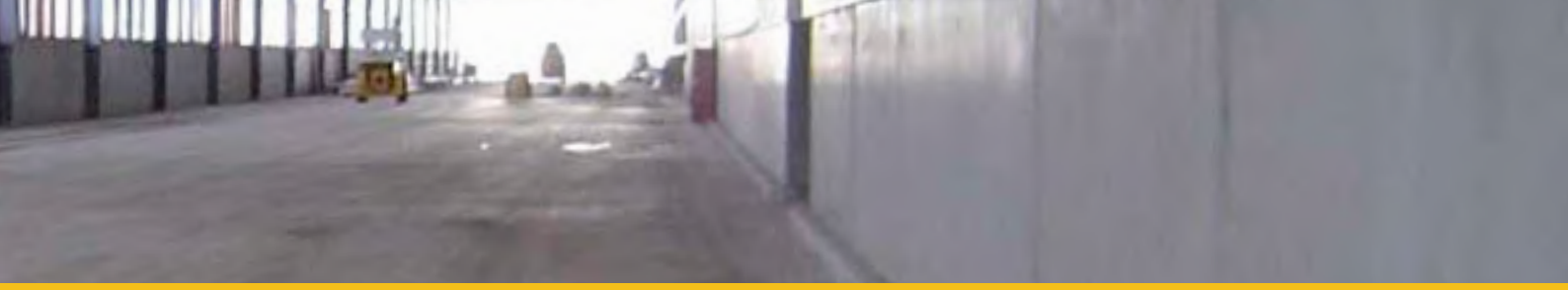
▶ ROUND DOWEL

▶ HI-MOVE METAL DOWEL

▶ DIAMOND DOWEL

▶ DOWEL LADDER

▶ SHEAR LOAD CONNECTOR



LESA SYSTEMS - ENGINEERED CONCRETE FLOOR SYSTEMS

Floor Design Systems

Traditional design techniques resulted in floors with many joints (usually a mix of construction joints and sawn joints) and there was little control over the widths of the joints.

Modern floor design methods reduce the numbers of joints in floors, or control the widths of the joints. These methods include pre-stressed floors, jointless steel fibre floors, and controlled movement floors. The increase in the distance between joints increases the widths of the joints in which movement occurs.

Early plate dowel design was based on American floor construction methods which were popular at the time. Thin, heavily tappered dowels do not provide adequate load transfer in wide joints. Lesa Plate Dowels meet the requirements of current floor design systems.

Construction or Movement Joints vs Control or Sawcut Joints

Where floor design ensures that the shrinkage movement is controlled, almost all movement will appear in the construction or movement joints. In construction joints or movement joints, the often significant lateral movement (along the line of the joint) will influence the dowel selection.

How Wide is the Joint? What Dowels Should be Used?

Good slab design should be able to specify the final width of the joints. For major floors, dowel suppliers should be able to determine joint widths and supply suitable dowels accordingly, if supplied with design loads and slab construction details. Dowels should be specified to suit the parameters of the construction of the slab.

The Design of Dowels

Designing shear dowels is complex and the capacity of a dowel in a joint is a function of the following criteria:-

1. the steel shear stress;
2. the steel/concrete bearing stress;
3. the steel bending stress;
4. the steel deflection (and consequently the concrete deflection);
5. the concrete shear capacity.

Dowel design must consider the dowel shape and thickness, the concrete strength and thickness, the floor joint spacing, and the subgrade.

What are Plate Dowels.

Plate Dowels are concrete shear dowels which use steel flat bars for load transfer across joints in concrete slabs on ground, and have now replaced traditional round dowel bars in many installation. Square dowel bars in rectangular sheaths, have also been superceded.

Plate dowels are wider than the round or square bars they replace, so greater loads can be carried per dowel in many situations, since the bearing stresses between steel and concrete are reduced.

Plate dowels are generally quite short, and are easy to use in formed or construction joints, where nail-on sheaths are fixed to form boards. Penetration of formwork is avoided, and this simplifies the installation of these dowels. Plate dowels are now the most widely used dowels in industrial and commercial floor construction in countries where advanced construction techniques are used.

LESA DOMINATOR PLATE DOWELS

The Dominator Dowel.

The Dominator 75/10 Dowel is the most advanced in plate dowel design, and has the following features:

- A constant width steel plate,
- A tapered sleeve.

The width and thickness of the Dominator Dowel have been selected for:

- high bearing capacity (but not excessive bearing capacity) in narrow joint widths,
- high bending capacity for a range of joint widths;
- tapered dowel sleeve to allow increasing lateral movement as the joint width increases.

A tapered dowel plate is not used, since a tapered plate would rapidly reduce the dowel capacity as the joint width increases.

Dominator Plate Dowel vs Typical Plate Dowel

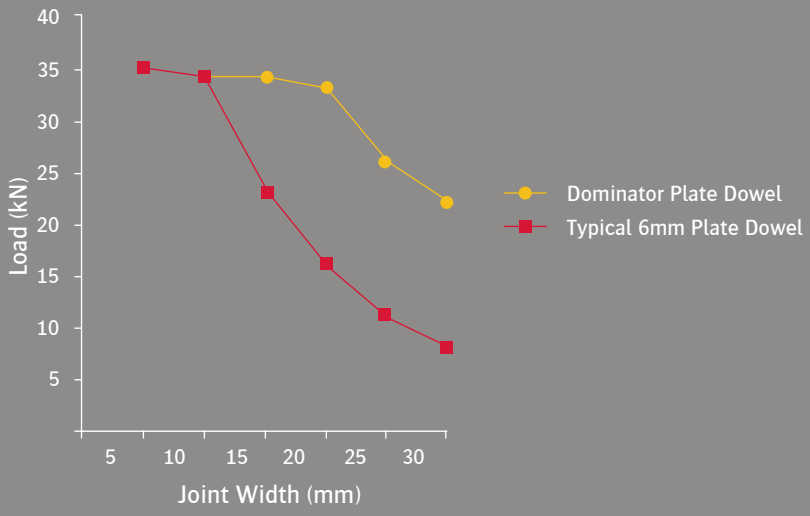


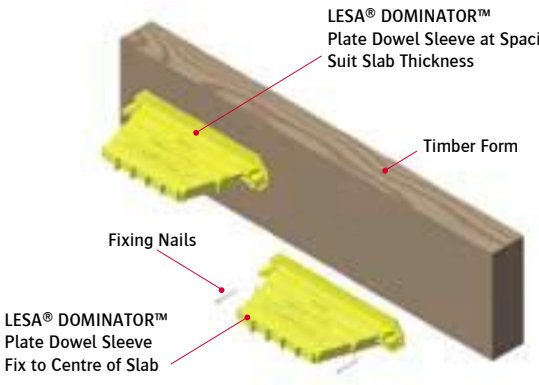
Plate Dowel Selection.

Plate dowels are now available in a range of sizes and shapes. Different shapes are available for both the steel dowel plates, and the plastic sheaths which encase the dowels. The sheaths allow for the movement of the concrete relative to the dowel plates.

Much of the concrete movement will be perpendicular to the line of the joint as the joint opens. However, some relative movement between the bays of concrete on each side of the joint will also occur along the line of the joint. It is vital that the dowels allow for this relative movement. If the dowels do not allow for this movement, then unnecessary stresses will develop in the slab, and these may contribute to cracking. With the range of floor construction techniques available, the selection of the dowels must suit the design of the floor, and adequately allow for slab movement, while still retaining adequate load capacity.

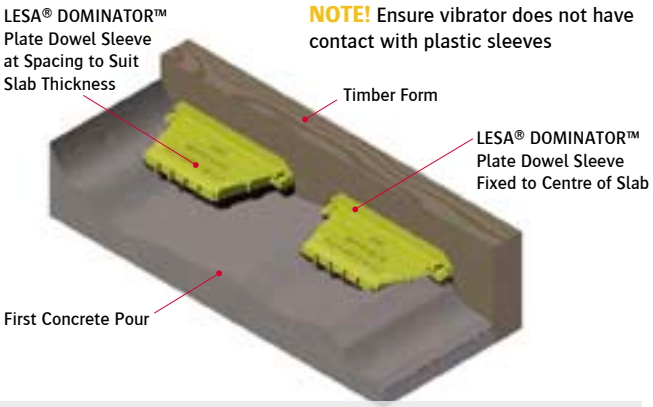
LESA DOMINATOR PLATE DOWELS - INSTALLATION INSTRUCTIONS

INSTALLATION STEPS



▶ STEP 1

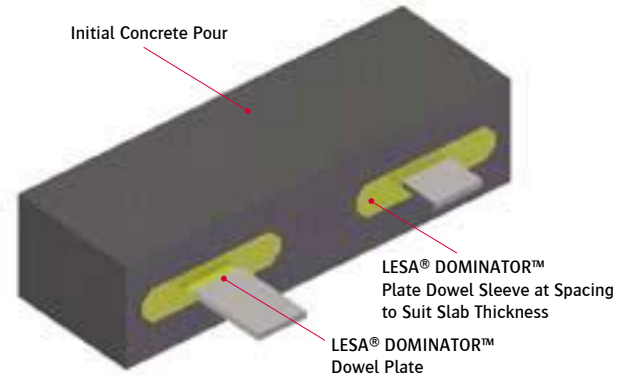
Mark the form for slab centre and Dominator Plate Dowel spacing. Using nails provided fix the Dominator Dowel Sleeve to the form.



NOTE! Ensure vibrator does not have contact with plastic sleeves

▶ STEP 2

Set the form to line and level as normal.
Place and finish concrete. Edge of slab must be vibrated to consolidate concrete around the Dominator Sleeve.

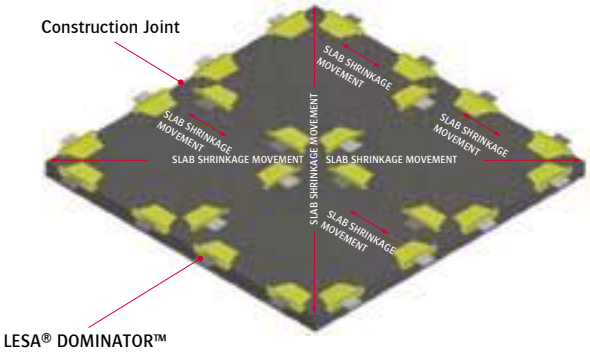


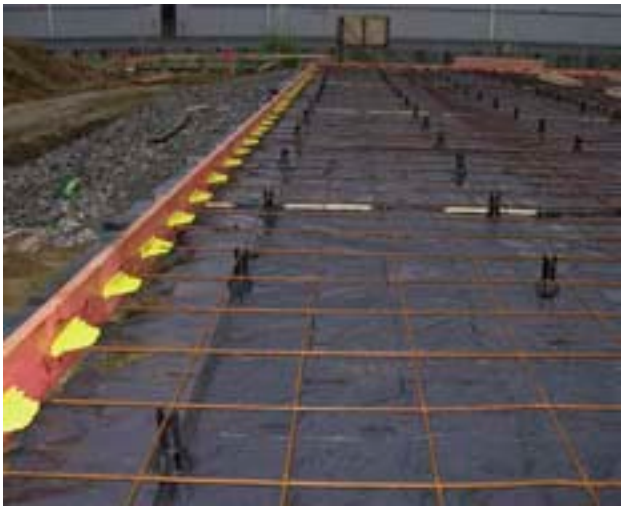
▶ STEP 3

Strip the form. Forms should be cleaned and stored for reuse. Insert the 75/10 Plate Dowel when required prior to concrete pour.

▶ STEP 4

Pours proceed after plate installation.





LESA HI-MOVE PLATE DOWEL SYSTEM

Lesa Hi-Move Plate Dowel System

The Lesa Hi-Move Dowel System uses plate dowel technology to replace traditional dowels in Shrinkage Compensating Concrete, Stressed Slabs and Jointless Fibre Slabs. Hi-Move Dowels consists of two parts. The first being a high quality, high density one piece plastic nail on sleeve. The second being a 10mm parallel side steel plate.

The Hi-Move Plate Dowel System enables this unique sleeve to be cast into new slabs without having to penetrate formwork, thus eliminating damage to the forms. The built in ring necked nails make installation very quick and easy and also ensure accurate dowel alignment.

This is achieved by the sleeve generating a precise void in the concrete into which the dowel plate can be inserted at the optimum time of construction. The parallel sided steel plate ensures constant bearing at all times while the tapered sleeve allows progressive lateral movement as the concrete shrinks and cures.

The construction of the sleeve is such that it ensures once the dowel plate is inserted into the sleeve an effective seal is formed around the dowel to prevent concrete slurry from entering the sleeve.

Note: For additional lateral movement requirements, two sleeves can be used, back to back. This is an important issue that is often over looked when onsite fabrication of dowel sleeves using over sized conduit is used.

Hi-Move Dowels are available in black steel, stainless steel or hot dip galvanised.
For spacing of Hi-Move Dowels please refer to Lesa's dowel charts.

Sample Dowel Capacity Chart

32 MPa CONCRETE - 150mm SLAB

Joint Width	Lesa Dominator Dowel 75/10	Lesa Hi-Move Dowel 100/10	Diamond Dowel 6mm	Diamond Dowel 10mm	100/6 Plate Dowel	50 x 6 Load Plate	50 x 10 Load Plate	16mm Square Dowel **	20mm Square Dowel **
5mm	31	32	30	30	26	13	21	16	26
10mm	30	31	29	29	26	13	21	16	26
15mm	30	31	23	29	21	10	21	16	26
20mm	30	31	16	28	16	8	21	16	26
25mm	26	30	11	28	13		17	14	26
30mm	22	29	8	23	10		14	12	23
35mm	19	25		17				10	20
40mm	16	22		13					17

* Note: 37 Underline indicates that punching governs

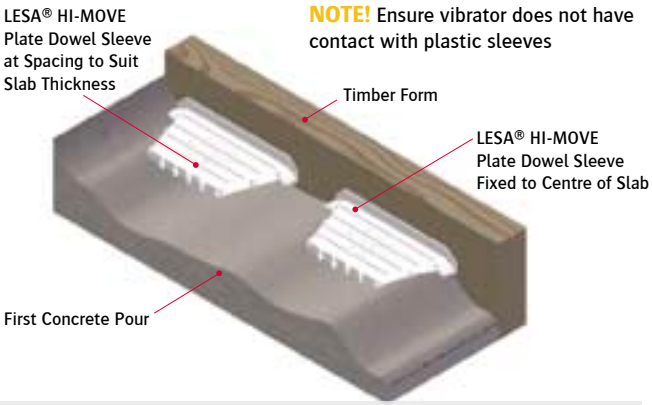
** Note: Excludes punching

Refer to Lesa System for specific load requirements

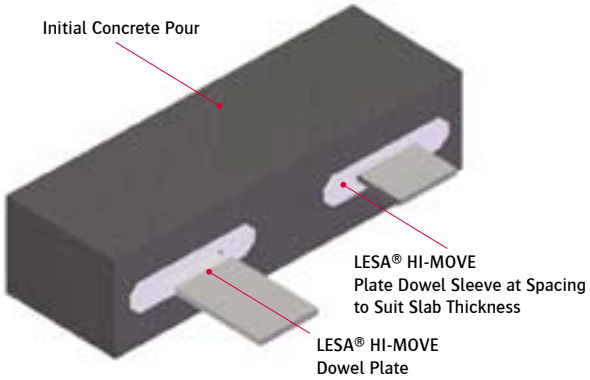
LESA HI-MOVE PLATE DOWEL - INSTALLATION INSTRUCTIONS

INSTALLATION STEPS

▶ STEP 1
Mark the form for slab centre and Hi-Move Plate Dowel spacing. Using nails provided fix the Hi-Move Dowel Sleeve to the form.



▶ STEP 2
Set the form to line and level as normal.
Place and finish concrete. Edge of slab must be vibrated to consolidate concrete around the Hi-Move Sleeve.



▶ STEP 3
Strip the form. Forms should be cleaned and stored for reuse. Insert the HI-MOVE Plate Dowel when required prior to concrete pour.

Embedded LESA® HI-MOVE Dowel Sleeve Creates Slot to Receive Hi-Move Dowel

▶ STEP 4
Pours proceed after plate installation.

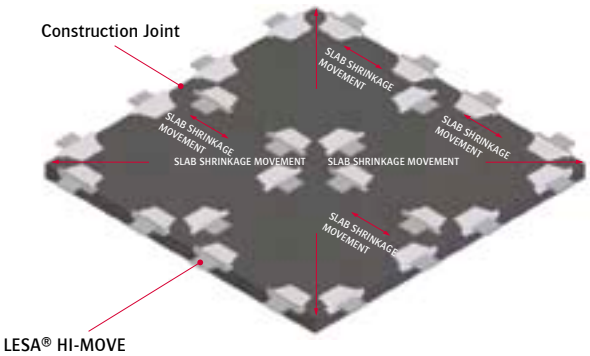


Plate Dowels Provide Lateral Movement and Load Transfer Performance

LESA DOMINATOR SQUARE DOWEL SYSTEM

Lesa Dominator Square Dowel System

The Lesa Dominator Square Dowel System has an extensive history throughout Australasia and consists of two parts. The first being a high quality, high density plastic square dowel sleeve. The second being a high quality plastic reusable nail on base plate.

The Dominator Square Dowel System enables square dowels to be cast into new slabs without having to penetrate formwork, thus eliminating damage to the forms. This design also increases the accuracy of the dowel alignment.

This is achieved by the sleeve generating a precise void in the concrete into which the dowel can be inserted at the optimum time of construction. The square sleeve can also be used in Dowel Ladders, Dowel Baskets or between existing to new slabs.

The Lesa Dominator Square Sleeves are designed to allow lateral movement of the dowel joint as the concrete cures and shrinkage occurs. The sleeve is designed with an additional 5mm void which provides lateral movement.

The construction of the sleeve is such that it ensures once the dowel is inserted into the sleeve an effective seal is formed around the dowel to prevent concrete slurry penetrating into the 5mm void, and reducing lateral movement capacity.

Note: This is an important issue that is often over looked when onsite fabrication of dowel sleeves using over sized conduit is used or with sleeves without seals.

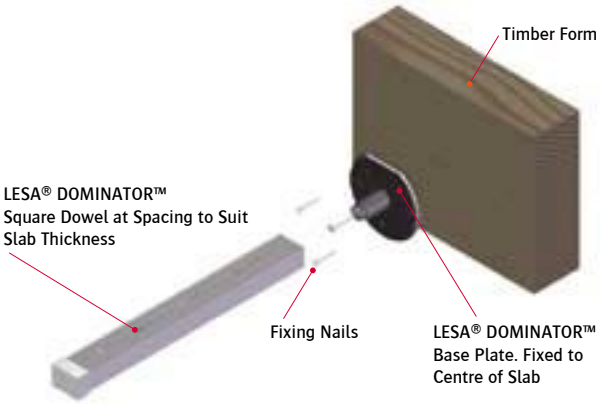
The Dominator Square Sleeves are available in standard lengths 225 and 300mm to suit the following sizes:

- 16mm
- 20mm
- 25mm

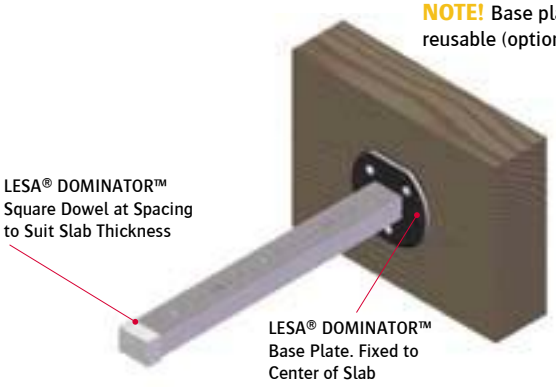
Special lengths can also be made to order.
Dowels are supplied in black steel, stainless steel or hot dip galvanised to suit sleeve lengths.

LESA DOMINATOR SQUARE DOWEL - INSTALLATION INSTRUCTIONS

INSTALLATION STEPS



NOTE! Base plates are reusable (optional)

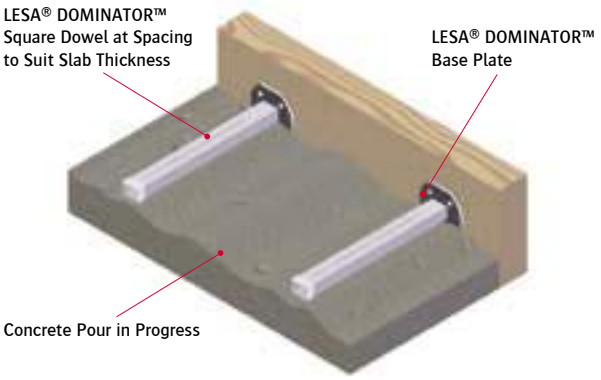


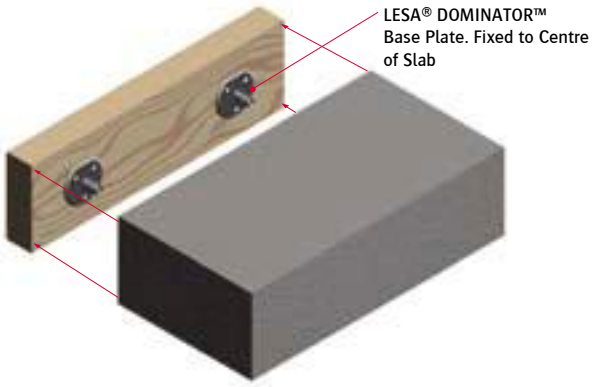
▶ STEP 1

Mark the form for slab centre and Dominator sleeve spacing. Using 3 suitable nails or screws fix the Dominator Base Plate to the form.

▶ STEP 2

Set the form to line and level as normal. Slide the sleeve on to the base ensuring that it is flush with the base plate. Dowel support maybe required to ensure the sleeve is not dislodged during concrete placement.



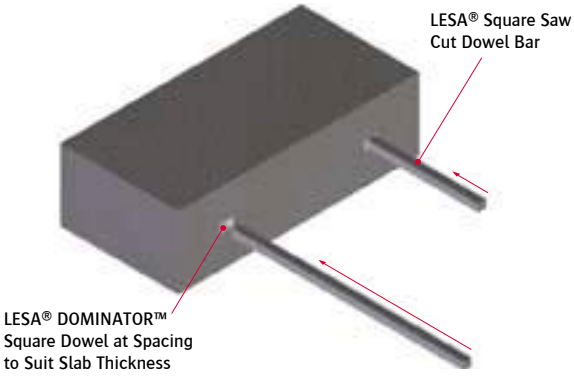


▶ STEP 3

Place and finish the concrete. Edge of slab must be vibrated to consolidate concrete around the Dominator Square Dowel. (Care must be taken to ensure the sleeve is not dislodged).

▶ STEP 4

Strip the form. This is best accomplished by starting at one end and working along the form. Forms with base plates attached should be cleaned and stored for reuse.



▶ STEP 5

Insert the burr free end of the dowel bar in to the Dominator Square Sleeve. Second concrete pour can now proceed.

LESA DOMINATOR ROUND DOWEL SYSTEM

Lesa Dominator Round Dowel System

The Lesa Dominator Round Dowel System has an extensive history throughout Australasia and consists of two parts. The first being a high quality, high density plastic round dowel sleeve. The second being a high quality plastic reusable nail on base plate.

The Dominator Round Dowel System enables round dowels to be cast into new slabs without having to penetrate formwork, thus eliminating damage to the forms. This design also increases the accuracy of the dowel alignment, a critical detail when using round dowel bars. The sleeve eliminates the need to grease or tape round dowel bars and limits compression. The built in internal end cap will stop any ingress of grout while allowing for any slab expansion so additional expansion caps are not required.

This is achieved by the sleeve generating a precise void in the concrete into which the round dowel can be inserted at the optimum time of construction. The round sleeve can also be used in Dowel Ladders, Dowels Baskets or anywhere a round dowel is specified.

Dominator Round Dowels are quick and easy to install with the Lesa reusable nail on base plate and can also be used on existing dowels if required.

Note: Round Dowels do not allow lateral movement. If in doubt, contact your local Lesa representative for confirmation on the appropriate system for use.

Sleeves are available in standard lengths 225 and 300mm to suit the following diameters:

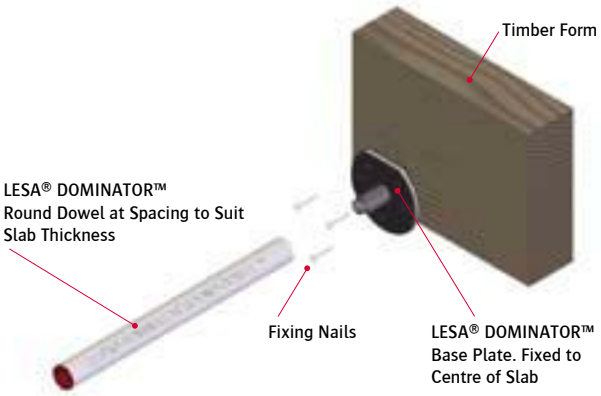
- 16mm
- 20mm
- 24mm
- 25mm

Special lengths can be made to order.

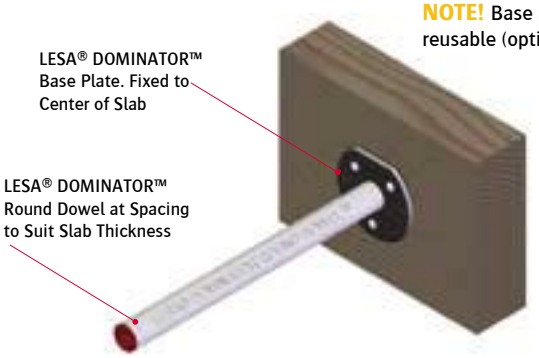
Dowels are supplied in black steel, stainless steel or hot dip galvanised to suit sleeve lengths.

LESA DOMINATOR ROUND DOWEL - INSTALLATION INSTRUCTIONS

INSTALLATION STEPS



NOTE! Base plates are reusable (optional)

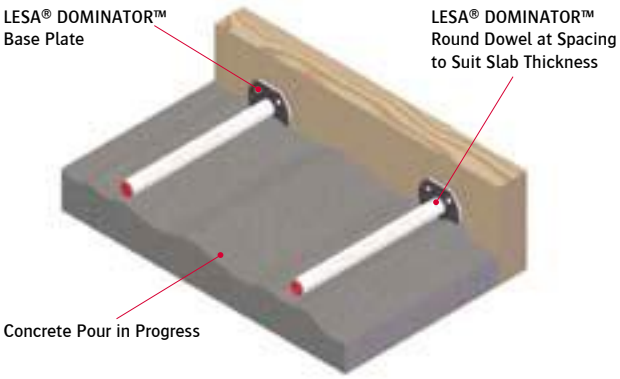


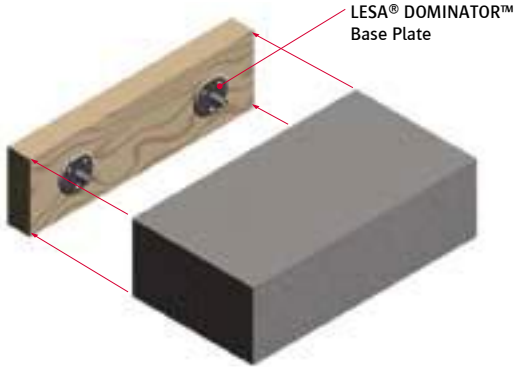
▶ STEP 1

Mark the form for slab centre and Dominator sleeve spacing. Using 3 suitable nails or screws fix the Dominator Sleeve Base Plate to the form.

▶ STEP 2

Set the form to line and level as normal. Slide the Dominator sleeve on to the base ensuring that it is flush with the base plate. Dowel support maybe required to ensure the sleeve is not dislodged during placement.



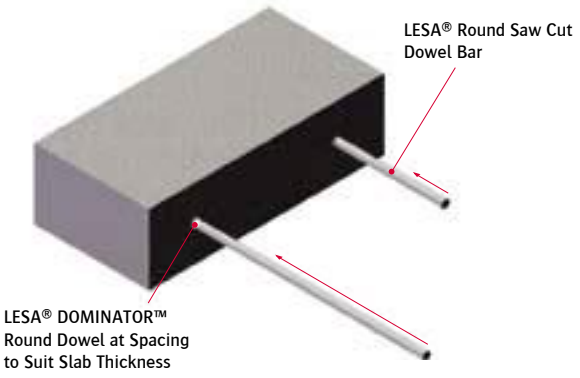


▶ STEP 3

Place and finish the concrete. Edge of slab must be vibrated to consolidate concrete around the Dominator Sleeve. (Care must be taken to ensure the sleeve is not dislodged).

▶ STEP 4

Strip the form. This is best accomplished by starting at one end and working along the form. Forms with base plates attached should be cleaned and stored for reuse.



▶ STEP 5

Insert the burr free end of the dowel bar in to the Dominator Sleeve. Second Concrete pour can now proceed.

LESA HI-MOVE METAL DOWEL SYSTEM

Lesa Hi-Move Metal Dowel System

The Lesa Hi-Move Metal Box Dowel System uses square dowel technology to transfer loads in wide joints. These are typically in Shrinkage Compensating Concrete, Stressed Slabs and highly loaded slabs.

Hi-Move Metal Dowels consist of two parts. The first being a high quality, fabricated nail on rectangular sheet metal sleeve to suit the dowel size and required lateral movement. The second being a burr free square dowel bar.

The Hi-Move Metal Dowel System enables this unique sleeve to be cast into new slabs without having to penetrate formwork, thus eliminating damage to the forms. This enables rapid installation and ensures accurate dowel alignment.

This is achieved by the sleeve generating a precise void in the concrete into which the dowel bar can be inserted at the optimum time of construction. Lesa can fabricate any length and width combination to suit project specifics.

The construction of the sleeve is such that it ensures once the dowel plate is inserted into the sleeve an effective seal is formed around the dowel to prevent concrete slurry from entering the sleeve, thus allowing lateral movement and freedom of movement as the concrete shrinks and cures.

Note: Where a high move sleeve is required for existing to new slabs, use the Lesa Hi-Move clip.
Hi-Move Dowels are available in black steel, stainless steel or hot dip galvanised.

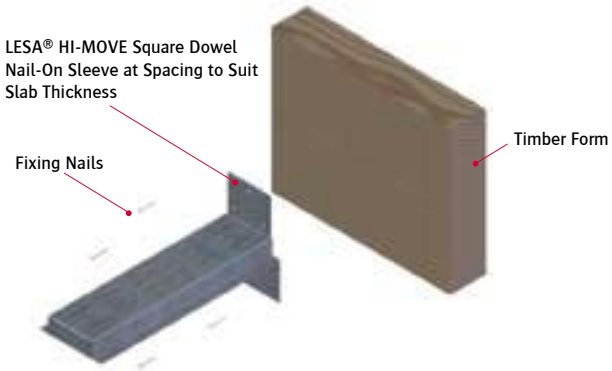
Standard Square Sizes Available:

- 12mm
- 16mm
- 20mm
- 25mm
- 32mm
- 40mm

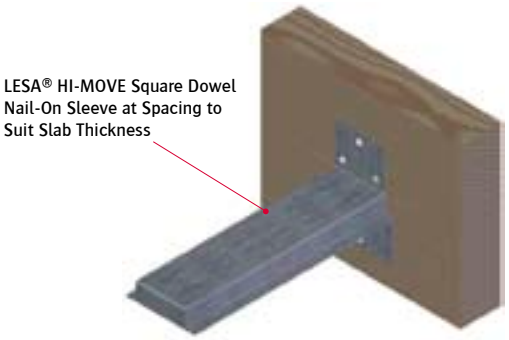
For spacing of Hi-Move Metal Dowels please refer to Lesa's dowel charts.

LESA HI-MOVE METAL DOWEL SYSTEM - INSTALLATION INSTRUCTIONS

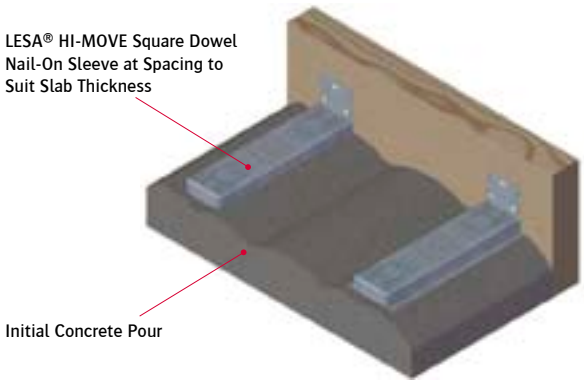
INSTALLATION STEPS



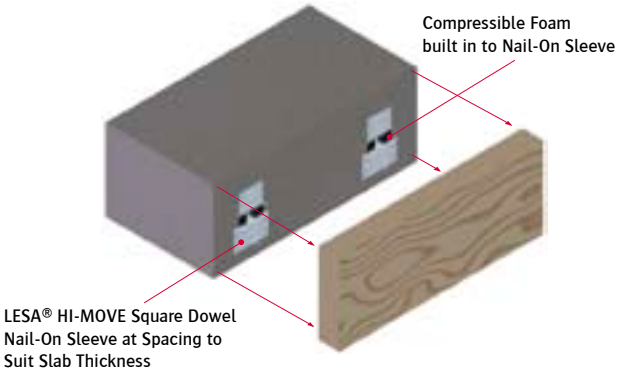
▶ STEP 1
Mark the form for slab centre and Nail-On Sleeve spacing. Using 4 suitable nails or screws fix the Hi-Move Square Dowel - Sleeve to the form.



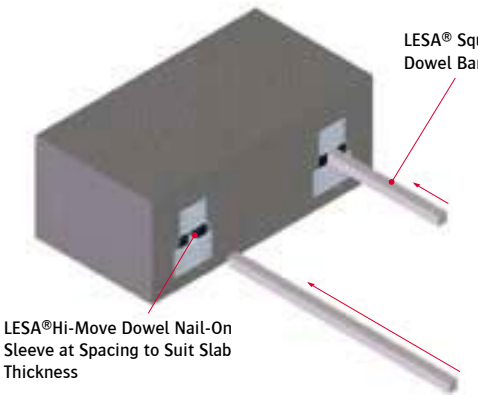
▶ STEP 2
Set the form to line and level as normal.



▶ STEP 3
Place and finish the concrete. Edge of slab must be vibrated to consolidate concrete around the Hi-Move Square Dowel.



▶ STEP 4
Strip the form. This is best accomplished by starting at one end and working along the form. Forms should be cleaned and stored for reuse.



▶ STEP 5
Insert the burr free end of the dowel bar in to the Nail-On Sleeve. Second concrete pour can now proceed.

LESA DIAMOND DOWEL SYSTEM

Lesa Diamond Dowel System

The Diamond Dowel System uses plate dowel technology to replace traditional dowels in concrete slabs where final joint widths will not exceed 15mm. Diamond Dowels consist of two parts. The first being a high quality, high density one piece plastic nail on sleeve. The second being a 6mm tapered steel plate.

The Diamond Dowel System enables this unique sleeve to be cast into new slabs without having to penetrate formwork, thus eliminating damage to the forms. The built in ring necked nails make installation very quick and easy and also ensure accurate dowel alignment.

This is achieved by the sleeve generating a precise void in the concrete into which the tapered dowel plate can be inserted at the optimum time of construction. The tapered sleeve allows progressive lateral movement as the concrete shrinks and cures.

The construction of the sleeve is such that it ensures once the dowel plate is inserted into the sleeve an effective seal is formed around the dowel to prevent concrete slurry from entering the sleeve.

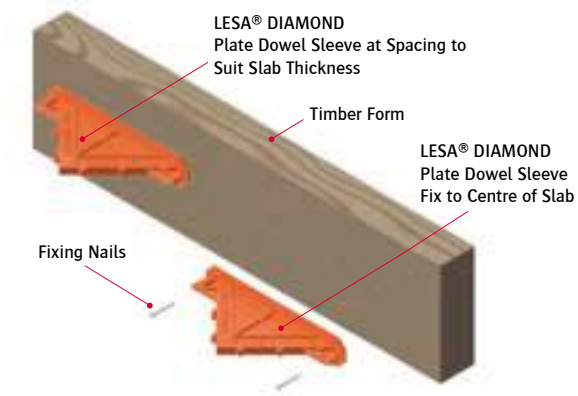
Note: Where joint widths are expected to be greater than 15mm, use Lesa's Dominator Plate Dowel System.

Diamond Dowels are available in black steel, stainless steel or hot dip galvanised.
For spacing and suitability of Diamond Dowels please refer to Lesa's dowel charts.

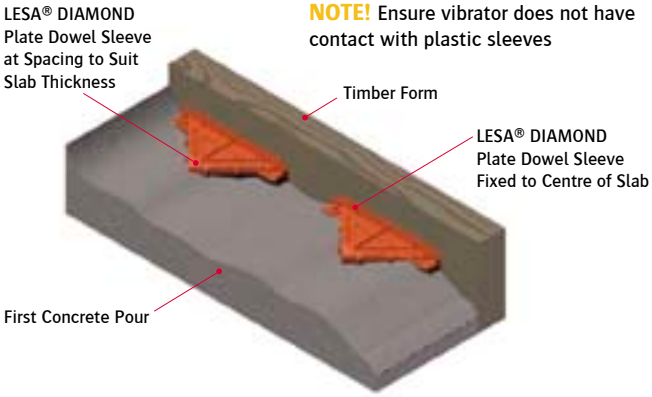
Note: Lesa Diamond Dowels are not available in all countries and equivalent dowels may be substituted.

LESA DIAMOND DOWEL - INSTALLATION INSTRUCTIONS

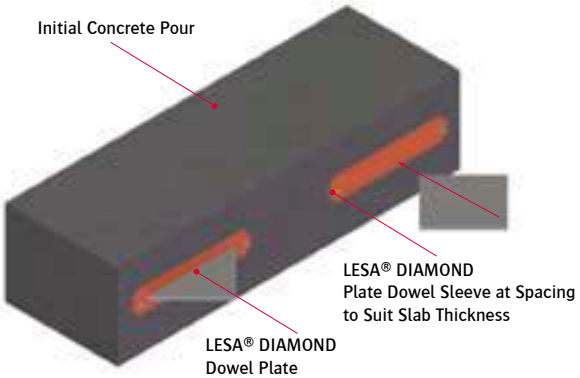
INSTALLATION STEPS



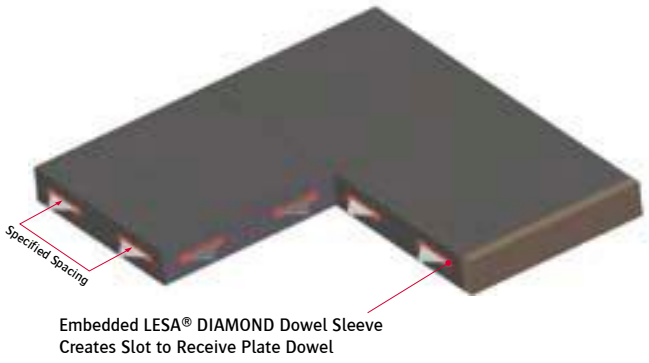
▶ STEP 1
Mark the form for slab centre and Diamond Dowel sleeve spacing. Nail the sleeves to the form using the nails supplied in the sleeves.



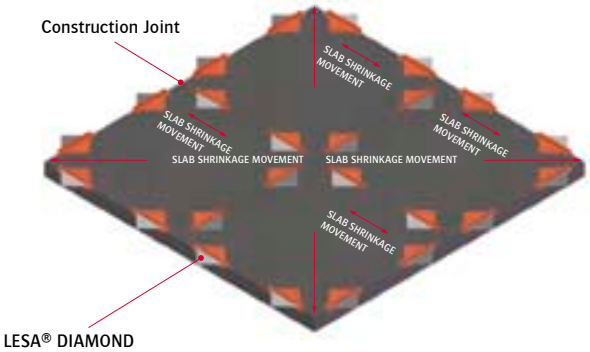
▶ STEP 2
Set the form to line and level as normal and finish concrete. Edge of slab must be vibrated to consolidate concrete around the Diamond Dowel sleeve.



▶ STEP 3
Strip the form. Forms should be cleaned and stored for reuse. Insert the DIAMOND Plate Dowel when required prior to concrete pour.



▶ STEP 4
Pours proceed after plate installation.



LESA DOWEL CRADLE / BASKET SYSTEMS

Lesa Dowel Cradle / Basket Systems

The Lesa Dowel Cradle / Basket System is a high quality welded pre-fabricated dowel support assembly for use beneath sawn joints. The system is designed to ensure that dowels are pre-set to height in a self-supporting frame and that the dowels are perfectly aligned and at the correct centre spacing, thus avoiding the potential for slab lock up.

The advantage of Lesa's Dowel Cradle / Basket System is that it takes the guess work out of dowel alignment and offers rapid placement. Lesa Dowel Cradles / Baskets have been used throughout Australasia for many years due to their simplicity, ease of use and affordability.

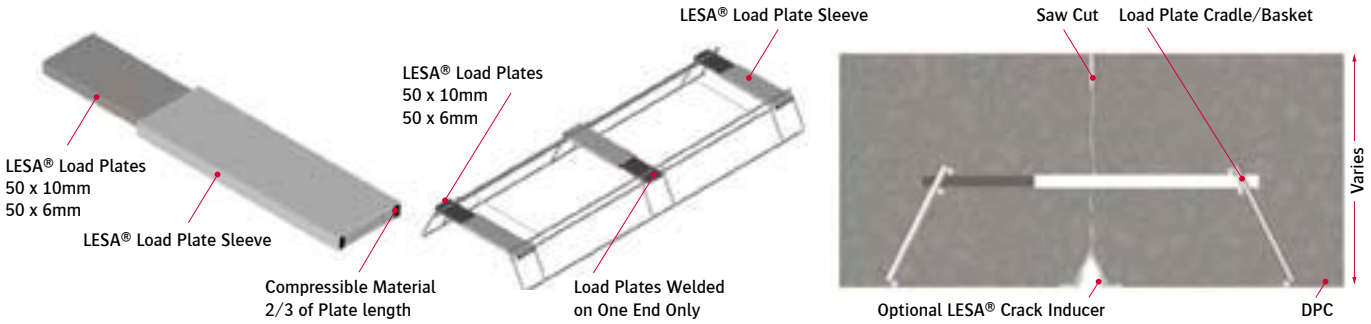
All Lesa Dowel Cradles / Baskets are supplied to site fully assembled in standard three metre lengths and are ready to install. All dowels are supplied with sleeves which are designed to ensure effective dowel movement and maximise dowel efficiencies. Lesa Dowel Cradles / Baskets are the preferred system by engineer's and contractors around the world.

Lesa Dowel Cradles / Baskets can be placed as the pour proceeds or laid out prior to the pour. Dowel Cradles / Baskets are available with Lesa Roundowels, Dominator Square Dowels or Load Plates, all in standard diameters and lengths and at centre spacings to suit the slab thickness.

Dowels are supplied in black steel, stainless steel or hot dip galvanised with special lengths and sizes available to order.

Note: When using Dowels in two directions ensure dowel sleeves with a lateral movement capability are specified. All Lesa Cradles / Baskets are fabricated with a temporary transit tie which requires cutting once in place. If in doubt, contact your local Lesa representative for confirmation on the appropriate system for use.

INSTALLATION STEPS



LESA® LOAD PLATE CRADLES AND BASKETS

All LESA® dowel baskets (cradles) or ladders (tracks) support systems available with plates, square or round dowels. A full range available for all slab thicknesses. (See Lesa dowel chart). Square dowels in sizes 16mm, 20mm and 25mm. Round dowels sizes from 12mm to 40mm. Optional LESA® crack inducers available Galvanised dowels available.

LESA SQUARE AND ROUND DOWEL LADDER / TRACK SYSTEMS

Lesa Dowel Ladder / Track Systems

The Lesa Dowel Ladder / Track System is a high quality welded pre-fabricated dowel support assembly. The system is designed to ensure that dowels are perfectly aligned beneath sawn joints. This system ensures that the dowels are perfectly aligned and at the correct centre spacing, thus avoiding the potential for slab lock up.

The advantage of Lesa's Dowel Ladder / Track System is that it takes the guess work out of dowel alignment and offers rapid placement. Lesa Dowel Ladders / Tracks have been used throughout Australasia for many years due to their simplicity, ease of use and affordability.

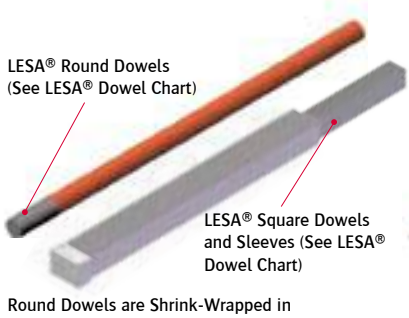
All Lesa Dowel Ladders / Tracks are supplied to site fully assembled in standard three metre lengths and are ready to install. All dowels are supplied with sleeves which are designed to ensure effective dowel movement and maximise dowel efficiencies. Lesa Dowel Ladders / Tracks are supported on standard reinforcing supports which can be supplied as separate components, or are readily available from your preferred supplier.

Lesa Dowel Ladders can be placed as the pour proceeds or laid out prior to the pour and chaired up as required. Dowel Ladders / Tracks are available with Lesa Roundowels, Dominator Square or Load Plates, all in standard diameters and lengths and at centre spacings to suit the slab thickness.

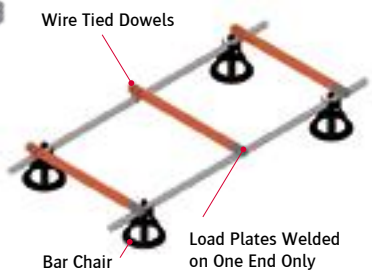
Dowels are supplied in black steel, stainless steel or hot dip galvanised with special lengths and sizes available to order.

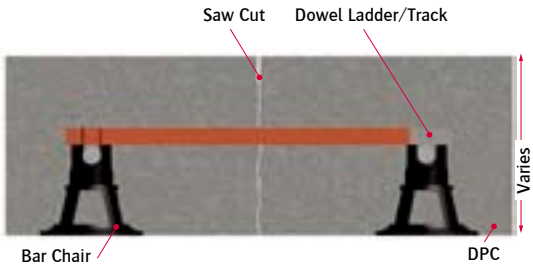
Note: When using Dowels in two directions ensure dowel sleeves with a lateral movement capability are supplied. If in doubt, contact your local Lesa representative for confirmation on the appropriate system for use.

INSTALLATION STEPS



Round Dowels are Shrink-Wrapped in Polythene Plastic for Easy Slippage and Convenient Handling On Site





LESA® SQUARE AND ROUND DOWELS LADDERS / TRACKS

All LESA® dowel baskets (cradles) or ladders (tracks) support systems available with plates, square or round dowels. A full range available for all slab thicknesses. (See Lesa dowel chart). Square dowels in sizes 16mm, 20mm and 25mm. Round dowels sizes from 12mm to 40mm. Optional LESA® crack inducers available, Galvanised dowels available.

ANCON SHEAR LOAD CONNECTOR

Ancon Shear Load Connectors

Ancon Shear Load Connectors are a twin stainless steel dowel system for a wide range of applications. Each connector is a two part assembly comprising a nail on sleeve and a dowel component.

Shear Load Connectors allow the sleeve to be cast into new concrete slabs without having to penetrate formwork, thus eliminating damage to the forms. This system allows a quick and easy installation and also ensures accurate dowel alignment.

DSD Shear Load Connectors allow the dowel to move longitudinally within the sleeve and are available in ten standard sizes to transfer loads from 20kN to over 450kN.
DSD/Q Shear Load Connectors use the same dowel component as the DSD, but use a cylindrical sleeve contained within a rectangular box which allows lateral movement. Nine standard sizes are available in DSD/Q to transfer loads from 30kN to over 450kN.

All Shear Load Connectors are manufactured from stainless steel to ensure high degree of corrosion resistance with no requirement for additional protection. To complement this DSD/Q and ESD/Q connectors can be supplied with 90 minute fire protection.

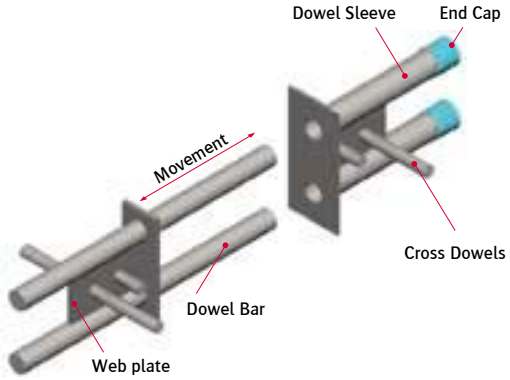
Note: Talk to Lesa's Technical Department for special dowels and solutions using DSD and DSD/Q.

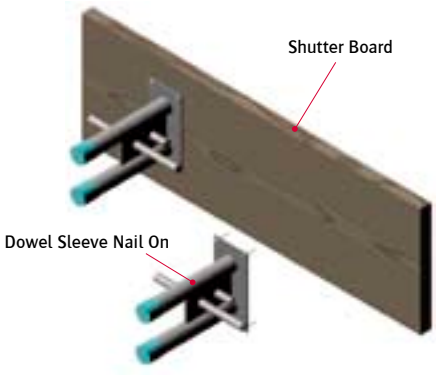
Servicability Loads (kN) for Various Design Joint Widths 30MPa Concrete

Ref DSD DSDQ	0mm	10mm	20mm	30mm	40mm	50mm	60mm
25	25.5	21.6	19.2	17.5	16.8		
30	39.2	36.2	33.7	31.5	24.8		
50	46.8	43.4	40.5	38	34.7	28.5	
65	61.4	57.6	54.3	51.3	46.9	38.7	
75	74.9	70.6	66.8	63.4	60.4	50.9	
100	126.6	120.8	115.5	110.6	106.2	92.7	80.5
130	158.7	151.8	145.5	139.7	134.3	129.4	123.6
150	211.5	203.3	195.7	188.7	184.1	176	170.2
400	319	308.7	299.1	290.1	275.2	249.7	226.5
450	453.3	440.2	427.9	416.2	405.1	394.6	384.6

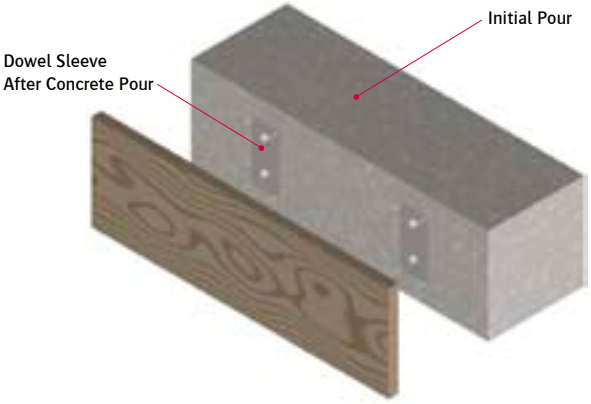
SHEAR LOAD CONNECTOR - INSTALLATION INSTRUCTIONS

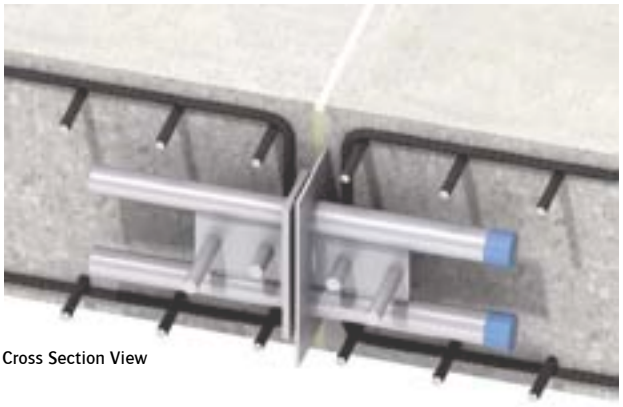
INSTALLATION STEPS



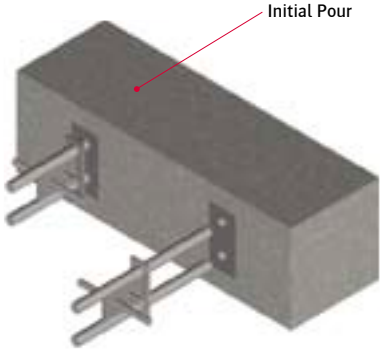


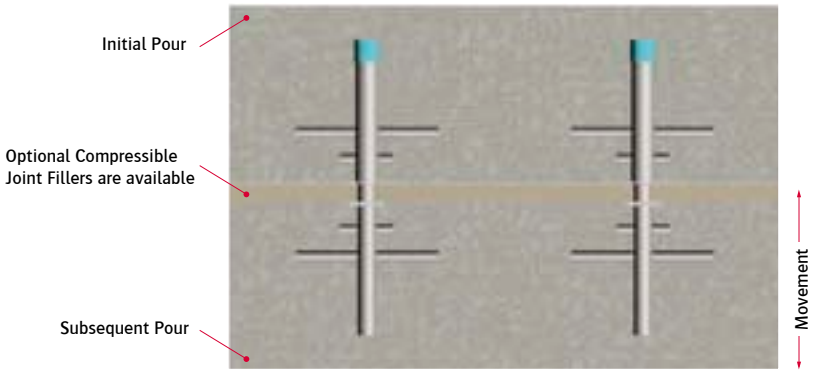
▶ STEP 1
Nail the sleeve component to the shuttering ensuring that the sleeve is correctly orientated for the direction of the load.




Cross Section View

▶ STEP 2
When the concrete has achieved sufficient strength, strip the shuttering. Peel off or puncture the label to reveal the holes for the dowels.





▶ STEP 3
Push the dowel component in to the dowel sleeve until it is fully located in the sleeve component.

LESA

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