Leviat
A CRH COMPANY

CI/SfB	(29)	Et6	
	April 2023		

HLD/Q
Design Program
available

Ancon®

HLD and ESD Shear Load Connectors

for the Construction Industry

Leviat
A CRH COMPANY

We are one team.
We are Leviat.

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

Under the Leviat brand, we have united 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

HALFEN

HELIFIX

ISEDIO

PLAKA

60 locations

sales in **30+** locations

3000 people worldwide

Shear Load Connectors

Efficiently transfer shear load across movement joints in concrete

Reinforced concrete is an important construction material. It offers strength, durability and can be formed into a variety of shapes. Concrete structures are designed with expansion and contraction joints at appropriate places to allow movement to take place. The design of the joint is important for the overall design to function correctly.

Ancon shear load connectors offer significant advantages over plain dowels. These connectors are more effective at transferring load and allowing movement to take place, easier to fix on site and can prove a more cost-effective solution.

Each connector is a two-part assembly comprising a sleeve and a dowel component. Installation is a fast and accurate process, drilling of either formwork or concrete is not required. The sleeve is simply nailed to the formwork ensuring subsequent alignment with the dowel, essential for effective movement.

They are manufactured from stainless steel to ensure a high degree of corrosion resistance with no requirement for additional protection.

In most cases, dowelled or keyed joints can be replaced by joints incorporating Ancon shear load connectors. They can be used for movement joints in floor slabs, suspended slabs, and for replacing double columns and beams at structural movement joints.

Applications in civil engineering include joints in bridge parapets, bridge abutments and diaphragm wall construction.

Contents

Dowelled Joints 4

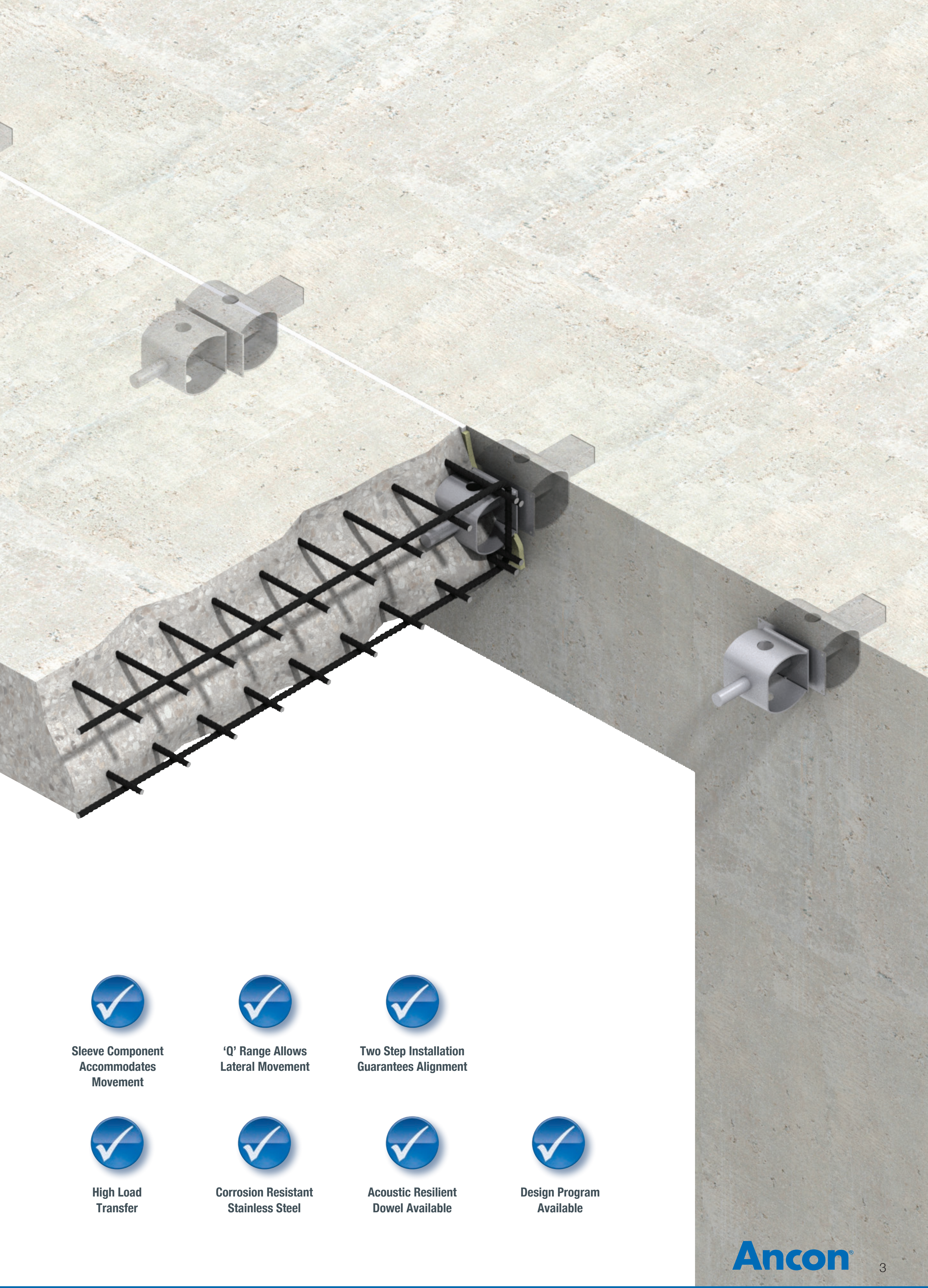
Ancon Solutions to Joints 5

Ancon HLD and HLDQ Shear Load Connector 6-9

Ancon ESD, ESDQ, ED and Staisil HLD Shear Load Connector 10-13

Installation Procedure 14

Other Ancon Products 15



Sleeve Component Accommodates Movement

'Q' Range Allows Lateral Movement

Two Step Installation Guarantees Alignment

High Load Transfer

Corrosion Resistant Stainless Steel

Acoustic Resilient Dowel Available

Design Program Available

Shear Load Connectors

Dowelled Joints

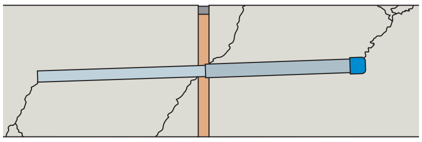
Dowels are used to transfer shear across construction and movement joints in concrete. They are often either cast or drilled into the concrete. A single row of short thick dowels provides reasonable shear transfer but suffers from deformation. This can lead to stress concentrations, resulting in subsequent spalling of the concrete.

Where dowels are used across expansion and contraction joints, half the length of the bar is debonded to allow movement to take place.

Dowelled joints either require formwork to be drilled for the dowels to pass through, or concrete to be drilled for dowels to be resin fixed in one side.

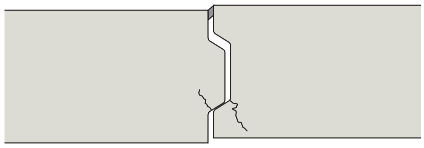
At movement joints, dowels will need to be accurately aligned in both directions to ensure movement can actually take place, otherwise cracking is likely to occur.

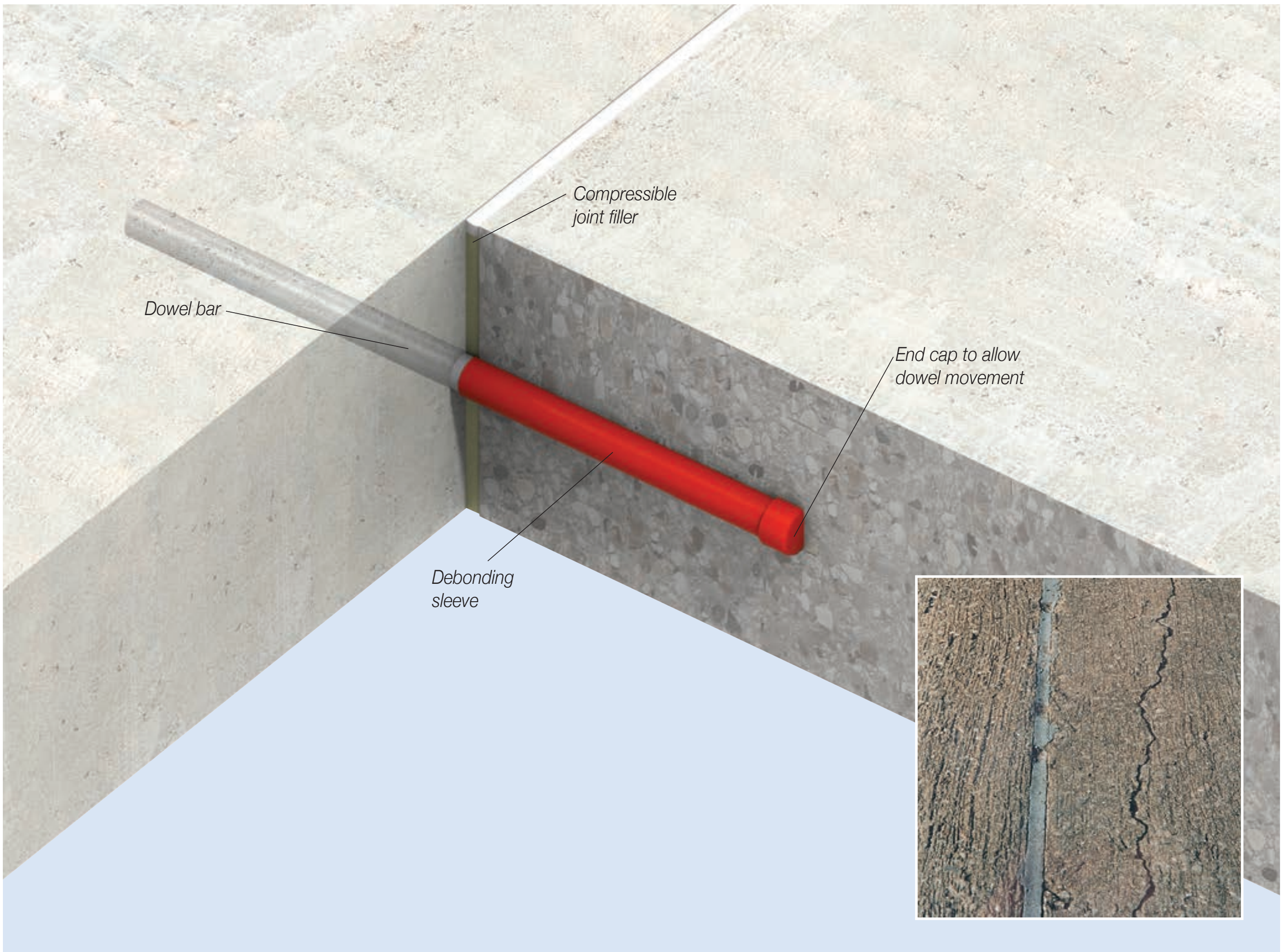
Plain dowels are not very effective when used across joints wider than 10mm.



Keyed Joints

Keyed joints require complicated formwork to create the tongue and groove. If the joint is not formed correctly, differential movement can take place. Load is transferred through the locally reduced section of the joint which can at times result in cracking.



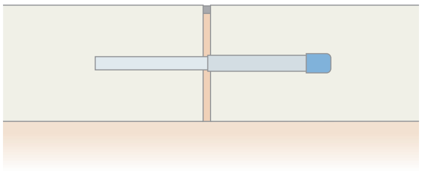


Misaligned dowels can result in cracking away from the expansion joint

The two-part assembly of Ancon connectors ensures dowel alignment

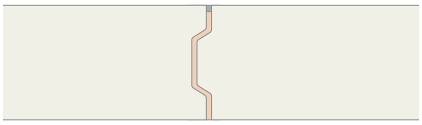
Conventional Joints

Floor Slab



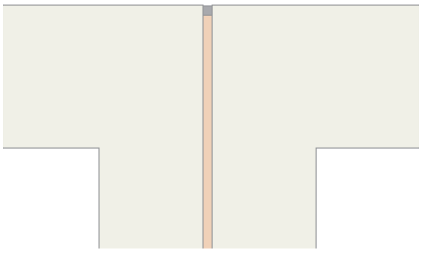
Dowel Bar

Wall



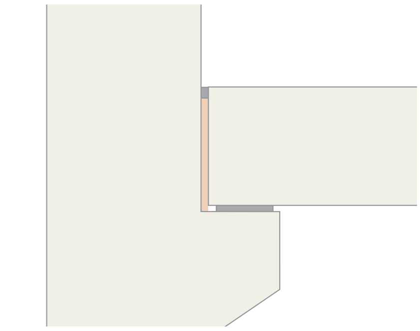
Keyed Joint

Structural Movement Joint



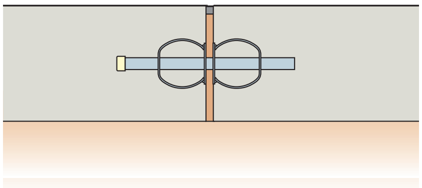
Double Columns

Floor to Wall Connection

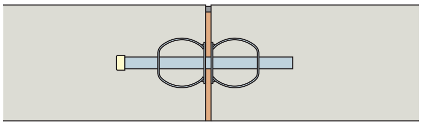


Corbel Support

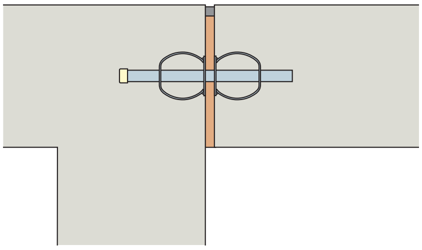
Ancon Solutions



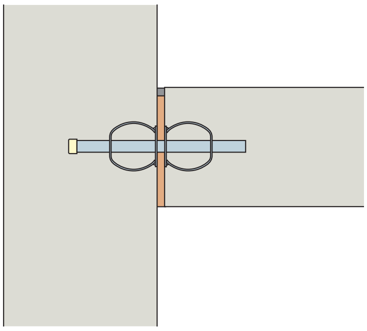
Ancon HLD



Ancon HLD



Ancon HLD



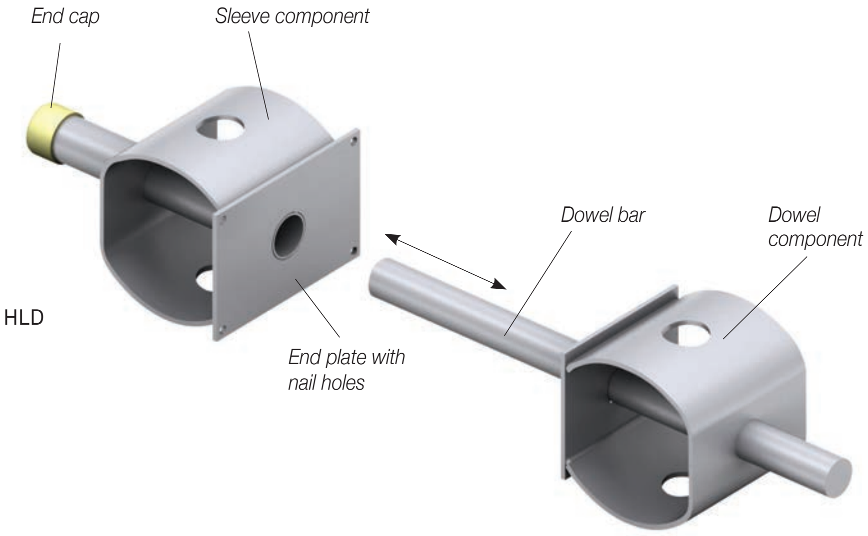
Ancon HLD

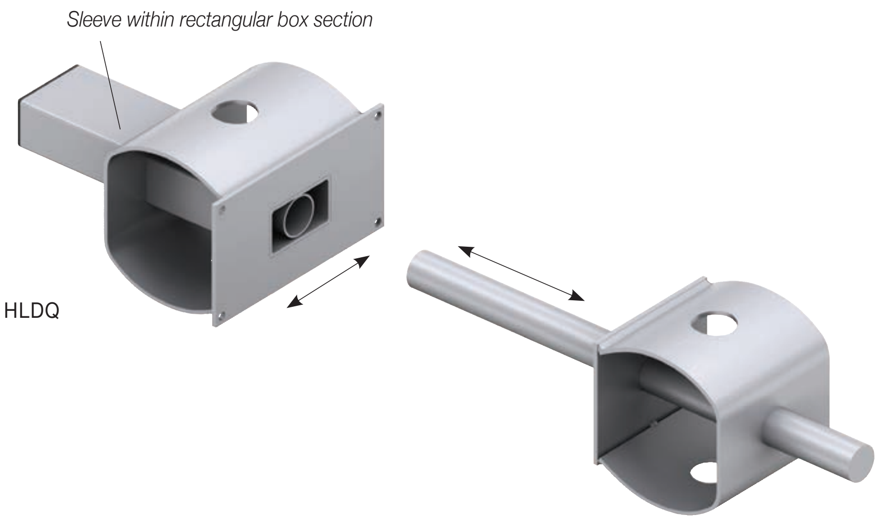
Ancon Solutions to Joints

In most cases dowelled or keyed joints can be replaced by joints incorporating Ancon shear load connectors. These connectors are more effective at transferring load and allowing movement to take place, easier to fix on site and can prove a more cost-effective solution.

Ancon connectors can be used for movement joints in floor slabs, suspended slabs, and for replacing double columns and beams at structural movement joints. Applications in civil engineering include joints in bridge parapets, bridge abutments and diaphragm wall construction.

Shear Load Connectors





Ancon HLD/Q Connectors

The Ancon HLD range of shear load connectors provides solutions for a wide range of applications, loads, slab depths and joint thicknesses.

Each connector is a two-part assembly comprising a sleeve and a dowel component. The sleeve is nailed to the formwork ensuring subsequent alignment with the dowel. This alignment is essential for effective movement. The complete installation procedure is shown on page 14.

Ancon shear load connectors are manufactured from stainless steel to ensure a high degree of corrosion resistance with no requirement for additional protection.

Ancon HLD

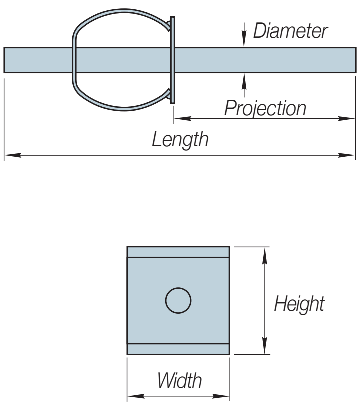
The Ancon HLD is a two-part, high load, shear connector. The dowel component moves longitudinally within the sleeve to accommodate movement. The connector is available in seven sizes with design capacities from 24kN to over 500kN. The load tables on page 8 include slab depths from 160mm to 600mm and joints up to 60mm wide. The dowel bar is Duplex stainless steel and all other components are manufactured from grade 1.4301 (304) stainless steel.

Ancon HLDQ

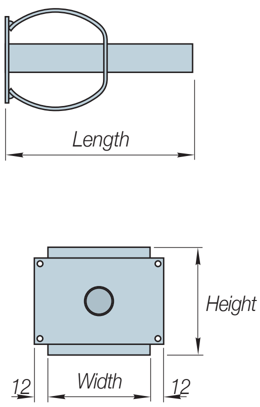
The Ancon HLDQ, high load shear connector uses the same dowel component as the Ancon HLD, but the cylindrical sleeve is contained within a rectangular box section. This sleeve allows lateral movement or rotation in addition to longitudinal movement. Available sizes, performance data and material specifications are the same as the HLD.

Dimensions

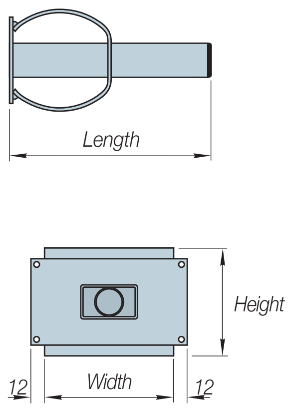
Dowel



HLD Sleeve



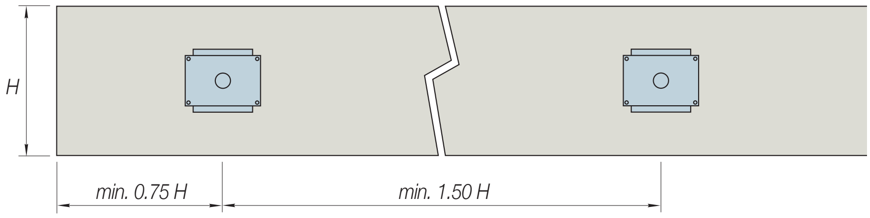
HLDQ Sleeve



	Dowel (mm)					HLD Sleeve (mm)			HLDQ Sleeve (mm)			
HLD/Q	Length	Diameter	Projection	Height	Width	Length	Height	Width	Length	Height	Width	Lateral Movement
18	270	18	150	75	70	155	75	70	170	75	100	25
22	310	22	160	95	90	165	95	90	175	95	114	21
24	330	24	170	110	100	175	110	100	180	110	122	23
30	365	30	185	140	115	190	140	115	210	140	161	41
35	420	35	210	160	132	215	160	132	235	160	172	33
42	470	42	230	180	175	245	180	175	245	180	203	47
52	570	52	280	220	210	295	220	210	295	220	244	39

Edge Distance and Spacing

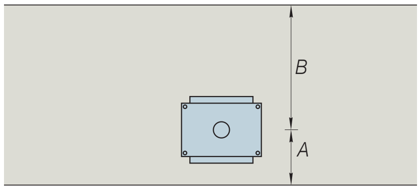
The minimum edge distance and spacing of all Ancon shear load connectors is determined by the depth of slab and is illustrated in the adjacent drawing. It is possible to reduce the spacing further with the absolute minimum being 1.5 H_{min} (where H_{min} is the minimum slab depth for each connector type), however the design resistances are then limited to those given for H_{min} only.



Position of connectors in slab

The tables on page 8 are based on the shear connector being located centrally in the slab edge. If the shear connector is offset from the centreline, the minimum distance between the connector centre and the slab face should be considered as H/2.

Product Reference	Minimum Slab Depth H_{min}	Minimum Slab Depth A
HLD/HLDQ 18	160mm	80mm
HLD/HLDQ 22	200mm	100mm
HLD/HLDQ 24	220mm	110mm
HLD/HLDQ 30	240mm	120mm
HLD/HLDQ 35	300mm	150mm
HLD/HLDQ 42	350mm	175mm
HLD/HLDQ 52	600mm	300mm

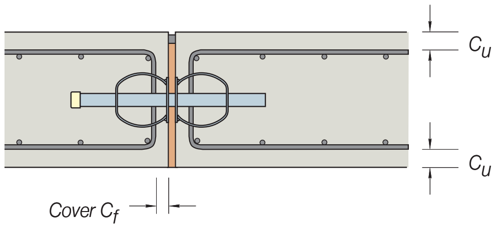


A < B
Slab thickness to be considered in selecting the connector is 2 x A. Minimum values are shown in the adjacent table.

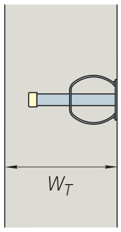
Cover

Minimum cover C_u to local reinforcement is to the recommendations of BS EN 1992. Maximum cover C_f to face of slab is as shown below:

Ref HLD/HLDQ	Max Cover to Face C_f (mm)
18	45
22	50
24	50
30	50
35	50
42	50
52	50



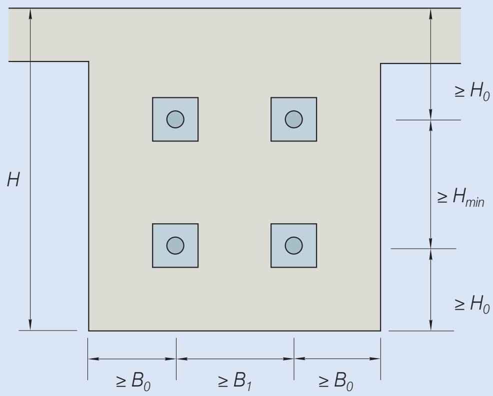
Minimum Wall Thickness



Ref HLD/HLDQ	Minimum Wall Thickness W_T HLD	HLDQ
18	205mm	220mm
22	215mm	225mm
24	225mm	230mm
30	240mm	260mm
35	265mm	265mm
42	295mm	295mm
52	345mm	345mm

Guidance on Specifying HLD at Beam Connections

The diagram and table show the minimum vertical and horizontal dowel spacings. For further guidance, and local reinforcement requirements, please contact Ancon.



Minimum Dowel Centres (mm)

HLD Type	H_{min}	H_0	B_0	B_1
HLD18	160	135	177	306
HLD22	180	155	200	335
HLD24	200	165	205	345
HLD30	240	200	250	415
HLD35	300	230	273	484
HLD42	350	260	312	536
HLD52	400	285	340	590

Shear Load Connectors

Performance Data

The tables below show the V_{Rd} values for the HLD and HLDQ connectors in concrete grades C25/30 and C30/37. These are design resistances and have been derived from ultimate values. Appropriate partial safety factors (γ_G and γ_Q) will need to be applied to the characteristic dead and imposed loads, as illustrated by the design example on the right.

Design Example

Slab thickness	= 240mm	
Joint width	= 20mm	
Concrete strength	= C25/30	
Characteristic dead load	= 50kN/m	γ_G = 1.35*
Characteristic imposed load	= 60kN/m	γ_Q = 1.5*
Design load	= (50 x 1.35) + (60 x 1.5) = 157.5kN/m	

V_{Rd} (design resistance)	Maximum centres
HLD22 = 98kN	622mm
HLD24 = 118kN	749mm
HLD30 = 151kN	959mm

Any of the three options would be acceptable although using HLD30s at 900mm centres would minimise the number of connectors to be installed.

**The partial safety factors of 1.35 (γ_G) and 1.5 (γ_Q) are those recommended in EN 1990 Eurocode: Basis for structural design. For designs to Eurocode 2, please refer to the national annex for the factors to be used in the country concerned. For designs to BS8110, γ_G=1.4 and γ_Q = 1.6. Other national standards may require different partial safety factors.*

Slab Thickness (mm)	Product Reference	V_{Rd} Design Resistances (kN) for Various Joint Widths (mm) and Slab Thickness (mm) using C25/30 Concrete 10	20	30	40	50	60
160*	HLD/HLDQ 18	42	38	35	35	28	24
180		53	49	44	35	28	24
200		56	52	46	35	28	24
220		60	55	46	35	28	24
200*	HLD/HLDQ 22	90	84	77	63	51	43
220		97	91	81	63	51	43
240		104	98	81	63	51	43
260		112	99	81	63	51	43
280		115	99	81	63	51	43
220*	HLD/HLDQ 24	105	100	94	82	66	56
240		124	118	101	82	66	56
260		133	118	101	82	66	56
280		134	118	101	82	66	56
300		134	118	101	82	66	56
240*	HLD/HLDQ 30	151	151	145	134	111	94
260		163	163	161	136	111	94
280		177	177	161	136	111	94
300		190	183	161	136	111	94
350		203	183	161	136	111	94
400		203	183	161	136	111	94
300*	HLD/HLDQ 35	254	254	234	204	171	144
350		285	260	234	204	171	144
400		285	260	234	204	171	144
600		285	260	234	204	171	144
350*	HLD/HLDQ 42	329	328	300	266	232	199
400		368	334	300	266	232	199
600		368	334	300	266	232	199
600*	HLD/HLDQ 52	514	484	453	421	389	357

** Refers to the min slab depth H_{min} for each connector type.*

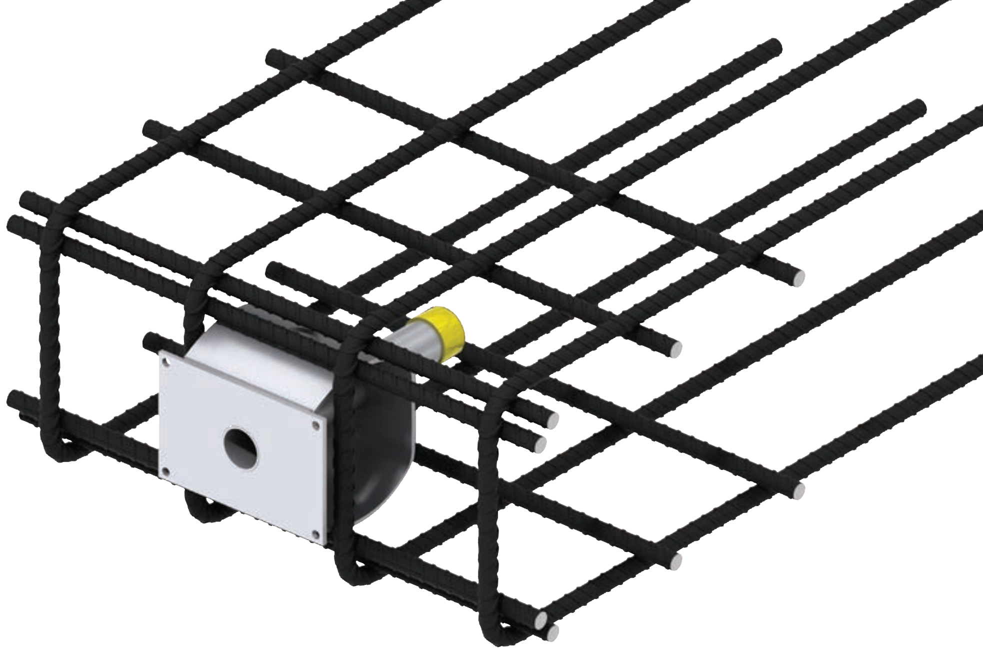
Slab Thickness (mm)	Product Reference	V_{Rd} Design Resistances (kN) for Various Joint Widths (mm) and Slab Thickness (mm) using C30/37 Concrete 10	20	30	40	50	60
160*	HLD/HLDQ 18	51	46	42	35	28	24
180		64	58	46	35	28	24
200		68	61	46	35	28	24
220		72	61	46	35	28	24
200*	HLD/HLDQ 22	105	101	81	63	51	43
220		117	101	81	63	51	43
240		118	101	81	63	51	43
260		118	101	81	63	51	43
280		118	101	81	63	51	43
220*	HLD/HLDQ 24	128	120	102	82	66	56
240		138	120	102	82	66	56
260		138	120	102	82	66	56
280		138	120	102	82	66	56
300		138	120	102	82	66	56
240*	HLD/HLDQ 30	171	171	162	136	111	94
260		185	185	162	136	111	94
280		200	186	162	136	111	94
300		209	186	162	136	111	94
350		209	186	162	136	111	94
400		209	186	162	136	111	94
300*	HLD/HLDQ 35	288	265	236	205	171	144
350		293	265	236	205	171	144
400		293	265	236	205	171	144
600		293	265	236	205	171	144
350*	HLD/HLDQ 42	368	334	300	266	232	199
400		368	334	300	266	232	199
600		368	334	300	266	232	199
600*	HLD/HLDQ 52	533	499	464	429	394	359

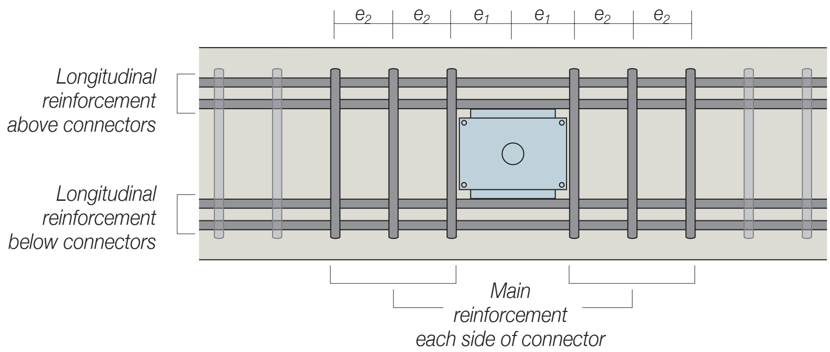
** Refers to the min slab depth H_{min} for each connector type.*

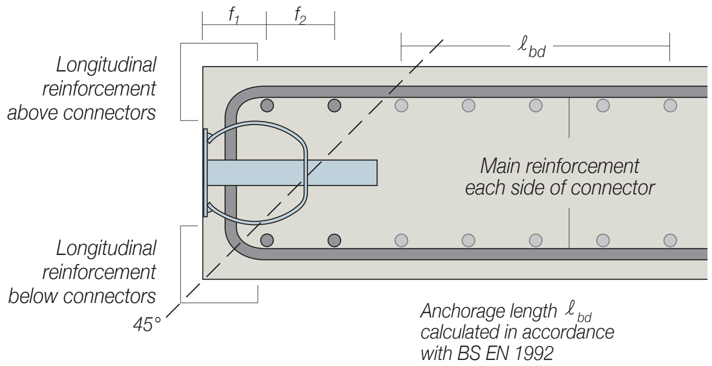
Reinforcement Details

Local reinforcement is required around each connector 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 Ancon HLD and HLDQ connectors attain their full capacity.

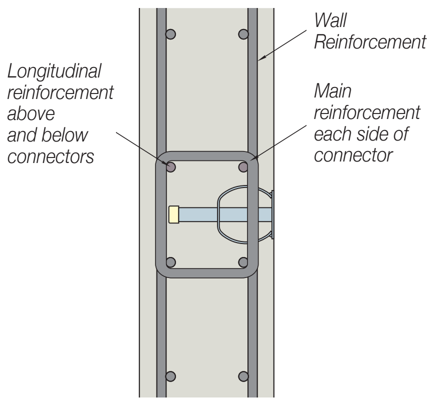
The tables below show proposals for the type and spacing of the main reinforcement, together with details of reinforcement above and below the connectors.







For walls, the reinforcement is repeated as in the tables but with links replacing the U-bars. Links should extend between the near face and the far face of the wall reinforcement.



Based on maximum slab depths and 20mm joints and 30mm cover (see page 8)

Product Reference	Options for Main Reinforcement (No. U bars each side)	Maximum Spacing (mm)
HLD 18	4 H8	e_1 = 45mm; e_2 = 31mm
	3 H10	e_1 = 45mm; e_2 = 42mm
	2 H12	e_1 = 45mm; e_2 = 75mm
HLDQ 18	4 H8	e_1 = 60mm; e_2 = 26mm
	3 H10	e_1 = 60mm; e_2 = 34mm
	2 H12	e_1 = 60mm; e_2 = 60mm
HLD 22	4 H10	e_1 = 55mm; e_2 = 44mm
	3 H12	e_1 = 55mm; e_2 = 62mm
HLDQ 22	4 H10	e_1 = 70mm; e_2 = 39mm
	3 H12	e_1 = 70mm; e_2 = 55mm
HLD 24	5 H10	e_1 = 60mm; e_2 = 38mm
	4 H12	e_1 = 60mm; e_2 = 48mm
	2 H16	e_1 = 60mm; e_2 = 128mm
HLDQ 24	5 H10	e_1 = 67mm; e_2 = 36mm
	4 H12	e_1 = 67mm; e_2 = 46mm
	2 H16	e_1 = 67mm; e_2 = 120mm
HLD 30	5 H12	e_1 = 67mm; e_2 = 58mm
	3 H16	e_1 = 67mm; e_2 = 108mm
HLDQ 30	5 H12	e_1 = 92mm; e_2 = 52mm
	3 H16	e_1 = 92mm; e_2 = 96mm
HLD 35	4 H16	e_1 = 75mm; e_2 = 124mm
HLDQ 35	4 H16	e_1 = 100mm; e_2 = 89mm
HLD 42	5 H16	e_1 = 97mm; e_2 = 91mm
HLDQ 42	5 H16	e_1 = 115mm; e_2 = 86mm
HLD 52	7 H16	e_1 = 115mm; e_2 = 62mm
HLDQ 52	7 H16	e_1 = 127mm; e_2 = 60mm

HLD/HLDQ	Options for Longitudinal Bars (No. bars top and bottom)	Spacing (mm)
18	2 H8	f_1 = 60mm; f_2 = 60mm
	1 H10	f_1 = 60mm;
	1 H12	f_1 = 60mm;
22	2 H10	f_1 = 60mm; f_2 = 70mm
	2 H12	
24	3 H10	f_1 = 60mm; f_2 = 70mm
	2 H12	
	2 H16	
30	3 H12	f_1 = 60mm; f_2 = 70mm
	2 H16	
35	2 H16	f_1 = 60mm; f_2 = 70mm
42	3 H16	f_1 = 60mm; f_2 = 70mm
52	4 H16	f_1 = 60mm; f_2 = 70mm

Shear Load Connectors

Ancon ESD, ESDQ, ED and Acoustic Connectors

A range of stainless steel single dowel shear connectors is also available.

Ancon ESD

The Ancon ESD shear load connector is used where loads are small, but where alignment is critical. It is available in four sizes with each size available in two lengths. The dowel component is Duplex stainless steel bar.

Ancon ESDQ

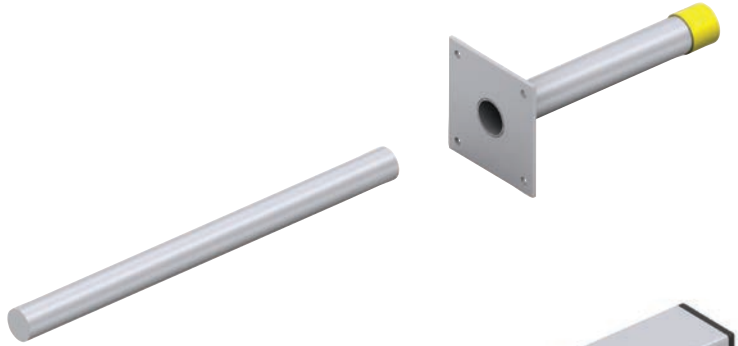
The Ancon ESDQ shear load connector uses the same dowel as the ESD, but the cylindrical sleeve is contained within a rectangular box section to allow lateral movement or rotation in addition to longitudinal movement.

Ancon ED

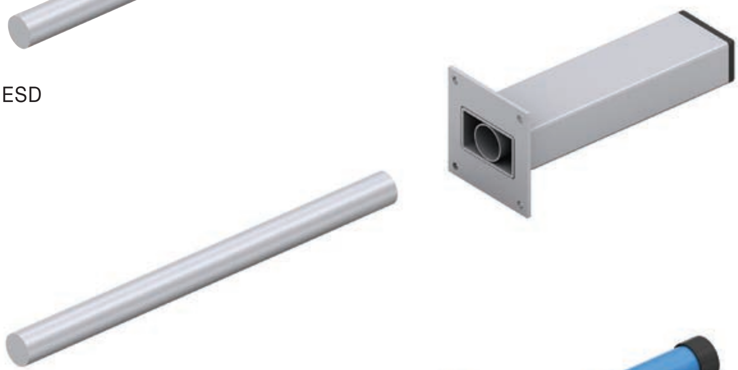
The Ancon ED is a low cost dowel connector for use in floor slabs where alignment is important but loads are small. The single dowel shear connector is available in four sizes with each size available in two lengths. The sleeve component is made from a durable plastic and features an integral nail plate. The dowel component is Duplex stainless steel.

Ancon Staisil-HLD Acoustic Dowel

The Ancon Staisil-HLD features a 22mm diameter stainless steel dowel, located in a sound absorbing sleeve. It is designed to reduce the oscillation of impact sound through a building by isolating concrete components, such as stair landings from the main structural frame. A decoupled concrete configuration, featuring Staisil-HLDs, offers an 18dB impact sound reduction over a rigid concrete floor connection, verified by the Fraunhofer Institute.



ESD



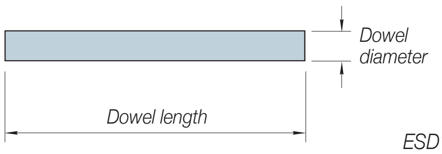
ESDQ

ED

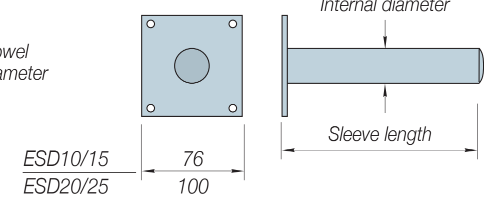
Staisil-HLD

Ancon ESD and ESDQ shear connectors

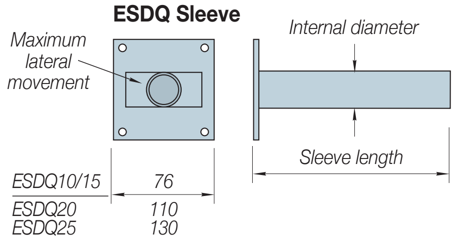
Dowel Component



ESD Sleeve



ESDQ Sleeve



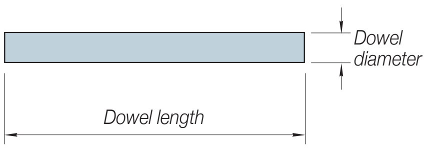
Dimensions

Ref ESD ESDQ	Dowel Component		ESD Sleeve		ESDQ Sleeve		
	Dowel Diameter	Dowel Length	Internal Diameter	Sleeve Length	Internal Diameter	Sleeve Length	Max. Lateral Movement
10 300	20	300	21	170	21	170	+/-10
10 400	20	400	21	220	21	220	+/-10
15 300	22	300	23	170	23	170	+/-10
15 400	22	400	23	220	23	220	+/-10
20 300	30	300	31	170	31	170	+/-20
20 400	30	400	31	210	31	210	+/-20
25 350	35	350	36	195	36	195	+/-18
25 470	35	470	36	265	36	285	+/-18

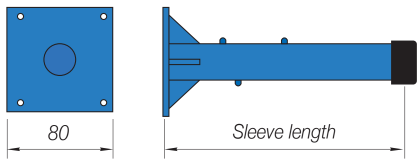
Notes: *Example Ref ESD10 300. All dimensions are in millimetres (mm).*

Ancon ED Shear Connectors

Dowel Component



ED Sleeve

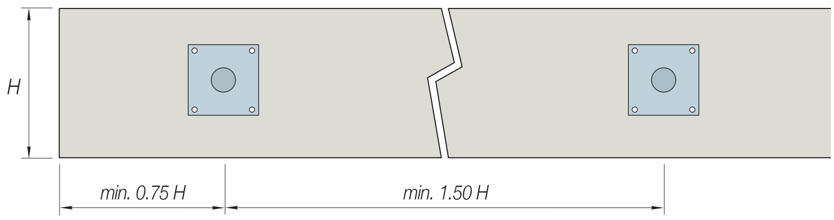


Dimensions

Ref ED	Dowel Length	Dowel Diameter	Sleeve Length
10 300	300	20	170
10 400	400	20	220
15 300	300	22	170
15 400	400	22	220
20 300	300	30	170
20 400	400	30	220
25 350	350	35	195
25 470	470	35	260

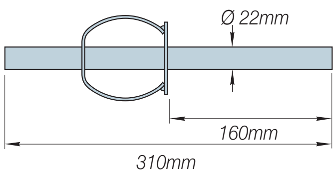
Edge Distance and Spacing

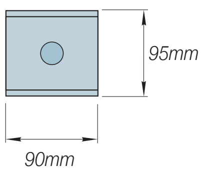
The minimum edge distance and spacing of Ancon ESD/ESDQ/ED shear load connectors is determined by the depth of slab and is illustrated in the adjacent drawing. It is possible to reduce the spacing further with the absolute minimum being 1.5 H_{min} (where H_{min} is the minimum slab depth for each connector type), however the design resistances are then limited to those given for H_{min} only.



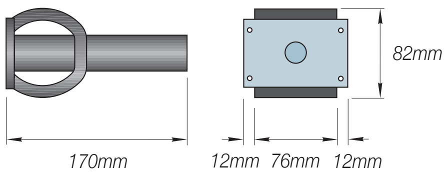
Ancon Staisil-HLD Acoustic Shear Dowel

Dowel Component



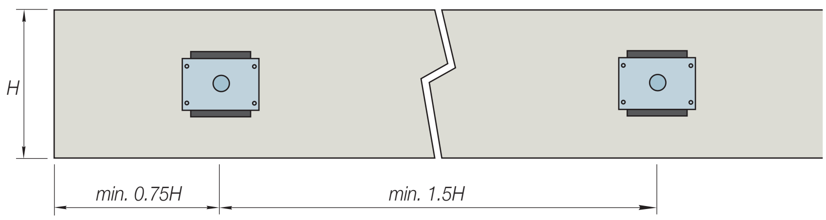


Sleeve



Edge Distance and Spacing

The minimum edge distance and spacing of Ancon Staisil-HLD shear load connectors is determined by the depth of slab and is illustrated in the adjacent drawing. The minimum distances shown apply to slabs less than or equal to 220mm. For slabs greater than 220mm, the minimum spacing is 330mm and the minimum edge distance is 165mm.



Shear Load Connectors

V_{Rd} Design Resistances (kN) for Various Joint Widths (mm) and Slab Thickness (mm) using C25/30 Concrete

Slab Thickness (mm)	Product Reference	Maximum Width of Joint (mm) 10	20	30	40
180*	ESD/ESDQ 10	25.6	25.6	22.4	19.7
200		26.7	25.7	22.4	19.7
220		26.7	25.7	22.4	19.7
240		26.7	25.7	22.4	19.7
260		26.7	25.7	22.4	19.7
280		26.7	25.7	22.4	19.7
180*	ESD/ESDQ 15	28.7	28.7	28.1	24.9
200		32.3	31.9	28.1	24.9
220		32.3	31.9	28.1	24.9
240		32.3	31.9	28.1	24.9
260		32.3	31.9	28.1	24.9
280		32.3	31.9	28.1	24.9
220*	ESD/ESDQ 20	47.3	47.3	47.3	47.3
240		54.9	54.9	54.9	52.7
260		60.0	60.0	57.8	52.7
280		60.0	60.0	57.8	52.7
300		60.0	60.0	57.8	52.7
350		60.0	60.0	57.8	52.7
240*	ESD/ESDQ 25	56.8	56.8	56.8	55.7
260		65.0	65.0	61.5	55.7
280		73.7	68.0	61.5	55.7
300		75.4	68.0	61.5	55.7
350		75.4	68.0	61.5	55.7
400		75.4	68.0	61.5	55.7

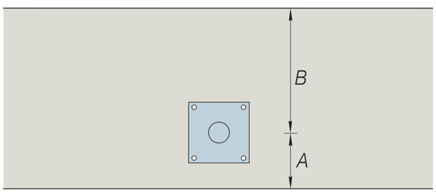
Slab Thickness (mm)	Product Reference	Maximum Width of Joint (mm) 10	20	30	40
180*	ED 10	25.6	25.6	22.4	19.7
200		26.7	25.7	22.4	19.7
220		26.7	25.7	22.4	19.7
240		26.7	25.7	22.4	19.7
260		26.7	25.7	22.4	19.7
280		26.7	25.7	22.4	19.7
180*	ED 15	28.7	28.7	28.1	24.9
200		32.3	31.9	28.1	24.9
220		32.3	31.9	28.1	24.9
240		32.3	31.9	28.1	24.9
260		32.3	31.9	28.1	24.9
280		32.3	31.9	28.1	24.9
220*	ED 20	47.3	47.3	47.3	47.3
240		54.9	54.9	54.9	52.7
260		60.0	60.0	57.8	52.7
280		60.0	60.0	57.8	52.7
300		60.0	60.0	57.8	52.7
350		60.0	60.0	57.8	52.7
240*	ED 25	56.8	56.8	56.8	55.7
260		65.0	65.0	61.5	55.7
280		73.7	68.0	61.5	55.7
300		75.4	68.0	61.5	55.7
350		75.4	68.0	61.5	55.7
400		75.4	68.0	61.5	55.7

* Refers to the minimum slab depth H_{min} for each connector type.

Slab Thickness (mm)	Product Reference	Maximum Width of Joint (mm) 10	20	30	40	50	60
180	Staisil-HLD	35	35	35	34	33	32
200		37	37	37	37	37	37
220		39	39	39	39	39	39
240		39	39	39	39	39	39
260		39	39	39	39	39	39
280		39	39	39	39	39	39
300		39	39	39	39	39	39
320		39	39	39	39	39	39

Position of connectors in slab

The above tables are based on the shear connector being located centrally in the slab edge. If the shear connector is offset from the centreline, the minimum distance between the connector centre and the slab face should be considered as H/2.



A < B
Slab thickness to be considered in selecting the connector is 2 x A. Minimum values are shown in the table.

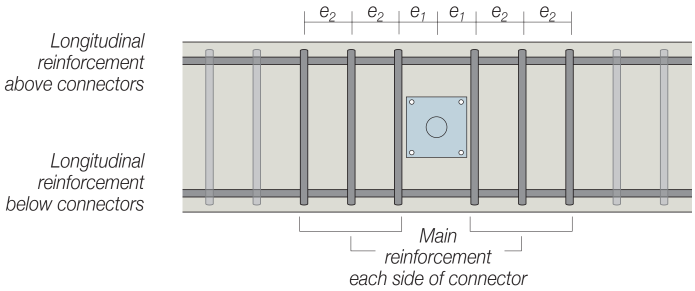
Product Reference	Minimum Slab Depth H_{min}	Minimum Depth 'A'
ESD/ESDQ 10	180mm	90mm
ESD/ESDQ 15	180mm	90mm
ESD/ESDQ 20	220mm	110mm
ESD/ESDQ 25	240mm	120mm
ED 10	180mm	90mm
ED 15	180mm	90mm
ED 20	220mm	110mm
ED 25	240mm	120mm
Staisil-HLD	180mm	90mm

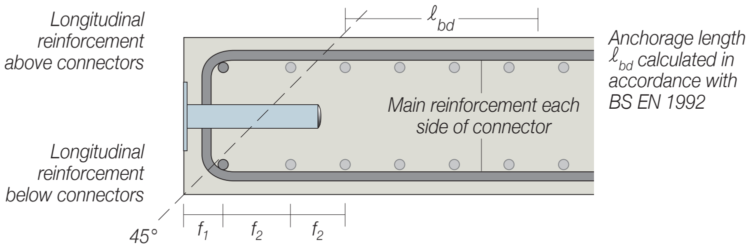
Reinforcement Details

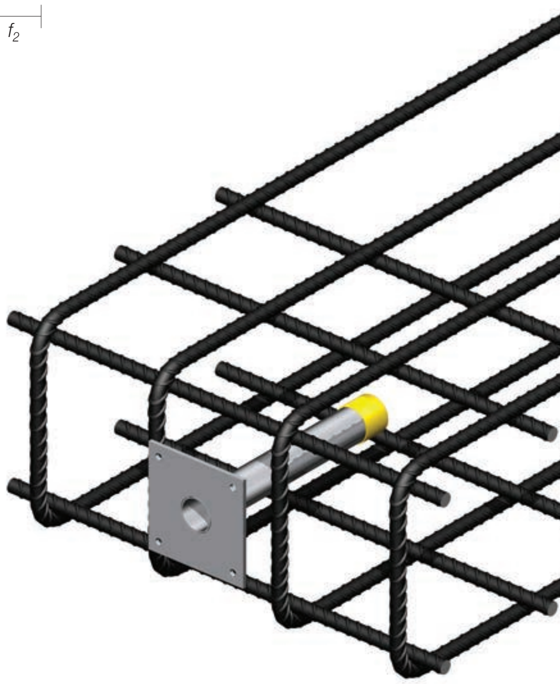
Local reinforcement is required around each connector to guarantee that the forces are transferred between the connectors and the concrete. Correct detailing in accordance with appropriate design codes and the recommendations provided here will ensure Ancon ESD, ESDQ, ED and Staisil connectors attain their full capacity.

The tables show proposals for the type and spacing of the main reinforcement, together with details of reinforcement above and below the connectors.

For walls, the reinforcement is repeated as in the tables but with links replacing the U-bars. Links should extend between the near face and the far face of the wall reinforcement.





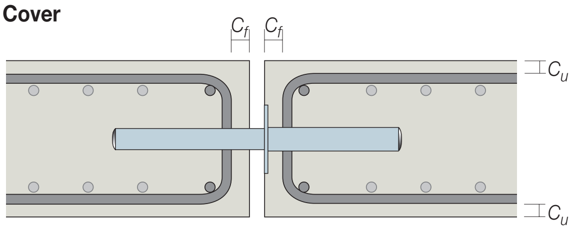


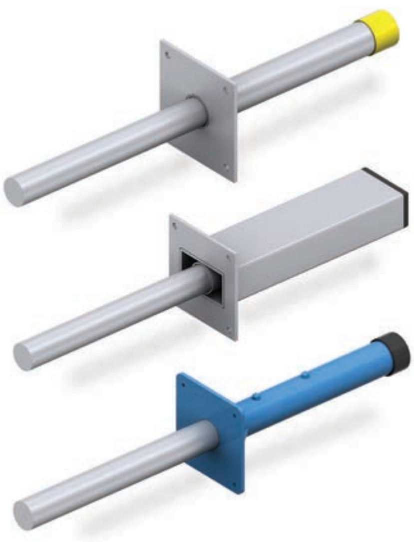
Based on a minimum of C25/30 Concrete, maximum slab depth (see page 16) and 20mm joint

ED/ESD/ESDQ	Options for Main Reinforcement (No. U bars each side)	Maximum Spacing (mm)
10	2 H10	e_1 = 35mm; e_2 = 50mm
	1 H12	e_1 = 35mm
15	2 H10	e_1 = 50mm; e_2 = 40mm
	2 H12	e_1 = 50mm; e_2 = 40mm
20	2 H12	e_1 = 40mm; e_2 = 30mm
25	3 H12	e_1 = 45mm; e_2 = 45mm
Staisil-HLD	3 H10	e_1 = 70mm; e_2 = 74mm
	2 H12	e_1 = 70mm; e_2 = 139mm

ED/ESD/ESDQ	Options for Longitudinal Reinforcement (No. bars top and bottom)	Spacing (mm)
10	2 H10	f_1 = 60mm; f_2 = 70mm
	1 H12	f_1 = 60mm
15	2 H10	f_1 = 60mm; f_2 = 70mm
	1 H12	f_1 = 60mm
20	2 H10	f_1 = 60mm; f_2 = 70mm
	1 H12	f_1 = 60mm
25	2 H10	f_1 = 60mm; f_2 = 70mm
	2 H12	f_1 = 60mm; f_2 = 70mm
Staisil-HLD	2 H10	f_1 = 60mm; f_2 = 70mm

Cover





Minimum cover Cu to local reinforcement is the recommendations of BS EN 1992

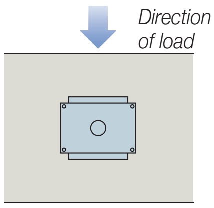
Reference	Minimum Cover to Face C_f	Maximum Cover to Face C_f
10	To be specified by engineer according to BS EN 1992	50mm
15		50mm
20		50mm
25		50mm
Staisil-HLD		50mm

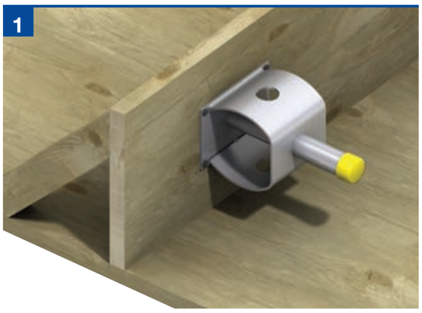
Shear Load Connectors

Installation Procedure

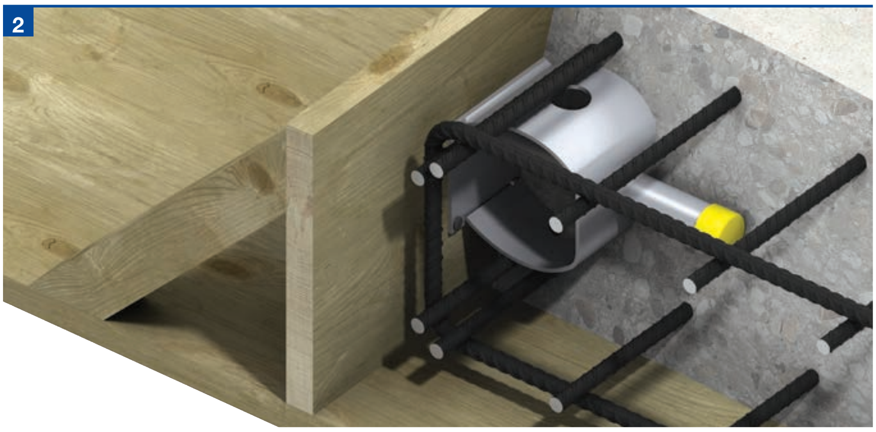
The two-part assembly of all Ancon shear connectors removes the need for drilling formwork on site, supporting dowel bars and fitting debonding sleeves and end caps. The installation is a fast and accurate process.

HLD and HLDQ connectors normally transfer vertical loads across a joint. The face marked ‘Top’ on both the sleeve and the dowel should be uppermost. For applications where the load is not vertical, the face marked ‘Top’ will need to be in the same direction as the load.





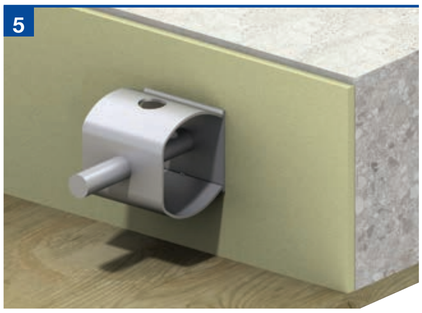
Nail the sleeve component to the shuttering ensuring that the sleeve is correctly orientated for the direction of the load. Check that the minimum spacing and edge distances are not exceeded. The label prevents debris from entering into the sleeve aperture and should not be removed at this stage.



Fix the local reinforcement in position around the sleeve component together with any other reinforcement that is required, ensuring that the correct cover to the reinforcement is maintained. Pour the concrete to complete the installation of the sleeve component.

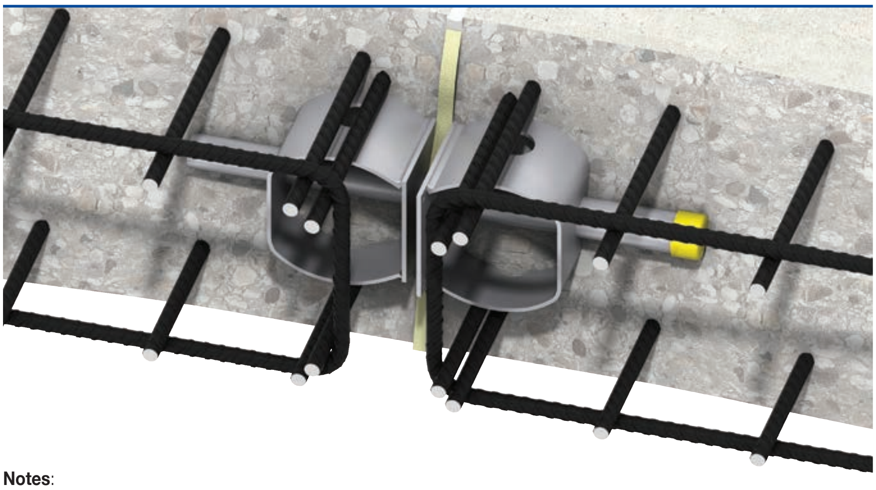
When the concrete has achieved sufficient strength, strike the shuttering. Peel off or puncture the label to reveal the hole for the dowel. Where HLDQ are being used, the label should only be punctured enough to allow the dowel into the cylindrical sleeve.

Position the compressible joint filler of the appropriate width for applications where movement is expected between the two sections of concrete.



Push the dowel component through the joint filler (if applicable) until it is fully located in the sleeve component. It may be necessary to tap the dowel component to overcome the dimple which pinch holds the dowel in the sleeve and prevents dislocation when the concrete is vibrated.

Fix the local reinforcement in position around the dowel component together with any other reinforcement that is required, ensuring that the correct cover to the reinforcement is maintained. Pour the concrete to complete the installation of the shear connector.



Notes:

(i) Although installation is shown for Ancon HLD, the procedure is the same for all Ancon Shear Connectors.

(ii) 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 placing of the concrete.

Other Ancon Products

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 required can be reduced. Because the strength of a mechanical splice is independent of the concrete in which it is located, the joint can also remain unaffected by any loss of cover. The range includes threaded and mechanically bolted couplers.

Reinforcement Continuity Systems
Ancon Eazistrip is approved by UK CARES and consists of bent bars housed in a galvanised steel casing. Once installed, the protective cover is removed and the bars are straightened, ready for joining to the slab reinforcement. Alternatively, Ancon KSN Anchors are cast into the wall and, when the formwork and thread protection are removed, Bartec threaded rebars are simply screwed into the anchors.

Punching Shear Reinforcement
Used within a slab to provide additional reinforcement around columns, Ancon Shearfix is the ideal solution to the design and construction problems associated with punching shear. The system consists of double-headed studs welded to flat rails, positioned around the column. The shear load from the slab is transferred through the studs into the column.

Insulated Balcony Connections
Ancon’s thermally insulated connectors minimise heat loss at balcony locations while maintaining structural integrity. They provide a thermal break and, as a critical structural component, transfer moment, shear, tension and compression forces. Standard solutions are available for concrete-to-concrete, steel-to-concrete and steel-to-steel interfaces.

Channels and Bolts for Fixing to Concrete
Cast-in channels are used for fixing masonry support systems to the edges of concrete floors and beams. Channels are available in different sizes ranging from simple self anchoring channels for restraints, to large capacity channels with integral anchors.
A selection of channels can also be supplied plain-backed for surface fixing. Stainless steel expansion bolts and resin anchors complete the range.

Leviat®

A CRH COMPANY

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

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 Praha 5
Tel: +420 - 311 - 690 060
Email: info.cz@leviat.com

Finland
Leviat
Vädursgatan 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 CS 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 Svanholmen 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 Poznań
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
28522 Rivas-Vaciamadrid
Tel: +34 - 91 632 18 40
Email: info.es@leviat.com

Sweden
Leviat
Vädursgatan 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 Arab Emirates
Leviat
RA08 TB02, PO Box 17225
JAFZA, Jebel Ali, Dubai
Tel: +971 (0)4 883 4346
Email: info.ae@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

Leviat.com

Leviat
A CRH COMPANY

For more information on these products, contact:

Leviat
President Way
President Park
Sheffield, S4 7UR
United Kingdom

Tel: +44 (0) 114 275 5224
Fax: +44 (0) 114 276 8543

Email: info.ancon.uk@leviat.com

For sales enquiries:
Email: reinforcement.uk@leviat.com

Ancon.co.uk
Leviat.com

Imagine. Model. Make.

Leviat.com