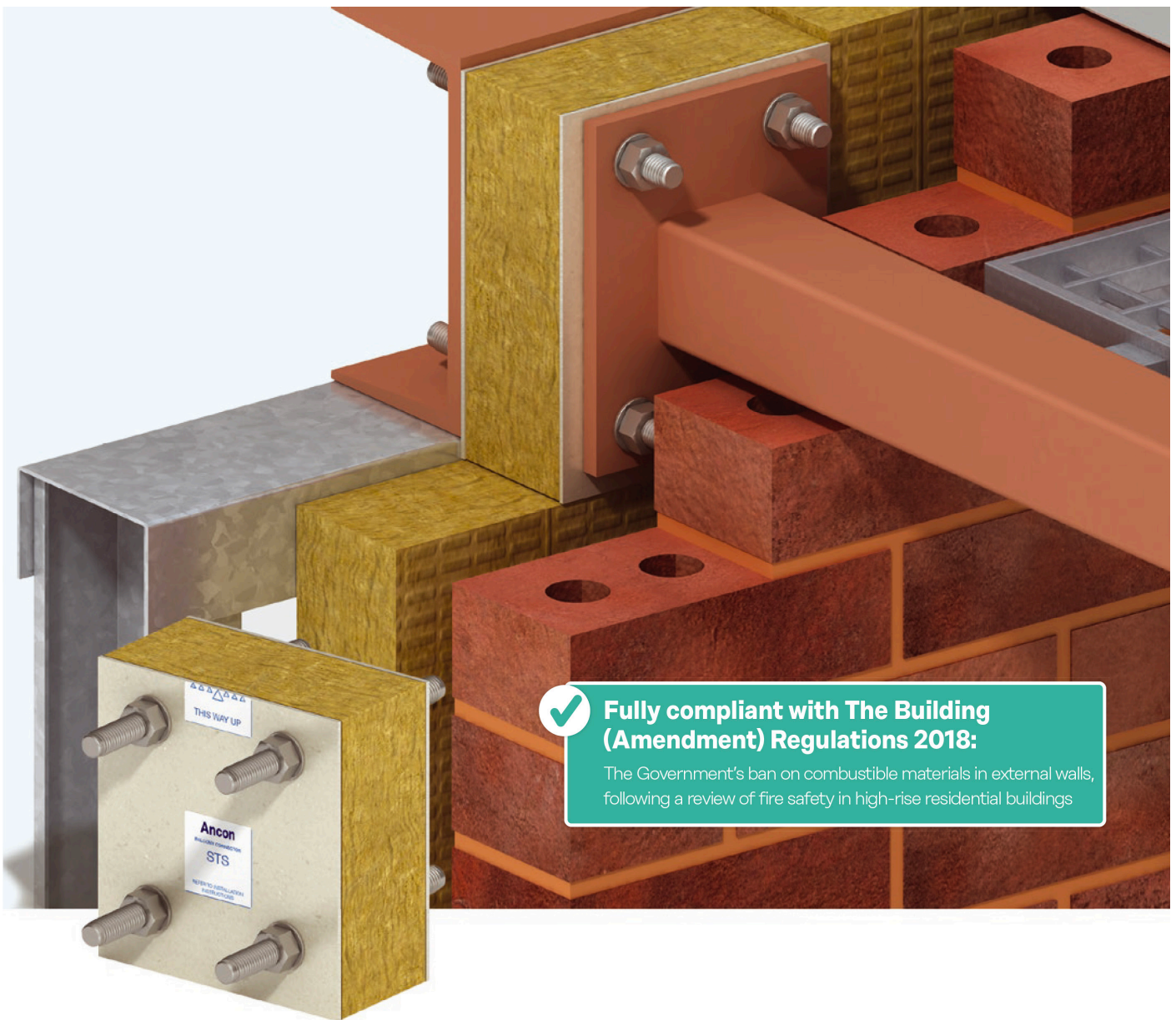


Structural Connections
Insulated Balcony Connectors

Leviat®
A CRH COMPANY

Ancon SSTS / STS

Thermally Insulated Balcony Connectors



Fully compliant with The Building (Amendment) Regulations 2018:

The Government's ban on combustible materials in external walls, following a review of fire safety in high-rise residential buildings

Imagine. Model. Make.



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.

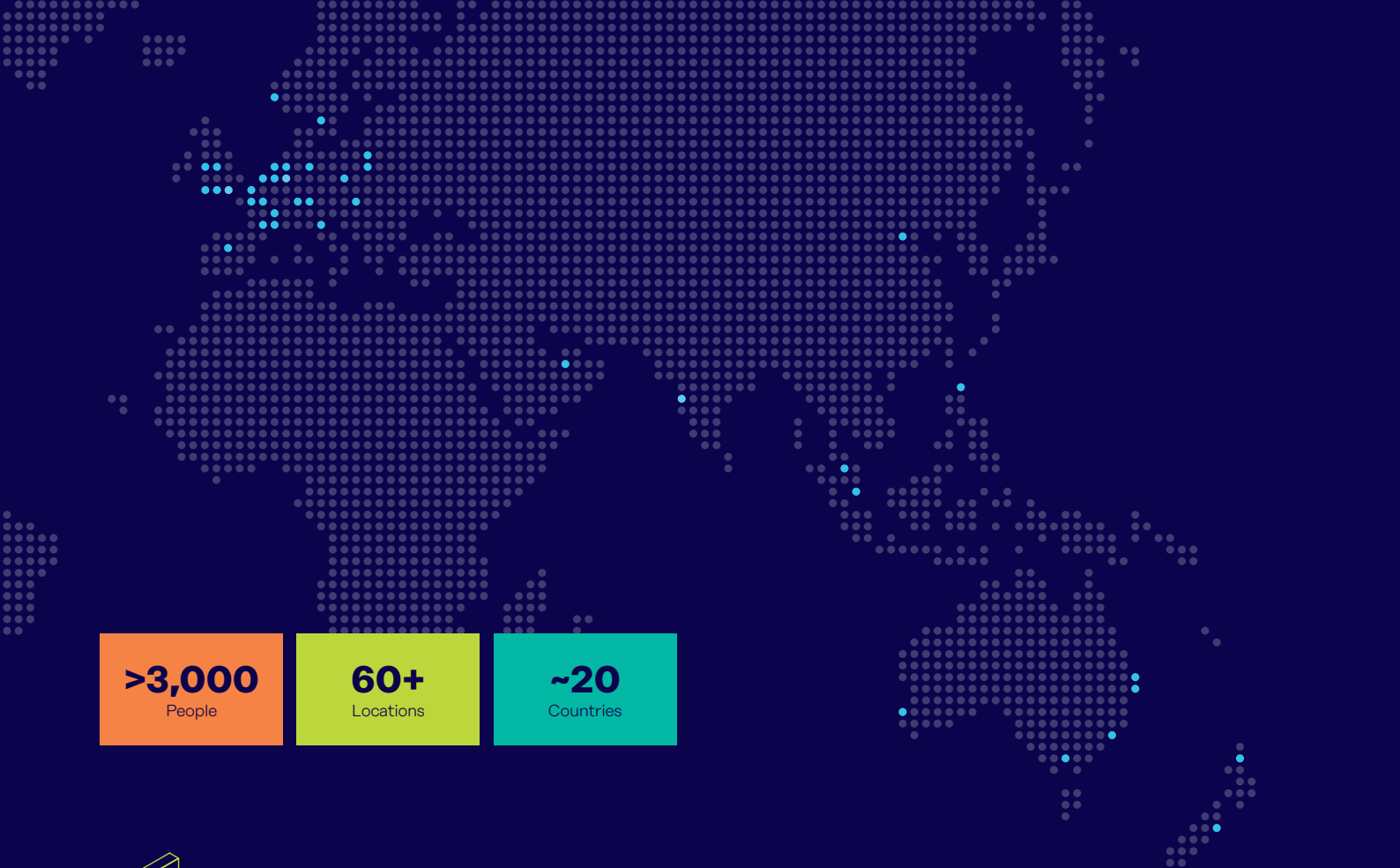
We provide technical design assistance at every stage of a project, from initial planning to installation and beyond.

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.

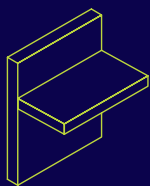




>3,000
People

60+
Locations

~20
Countries

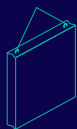


Structural Connections

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.

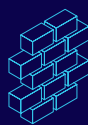
- Insulated balcony connectors
- Reinforcing bar couplers
- Concrete connections
- Reinforcement continuity systems
- Punching shear reinforcement
- Shear load connectors
- Floor joint systems
- Precast / reinforced columns
- Infrastructure products
- Precast connections
- Acoustic dowels and bearings
- Prestress

Other areas of expertise:



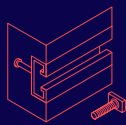
Lifting & Bracing

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.



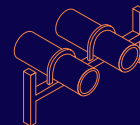
Anchoring & Fixing

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.

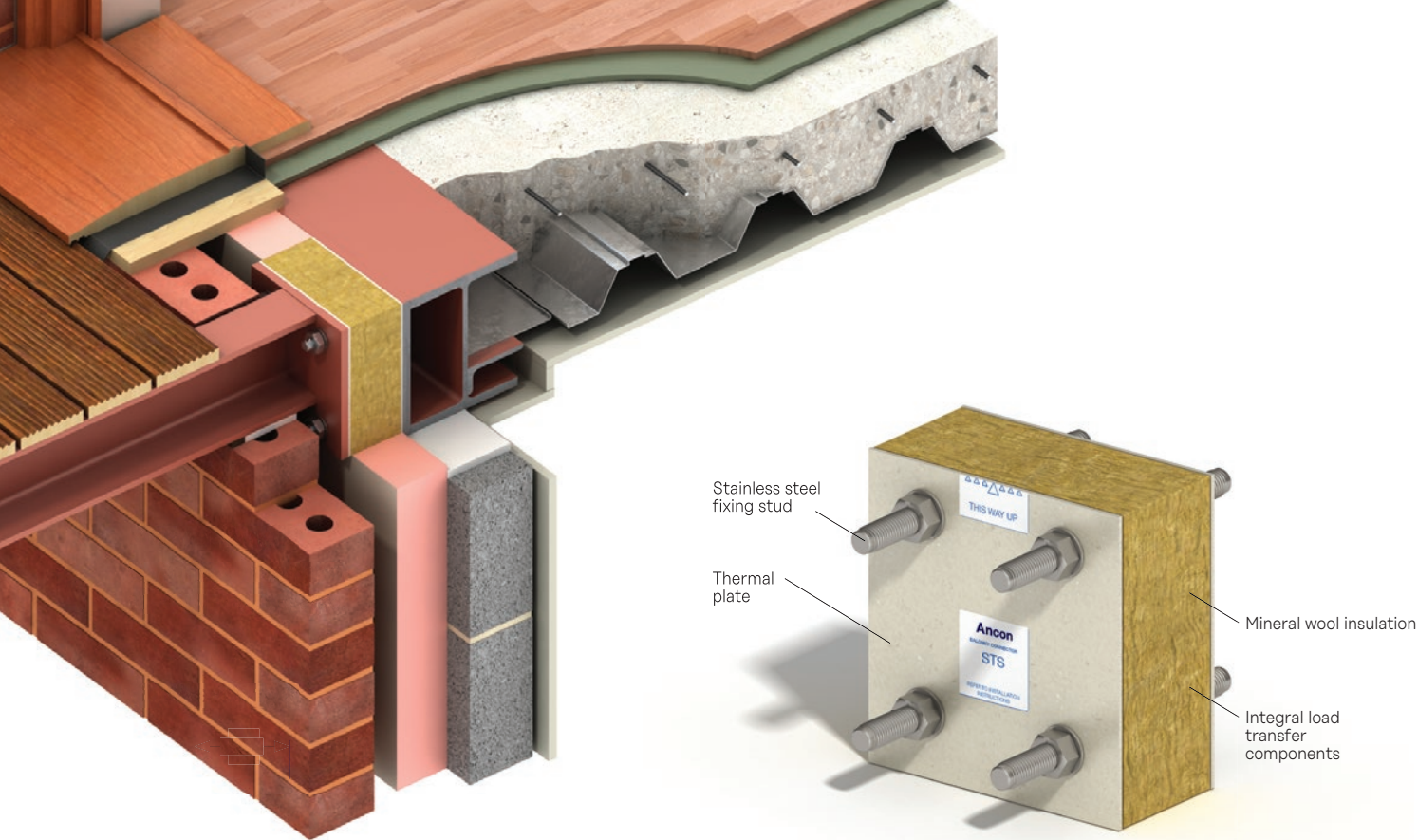


Industrial Technology

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



Steel-to-Steel Balcony Connectors

Ancon SSTS and STS are compact thermal breaks, typically used for connecting steel balconies to structural steel frames but which are equally suitable for other steel-to-steel applications. The connectors comprise tension and compression components within a single combined unit, wrapped in class A1 non-combustible mineral wool insulation. The fabricated compression component is manufactured from either 1.4301 (grade 304) stainless steel referenced SSTS or hot-dip galvanised S355 plain carbon steel referenced STS. Stainless steel offers the greater thermal efficiency and is essential for applications requiring enhanced corrosion protection such as coastal areas.

The fabricated elements are designed to EN 1993 (Eurocode 3) and UKCA and CE marked to BS EN 1090 Part 1.

The system is available in three standard stud sizes to accommodate a wide range of loads. Manufactured to order, the vertical centres of the four A4 stainless steel fixing studs can be specified to suit the exact requirements of the application.

A thermal plate, with an independently verified European reaction-to fire classification of A2-s1,d0, is located at each steel interface.

Design resistances are provided on page 4.



System Benefits

- Comprises materials of class A1/A2 combustibility only, ideal for high-rise construction
- Proven through thermal modelling to reduce heat loss and eliminate condensation risk
- Thermal pad located at each steel interface
- Bracket fabrication UKCA and CE marked to BS EN 1090-1
- Variable fixing heights to suit application
- In the case of SSTS, fully stainless steel components offer the ultimate corrosion protection and thermal efficiency benefits

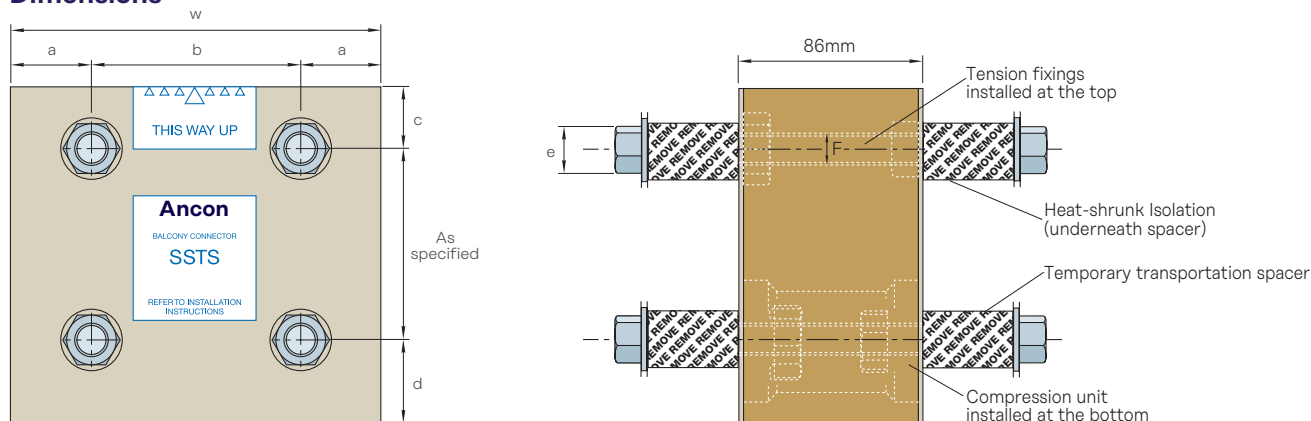
Material Combustibility

Following a review of fire safety, the Government has banned the use of combustible materials in the external walls of high-rise residential buildings in England. The Ancon SSTS and STS connectors are fully compliant with the material combustibility requirements of The Building (Amendment) Regulations 2018. All components are either European classification A1 or A2-s1,d0. Contact Leviat for further information.

Thermal Performance

Thermal modelling of a typical application showed a reduction in heat loss of almost 50% compared to a direct steel connection. It also illustrated a temperature factor within the limits detailed in BRE document IP1/06 for eliminating condensation risks in buildings of any type, even those with high humidity e.g. swimming pools (0.90).

Dimensions



Product Reference	W	A	Dimension (mm) B	C	D	E	F
SSTS/STS 16A	180	40	100	30	40	24 A/F	M16
SSTS/STS 20A	180	40	100	30	40	30 A/F	M20
SSTS/STS 24A	190	37.5	115	40	45	36 A/F	M24

Product Referencing System

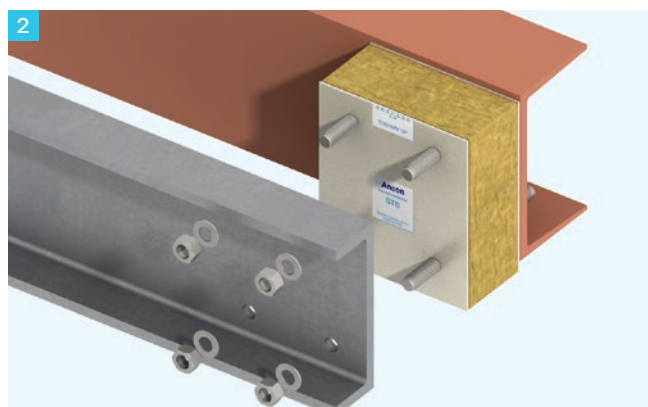
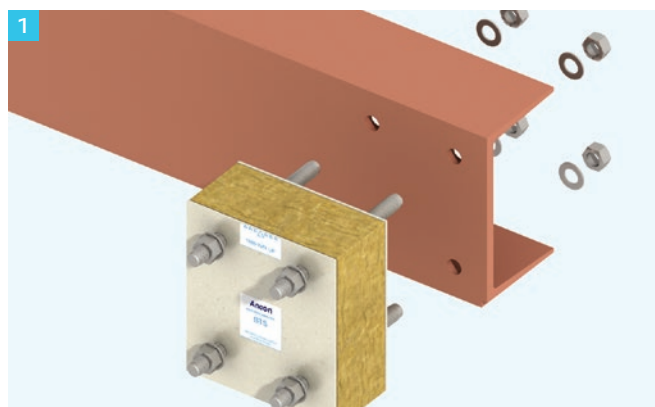
SSTS/STS 16A-140

Standard Product Reference Vertical Bolt Centres Required

Installation Guidance

The SSTS/STS Balcony Connector is supplied in a single unit with thermal plates attached to both inner and outer faces. These plates should not be removed. The assembly features all necessary steel fixings. Care should be taken to avoid damaging any balcony connector components prior to and during installation. It is essential that the connector is orientated and installed correctly.

Prior to installation of the connector, it is important to check the product dimensions against the engineer's drawings, specifically ensuring the mating parts match the connector stud centres.



The SSTS/STS Balcony Connector should be orientated so that the label indicating the uppermost face is correctly positioned and is facing out of the building.

Position the connector close to where it is to be installed. Ensure the connector is stable and not likely to fall. Carefully remove the nuts and washers from the studs on the inner face. Keep the steel nuts and steel washers close to hand. All non-metallic packing around the fixings should be discarded at this point, leaving the heat-shrunk isolation material on the stainless steel stud. Carefully lift and fit the exposed studs through the appropriate holes in the building structure. Do not force the connector into position. Re-fit the steel washers and steel nuts. Once the connector is fully aligned with the structure, torque up the nuts with a calibrated hydraulic torque wrench and suitable socket, referencing the table below.

Connector	SSTS/STS 16A	SSTS/STS 20A	SSTS/STS 24A
Wrench Size (A/F)	24	30	36
Torque (Nm)	148	288	498

Once all connectors are correctly positioned and fitted to the building structure, the balcony beams can be installed.

Remove the nuts and washers from the outer face of the connector and keep close to hand. Discard all non-metallic packing around the fixings to expose the heat-shrunk isolation on the stud.

Carefully lift the balcony fabrication, ensuring the balcony is horizontal. Align the balcony and carefully push over the exposed studs. Do not force it into position.

When positioned, re-fit the steel washers and steel nuts.

Once the balcony is fully aligned with the connector and structure, tighten the nuts to the correct torque. Remove all lifting straps.

Design Resistances

	STS 16A (Galvanised Steel)			SSTS 16A (Stainless Steel)		
Vertical Bolt Centres	Design Shear Resistance V_{Rd} (kN)	Design Resistance for Bending M_{Rd} (kNm)	Design Resistance for Tension N_{Rd} (kN)	Design Shear Resistance V_{Rd} (kN)	Design Resistance for Bending M_{Rd} (kNm)	Design Resistance for Tension N_{Rd} (kN)
70mm	60.75	12.66	180.9	39.36	12.66	180.9
75mm		13.57			13.57	
100mm		18.09			18.09	
125mm		22.61			22.61	
150mm		27.14			27.14	
175mm		31.66			31.66	
200mm		36.18			36.18	
225mm		40.70			40.70	
250mm		45.23			45.23	
275mm		49.75			49.75	
300mm		54.27			54.27	
325mm		58.79			58.79	
350mm		63.32			63.32	
	STS 20A (Galvanised Steel)			SSTS 20A (Stainless Steel)		
Vertical Bolt Centres	Design Shear Resistance V_{Rd} (kN)	Design Resistance for Bending M_{Rd} (kNm)	Design Resistance for Tension N_{Rd} (kN)	Design Shear Resistance V_{Rd} (kN)	Design Resistance for Bending M_{Rd} (kNm)	Design Resistance for Tension N_{Rd} (kN)
70mm	60.75	19.75	282.2	39.36	13.87	198.2
75mm		21.17			14.87	
100mm		28.22			19.82	
125mm		35.28			24.78	
150mm		42.33			29.73	
175mm		49.39			34.69	
200mm		56.44			39.64	
225mm		63.50			44.60	
250mm		70.55			49.55	
275mm		77.61			54.51	
300mm		84.66			59.46	
325mm		91.72			64.42	
350mm		98.77			69.37	
	STS 24A (Galvanised Steel)			SSTS 24A (Stainless Steel)		
Vertical Bolt Centres	Design Shear Resistance V_{Rd} (kN)	Design Resistance for Bending M_{Rd} (kNm)	Design Resistance for Tension N_{Rd} (kN)	Design Shear Resistance V_{Rd} (kN)	Design Resistance for Bending M_{Rd} (kNm)	Design Resistance for Tension N_{Rd} (kN)
85mm	78.1	25.80	304	61.1	21.11	248.3
100mm		30.35			24.83	
125mm		37.94			31.04	
150mm		45.53			37.25	
175mm		53.11			43.45	
200mm		60.70			49.66	
225mm		68.29			55.87	
250mm		75.88			62.08	
275mm		83.46			68.28	
300mm		91.05			74.49	
325mm		98.64			80.70	
350mm		106.23			86.91	

Design Example

Known requirements:

The Factored Ultimate Shear Force per connector, V_{Ed} , is 75kN.
The Factored Ultimate Moment per connector, M_{Ed} , is 45kNm.
Vertical bolt centres are limited to a maximum of 150mm

From the tables:

- ✗ STS16A at 150mm centres gives $V_{Rd} = 60.75\text{kN}$ and $M_{Rd} = 27.14\text{kNm}$
These connectors do not give the required capacity
- ✗ STS20A at 150mm centres gives $V_{Rd} = 60.75\text{kN}$ and $M_{Rd} = 42.33\text{kNm}$
- ✓ STS24A at 150mm centres gives $V_{Rd} = 78.1\text{kN}$ and $M_{Rd} = 45.53\text{kNm}$.
This connector meets the project requirements

Known requirements:

The Factored Ultimate Shear Force per connector, V_{Ed} , is 58kN
The Factored Ultimate Moment per connector, M_{Ed} , is 35kNm
Vertical bolt centres are limited to a maximum of 150mm

From the tables:

- ✗ SSTS16A at 150mm centres gives $V_{Rd} = 39.36\text{kN}$ and $M_{Rd} = 27.14\text{kNm}$
- ✗ SSTS20A at 150mm centres gives $V_{Rd} = 39.36\text{kN}$ and $M_{Rd} = 29.73\text{kNm}$
The above connectors do not give the required capacity
- ✓ SSTS24A at 150mm centres gives $V_{Rd} = 61.1\text{kN}$ and $M_{Rd} = 37.25\text{kNm}$
This connector meets the project requirements

Leviat occasionally supply:

- Special units with compression components top and bottom to accommodate uplift forces
- Special heavy duty units with multiple tension components and / or compression components

Ancon standard balcony connectors are designed to offer innovative solutions for a variety of load cases and construction geometries. For arrangements not covered by the standard connectors, bespoke engineered solutions are available upon request. Please contact our technical team to discuss your requirements.

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