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

Ancon
SSTS and STS Thermally Insulated Balcony Connectors
For Steel-to-Steel Applications

BS EN 1090-1
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 CE marked to BS EN 1090 Part 1.

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).

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 Ancon for further information.

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 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
Dimensions

Product     Dimension (mm)
Reference W A 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

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.

<table>
<thead>
<tr>
<th>Connector</th>
<th>SSTS/STS 16A</th>
<th>SSTS/STS 20A</th>
<th>SSTS/STS 24A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrench Size (A/F)</td>
<td>24</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>Torque (Nm)</td>
<td>148</td>
<td>288</td>
<td>498</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Vertical Bolt Centres</th>
<th>STS 16A (Galvanised Steel)</th>
<th>SSTS 16A (Stainless Steel)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design Shear Resistance $V_{\text{Rd}}$ (kN)</td>
<td>Design Resistance for Bending $M_{\text{Rd}}$ (kNm)</td>
</tr>
<tr>
<td>70mm</td>
<td>60.75</td>
<td>12.66</td>
</tr>
<tr>
<td>75mm</td>
<td>60.75</td>
<td>12.66</td>
</tr>
<tr>
<td>100mm</td>
<td>60.75</td>
<td>12.66</td>
</tr>
<tr>
<td>125mm</td>
<td>60.75</td>
<td>12.66</td>
</tr>
<tr>
<td>150mm</td>
<td>60.75</td>
<td>12.66</td>
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<tr>
<td>175mm</td>
<td>60.75</td>
<td>12.66</td>
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<tr>
<td>200mm</td>
<td>60.75</td>
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<tr>
<td>225mm</td>
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<tr>
<td>250mm</td>
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<tr>
<td>275mm</td>
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<tr>
<td>300mm</td>
<td>60.75</td>
<td>12.66</td>
</tr>
<tr>
<td>325mm</td>
<td>60.75</td>
<td>12.66</td>
</tr>
<tr>
<td>350mm</td>
<td>60.75</td>
<td>12.66</td>
</tr>
</tbody>
</table>

### Design Example

**Known requirements:**
The Factored Ultimate Shear Force per connector, $V_{\text{uc}}$, is 75kN.
The Factored Ultimate Moment per connector, $M_{\text{uc}}$, is 45kN.
Vertical bolt centres are limited to a maximum of 150mm.

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

**Design Example**

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The Factored Ultimate Shear Force per connector, $V_{\text{uc}}$, is 75kN.
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- STS24A at 150mm centres gives $V_{\text{uc}} = 78.1kN$ and $M_{\text{uc}} = 45.53kNm$.
  This connector meets the project requirements.

**Ancon 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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**Ancon Ltd**
President Way, President Park,
Sheffield S4 7UR, United Kingdom
Tel: +44 (0) 114 275 5224
www.ancon.co.uk