INVISIBLE CONNECTIONS

PRECAST CONCRETE CONNECTIONS
J&P augments the products of its parent companies by its partnership with Norwegian company, Invisible Connections™, specialists in the ‘unseen’ structural connection of precast stair landings and beam-to-column connections.

The Invisible Connections™ range of inserts was developed to meet the problem of unsightly support systems for precast slabs and beams.

Three ranges of inserts are available;

TSS & RVK
Primarily intended for precast stairs and landings, there are two standard capacities - 40 kN & 100 kN. They are also useful for conditions other than stairs (see pages 3-5).

DTS
This natural extension of the TSS range offers capacities up to 150 kN, making it ideal for smaller beams or heavy slabs.

BSF
These inserts are designed for heavy-duty beam supports, with capacities from 225 kN to 700 kN. By using pairs of inserts, loads up to 1400 kN can be catered for.

The capacities above (for all inserts) are resistances to factored loads (1.5 x live load, 1.35 x dead load)

The complete range of Invisible Connections has full ETA certification and CE marking as required by EC2

Design is in accordance with the following standards:


Steel is grade S355
Products are covered by appropriate European Technical Approvals, based on testing at SINTEF - the largest independent research organisation in Scandinavia.
Traditionally, precast slabs such as stair landings used to be supported by a steel angle bolted to the wall. Installation of these was slow, required high degrees of accuracy, tied up the crane with costly hook time and could only be used on straight walls.

Shimming and adjustment had to be done from underneath the suspended slab. Once installed, the angles needed to be fire-proofed and hidden from view.

The TSS and RVK range of inserts was developed specifically to address these and other needs.

<table>
<thead>
<tr>
<th>Bolted-on angle</th>
<th>TSS/RVK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation of bolts is costly</td>
<td>No bolts required</td>
</tr>
<tr>
<td>Accurate positioning of bolts required</td>
<td>Void in wall leaves ample tolerance</td>
</tr>
<tr>
<td>Large/long angle requires crane</td>
<td>No angle = No crane</td>
</tr>
<tr>
<td>Drilling may hit reinforcement</td>
<td>Voids formed between bars</td>
</tr>
<tr>
<td>Large clearance gap required for bolts/nuts</td>
<td>Tolerance gap only is required</td>
</tr>
<tr>
<td>Tools required to install bolts</td>
<td>No tools required</td>
</tr>
<tr>
<td>Pre-installed angles obstruct stairwell for following trades</td>
<td>No obstructions = clear route for following trades</td>
</tr>
<tr>
<td>Shimming/adjustment is done from below slab</td>
<td>All operations are from above</td>
</tr>
<tr>
<td>Fire protection required</td>
<td>Inserts automatically fireproofed after grouting</td>
</tr>
<tr>
<td>Visual treatment required</td>
<td>Inserts are concealed from view</td>
</tr>
<tr>
<td>Difficult to install on curved walls</td>
<td>Handles any shape</td>
</tr>
</tbody>
</table>

**Capacities**

- TSS41 & RVK41 = 40kN
- TSS101 & RVK101 = 100kN

Inserts may be used in pairs for even higher load requirements.
TSS & RVK are not limited to being used only in stair situations, as these examples show.

RVK inserts in these large architectural beams allowed complex connections with no corbels.

TSS inserts ‘on-edge’ in these beams allowed corbel-less spanning between curved supports.

At the London 2012 Olympic Athletes Village, TSS inserts supported bridge decks between accommodation blocks.

TSS inserts are the ideal method of stabilising parapets against vehicle impact, with no connection left on view. BSF inserts provide the vertical support.
TSS & RVK units have a number of additional benefits.

Using RVK and TSS enables architects to maintain clean lines, and provide a more aesthetic appearance.

TSS and RVK units can be used in pairs to allow higher, concentrated loads in certain areas.

TSS inserts shown here being used in a curved concrete unit – demonstrating the greater flexibility provided by using the system.

Retro-fit can be achieved by core drilling and inserting the units - as shown.
DTS & BSF beam inserts

DTS Inserts

These are similar in design and usage to TSS inserts, and many of the aforementioned details still apply.

Standard inserts have capacities of 120kN and 150kN.

DTS

BSF inserts

For heavy loads from beams into columns, walls or other beams, the ideal solution is the BSF system. These are similar in principle as shown.

<table>
<thead>
<tr>
<th>Type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSF225</td>
<td>225kN</td>
</tr>
<tr>
<td>BSF300</td>
<td>300kN</td>
</tr>
<tr>
<td>BSF450</td>
<td>450kN</td>
</tr>
<tr>
<td>BSF700</td>
<td>700kN</td>
</tr>
</tbody>
</table>

Capacities of DTS inserts

<table>
<thead>
<tr>
<th>Type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTS120</td>
<td>120kN</td>
</tr>
<tr>
<td>DTS150</td>
<td>150kN</td>
</tr>
</tbody>
</table>

Both systems incorporate an integral half-round bearing block, which ensures correct bedding of local reinforcement, avoiding local crushing.
Traditionally, beams were supported from columns using integral corbels. Apart from being difficult and costly to form in the column, they reduce headroom locally and spoil the appearance. Using BSF does away with the need for corbels, leaving a smooth soffit. Round, or odd-shaped columns present no problems.

Traditional corbel design.

Corbel-less BSF design on round column.

BSF insert in a beam with “knife” component projecting.

Inserts work equally well with beam/beam as with beam/column.
Focused on construction solutions for keynote projects in the UK and Worldwide

**BALCON™**
Adjustable and insulated steel balcony connections

**ISOPRO®**
Insulated concrete balcony connections

**JTA ANCHOR CHANNEL**
For adjustable connections into concrete

**PENTAFLEX®**
Concrete waterproofing systems

**COLUMN SHOES**
High-load connections for precast columns

**JDA**
Punching shear reinforcement for concrete columns

**RVK/TSS**
Invisible connections for precast stair landings

**JSD+**
Shear dowels for concrete movement joints

**FERBOX®**
Reinforcement continuity strip for in-situ connections

**RAPIDOBAT®**
Seamless column formwork for quality architectural concrete