

# Stair Landing Connections

## TSS Telescopic Connectors

Combining precast concrete stairs and landings with core walls which are poured in situ is increasingly common. Precast slabs such as stair landings are traditionally supported by rolled steel angles (RSAs) bolted to the wall. Installation is slow, requires high degrees of accuracy, ties up the crane with costly hook-time and can realistically only be used on straight walls.

To address these issues and provide an aesthetic alternative to unsightly bracketry, the TSS range of telescopic connectors was developed.

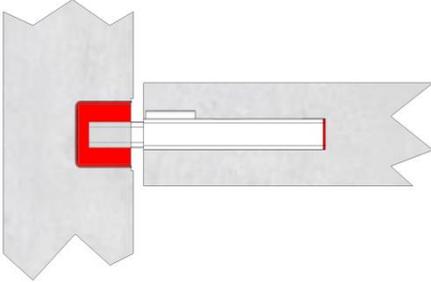
Owing to simplicity of installation and superior fixing tolerance, TSS connectors offer key benefits over RSA or corbel connection methods, such as:

- Significantly improved health and safety
- Inherent robustness compliance and fire resistance
- Demonstrable cost efficiency

A **study** found that using telescopic connectors instead of RSAs reduced direct costs by 33% and man hours by 80%.

### Product range

### TSS Telescopic Connectors



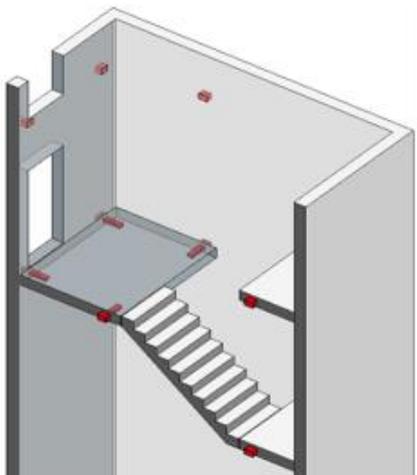
### Application



Fig 1



Fig 2



### Robustness

UK regulations require that all precast floor and stair elements are anchored to the main structure to provide robustness in the event of an incident. Traditional dowels or similar connections into walls result in more work and additional costs on site. With appropriate positioning of TSS telescopic connectors, anchorage is inherent. Where layout allows, robustness requirements are met with no additional measures or expenditure.

### Stair landing applications

Different configurations according to precast element shape and loadings are possible. To help you select the most appropriate stair landing connector, **technical enquiry forms** are available to download:

- Landing with connectors on three sides
- Landing with connectors at both ends
- Integral flight and landing with connectors on side and end
- Integral flight and landing with connectors on end
- Integral flight and two landings with connectors on sides and ends
- Integral flight and two landings with connectors at both ends

For other stair landing applications, please contact us for free technical and practical advice on product selection and installation.

### Alternative applications

TSS connectors can also be used for a diverse range of applications, including:

- Curved precast elements (Fig 1)
- Stabilising parapets against vehicle impact in multi-storey car parks (Fig 2)

### Product features

- Cord operated to deploy sliding inner tube
- Hot dip galvanised as standard, for smoother operation and corrosion resistance
- Cord operation means no hopper required, leaving no visible markings on top surface of landing
- Ideal where no screed is intended and blemish free precast finish is required
- Cold rolled grade S355 (minimum) steel is used for its high stress capacity
- Available in 4 variants to satisfy all common application conditions

### Capacity

To ensure lean and cost-efficient design, 40 kN, 80 kN and up to 100 kN standard capacities are available. Connectors may be used in pairs for higher load requirements. Capacities are resistances to factored loads (1.5 x live load, 1.35 x dead load). All telescopic connectors incorporate integral bearing blocks for correct seating of local reinforcement to avoid localised crushing or cracking.

### Fire resistance

Grouting around the connector (in the airgap between the landing and wall) provides equivalent cover as concrete, therefore 40mm grout cover will give 2 hours fire resistance.

### About Invisible Connections

We supply the concrete construction industry with 'unseen' telescopic connection systems for stairs, landings, beams and columns. We are also specialist manufacturers of the FERBOX® reinforcement continuity system, to application requirements.

All our products meet industry demands for improved safety, construction efficiency and cost competitiveness.

Our telescopic connection systems are endorsed by European Technical Approvals (ETAs). They comply with relevant Eurocode standards and are individually CE marked.

Our team provides free technical and practical advice on product selection and installation. Our technical specialism, innovative approach and manufacturing agility means we're often approached to help solve a specific issue. As a result, our product range continuously evolves to meet our customers' construction challenges.

Invisible Connections is the registered trademark of Norwegian company Invisible Connections AS. In 30 years, countless telescopic connectors have been used in construction projects around the world.

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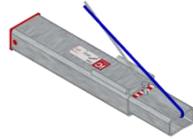
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[invisibleconnections.co.uk](http://invisibleconnections.co.uk)

## Stair Landing Connections

### TSS Telescopic Connectors

#### TSS product range



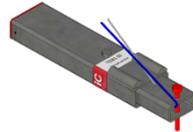
#### TSS 41 (standard version)

Cost-effective solution for thinner stair landings of thickness  $\geq 150\text{mm}$ . Small, compact connector for lighter loads up to 40 kN. Use in conjunction with REDiBOX PRF-STD.



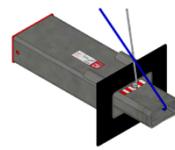
#### TSS 101 (standard version)

Versatile choice for most stair landing applications. Connector capacity up to 80 kN in a 200mm thick (min.) landing, increasing to 100 kN in a 265mm thick landing. Use in conjunction with REDiBOX PRF-STD.



#### TSS 81-30 (pinned version)

Where walls are located only on 2 sides of landing, connector has to be pinned to wall to meet robustness requirements. Axial capacity  $\leq 30\text{ kN}$ . Use in conjunction with REDiBOX PRF-PIN.



#### TSS 102 (acoustic version)

Minimises step-sound vibration from stairwell into adjacent rooms for high specification applications. Incorporates sound absorbing rubber composite between sliding components and landing/wall. Use in conjunction with REDiBOX PRF-STD.

### REDiBOX Permanent Recess Formers

All TSS telescopic connectors are designed to work in conjunction with a REDiBOX permanent recess former - a 'left in' component used to create recesses in precast or in situ walls to flexibly accommodate the TSS sliding connector.



#### REDiBOX PRF-STD (standard version)

Provides generous tolerance for installation of stair landings. Eliminates traditional digging-out of polystyrene or timber. Used in conjunction with TSS 41, TSS 101 and TSS 102.



#### REDiBOX PRF-PIN (pinned version)

Has an integral reinforced pocket (pin supplied) for tying landings to walls so robustness requirements can be met where only 2 walls available. Used in conjunction with TSS 81-30.

### Resources

Further information is available at [invisibleconnections.co.uk](http://invisibleconnections.co.uk) and includes:

- Technical literature
- BIM / CAD files
- NBS Plus specification links
- Case studies
- Cost comparison study: telescopic connectors v rolled steel angles
- 30 reasons why telescopic connectors are more efficient than rolled steel angles

### Standards

Design is in accordance with the following standards:

- Eurocode 2: Design of concrete structures Part 1-1 General rules and rules for buildings
- Eurocode 3: Design of steel structures Part 1-1 General rules and rules for buildings
- Eurocode 3: Design of steel structures Part 1-8 Design of joints

All TSS products are covered by appropriate **European Technical Approvals** (ETAs).

For technical and practical advice call

**+44 (0)1844 266000**