



SPEEDWAY

TECHNICAL DATA

This compilation of technical information is intended to supply essential details relating to the Speedway Cable Ladder System. This will ensure that the specified cable ladder installation has suitable strength & rigidity to provide reliable support at minimum installed cost.

Our Design Team is available to answer any questions relating to particular site requirements which may not be answered in the following sections.

Contents

1.0 Speedway Cable Ladder General Information	Page	3.0 Loading Information	Page
1.1 Slot Patterns	95	3.1 Dead Loads	105
1.2 Standard Material Gauges	96	3.2 Point Loads	105
1.3 Free Base Area	96	3.3 Load Deflection Tables	106
1.4 Cross-Sectional Area	96		
1.5 Speedway Cable Ladder Specification	97		
2.0 Installation	Page		
2.1 Loads	98		
2.2 Support Spacing	98		
2.3 Locations of Couplers	99		
2.4 Support Locations for Speedway Fittings	99		
2.4.1 Speedway Flat Elbows	100		
2.4.2 Speedway Inside & Outside Risers	100		
2.4.3 Speedway Equal & Unequal Tees	101		
2.4.4 Speedway Crosses	101		
2.4.5 Speedway Reducers	102		
2.5 Loading of Supports	102		
2.6 Electrical Continuity Characteristics	103		
2.7 Electromagnetic Compatibility (EMC)	103		
2.8 Assembly Recommendations	103		

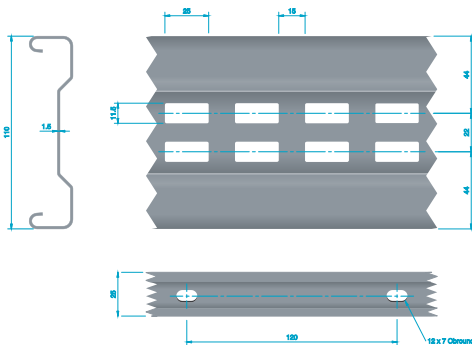


1. GENERAL INFORMATION

1.1 Slot Patterns

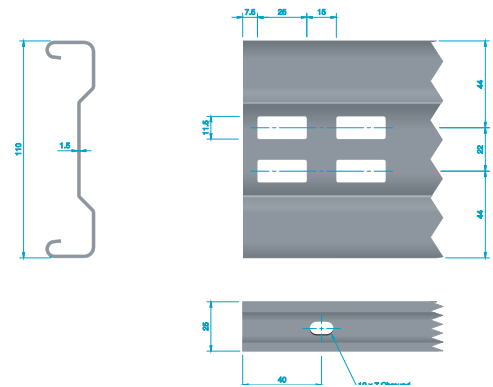
Details of the slot patterns for the Speedway cable ladder system are given in the following diagrams. These slot patterns are common for each Speedway cable ladder type, irrespective of material gauge.

Speedway SW4 Straight Ladder



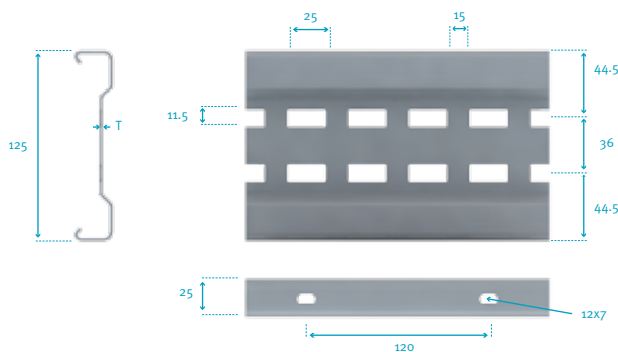
T = Side Wall Gauge (See section 1.2 for details).

Speedway SW4 Fittings



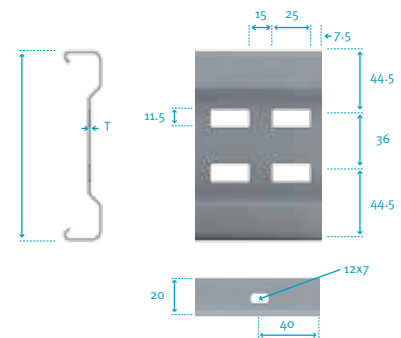
The slot pattern for the Speedway SW4 fittings is repeated at each end of the fitting side wall and centrally on radial side walls (elbows, tees & crosses).

Speedway SW5 Straight Ladder



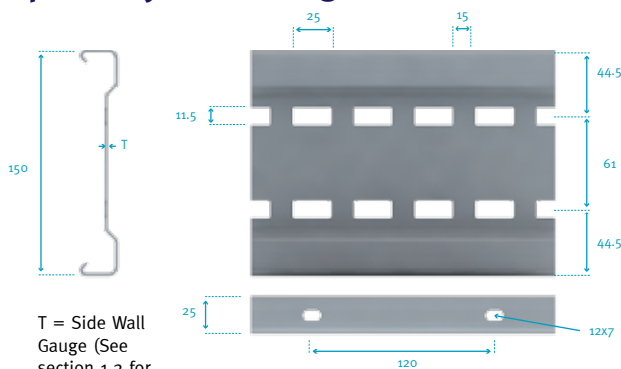
T = Side Wall Gauge (See section 1.2 for details).

Speedway SW5 Fittings



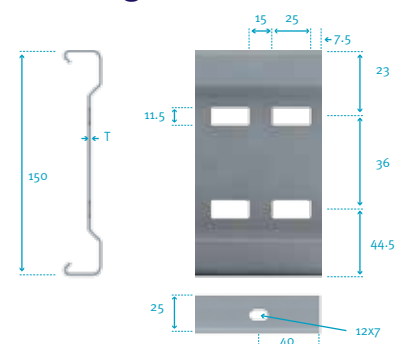
The slot pattern for the Speedway SW5 fittings is repeated at each end of the fitting side wall and centrally on radial side walls (elbows, tees & crosses).

Speedway SW6 Straight Ladder



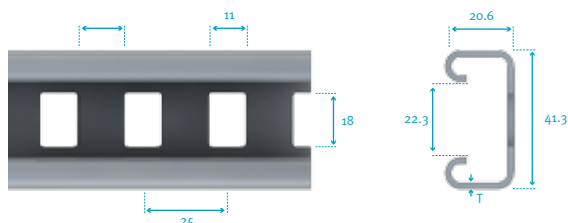
T = Side Wall Gauge (See section 1.2 for details).

Speedway SW6 Fittings



The slot pattern for the Speedway SW6 fittings is repeated at each end of the fitting side wall and centrally on radial side walls (elbows, tees & crosses).

Speedway Rung



T = Rung Gauge (1.5mm, 2.0mm or 2.5mm)

for the corresponding item in an alternative Finish and Material. For exact weights please contact our Technical Team.

Material Correction Factor		
Hot Dipped Galvanized Silicon Rich Steel		Stainless Steel
1.06		1.05

1.2 Standard Material Gauges

The gauges for the standard Speedway cable ladder & fittings have been determined by providing the most cost effective and efficient combination of material gauges for the side walls and rungs to suit the designed application of each type of Speedway cable ladder system.

The following table shows the standard material gauges for the Speedway cable ladder system in mild steel/hot dip galvanized finish (GA). These gauges are supplied as standard unless otherwise specified.

Standard Material Gauges

Ladder Type	Material & Finish	Side Wall Gauge	Rung Gauge						
			150 mm	300 mm	450 mm	600 mm	750 mm	900 mm	1050 mm
Speedway SW4	GA	1.5mm	1.5mm						
Speedway SW5		2mm							
Speedway SW6		2mm	2mm						

The Speedway cable ladder system is also available in a combination of side wall and rung gauge combinations from 1.5mm to 2.5mm to suit specific installation requirements.

Consult our Design Team for guidance on the correct selection of material gauge combinations.

Weights, where provided are for the Hot Dipped Galvanized Mild Steel item. The following correction factor should be used to determine the approximate weight

1.3 Free Base Area

Speedway straight cable ladder has the following free base area (FBA):

Ladder Type	Free Base Area	Classification to BS EN ISO 61537
Speedway SW4	86.5%	Y
Speedway SW5		
Speedway SW6		

1.4 Cross Sectional Area

Speedway cable ladder has the following cross-sectional area (CSA):

Speedway SW4 Ladder	CSA mm2	Speedway SW5 Ladder	CSA mm2	Speedway SW6 Ladder	CSA mm2
SW4/SL3/150/#	13780	SW5/SL/150/#	15975	SW6/SL/150/#	20075
SW4/SL3/300/#	26740	SW5/SL/300/#	30975	SW6/SL/300/#	38825
SW4/SL3/450/#	39700	SW5/SL/450/#	45975	SW6/SL/450/#	57575
SW4/SL3/600/#	52660	SW5/SL/600/#	60975	SW6/SL/600/#	76325
SW4/SL3/750/#	65620	SW5/SL/750/#	75975	SW6/SL/750/#	95075
SW4/SL3/900/#	78580	SW5/SL/900/#	75975	SW6/SL/900/#	113825
		SW5/SL/1050/#	105975	SW6/SL/1050/#	132575

Add Finish & Material.

> 1.5 Specification

The following is a typical specification for a cable ladder system which embodies the key features of the Speedway cable ladder system.

- 1 The cable ladder system shall be based on two longitudinal outward facing side members with returned edge flanges to improve safety during handling, installation and cablepulling activities. The longitudinal side members shall form the main structural elements of the cable ladder system and shall be longitudinally ribbed for enhanced stiffness and rigidity.
- 2 The profile of the side members shall remain constant for the straight cable ladder and the cable ladder fittings.
- 3 The profile of the side members shall present a smooth surface to allow for easier cable pulling and to minimise the opportunities for damage to the cable insulation.
- 4 The longitudinal side members shall have a height of:
 - 104mm and a flange width of 20mm (for Speedway SW4)
 - 125mm and a flange width of 25mm (for Speedway SW5)
 - 150mm and a flange width of 25mm (for Speedway SW6).
- 5 The longitudinal side member shall have a wall thickness of:
 - 1.5mm* (for Speedway SW4).
 - 2.0mm* (for Speedway SW5 1.5 & 2.0 Speedway SW6).
 * or required side wall thickness – see 1.2 for details.
- 6 The side members of the straight cable ladder shall be fully slotted to minimise weight. The slot pattern in the side members shall allow for cutting of the straight cable ladder at any point along the length without the need to drill the side member when connecting to adjacent straight cable ladder and cable ladder fittings using the standard means of coupling.
- 7 The two longitudinal side members shall be connected by individual transverse members (rungs) which shall be welded at low level to the inside face of the side members to give a loading depth of:
 - 78mm for Speedway SW4
 - 100mm for Speedway SW5 &
 - 125mm for Speedway SW6.
- 8 The transverse members shall be evenly spaced at 300mm centres along the length of the straight cable ladder. The transverse members for horizontal bends (flat elbows) shall be located at either 0° or 7.5° and

multiples there of around the fitting subject to a maximum spacing of 465mm between adjacent transverse members when measured as a linear distance along the outside face of the horizontal bend. The transverse members for horizontal intersection fittings (tees and crosses) shall be evenly spaced at intervals not exceeding 465mm. The transverse members for vertical bends (inside and outside risers) shall be evenly spaced at intervals not exceeding 300mm centres.

- 9 The transverse members shall be of channel profile with a width of 41mm and a height of 21mm. The transverse members shall have a continuous open slot to suit the mounting of cable restraint devices (cleats, etc.) and other equipment using standard channel nuts and fixings. The base of the transverse members shall have slots of size 18mm x 11mm at 25mm centres to suit the use of cable ties and banding.

- 10 The transverse members shall have a wall thickness of:

Hot Dip Galvanised Finish;

1.5mm* for widths up to and including 600mm, and a wall thickness of 2.0mm* for widths above 600mm (for Speedway SW4)

1.5mm* for widths up to and including 600mm, and a wall thickness of 2.0mm* for widths above 600mm (for Speedway SW5)

2.0mm* (for Speedway SW6)

Stainless Steel;

1.5mm* (for Speedway SW4)

2.0mm* (for Speedway SW5)

2.0mm* (for Speedway SW6)

Deep Galvanised Finish;

1.5mm* (for Speedway SW4)

1.5mm* (for Speedway SW5)

2.0mm* (for Speedway SW6)

* or required rung wall thickness – see 1.2 for details.

- 11 The transverse members for straight cable ladder shall be orientated with the continuous slot facing alternately upwards and downwards. The transverse members for cable ladder fittings shall be orientated with the continuous slot facing upwards to allow for the securing of cable restraint devices (cleats, etc.) at every rung position.
- 12 The width of the straight cable ladder and the cable ladder fittings shall be measured relative to the inside

faces of the side members. The widths of the straight cable ladder and cable ladder fittings shall be 150mm, 300mm, 450mm, 600mm, 750mm, 900mm & 1050mm.

- 13 The straight cable ladder shall have a length of 3000mm or 6000mm as specified.
- 14 The cable ladder fittings shall have fixed angles of 90°, 60°, 45° and 30°.
- 15 Radiused cable ladder fittings shall have a radius of 300mm, 450mm, 600mm, 750mm, 900mm, 1050mm & 1200mm. The radius of the fitting shall be measured relative to the inside face on the radiused side wall.
- 16 The cable ladder system shall be manufactured using:

For Mild Steel – Hot Dip Galvanized Finish; mild steel of grade D11 to BS EN 10111 and shall be hot dip galvanized after manufacture to BS EN ISO 1461.

For stainless steel: stainless steel grade 1.4404 (316 marine grade) to BS EN 10088.

For Silicon-rich Steel – Deep Galvanized Finish; silicon-rich steel (generally complying to grade S355 to BS EN 10025) and shall be deep galvanized after manufacture to twice the coating thickness specified by BS EN ISO 1461.

- 17 The couplers shall be profiled to match the profile of the cable ladder. The couplers shall be secured using M10 square-shouldered bolts with rounded heads. The bolts shall be secured with M10 serrated flanged nuts as standard. The couplers shall have a slot pattern which prevents slip between adjacent straight ladder lengths (including cut lengths of straight cable ladder) and between cable ladder fittings. The couplers shall have a slot pattern which allows for easy connection to cut lengths of straight cable ladder without the need for on - site drilling.

2. INSTALLATION RECOMMENDATIONS

2.1 Loads

A correctly designed and specified cable ladder installation should take into account the nature and extent of the loads which will be imposed on the cable ladder system. These loads comprise of dead loads including the self-weight of the cable ladder system, the weight of the cables and secondary equipment attached to the cable ladder, imposed loads which occur during installation of the cable ladder system and during cable pulling operations, and external loads such as wind, snow, & ice.

Cable ladders are often employed in locations where the wind speeds may cause considerable lateral loading and careful consideration must be given to design to ensure a satisfactory installation. An awareness of the worst possible climate conditions is necessary when specifying the correct Speedway cable ladder system.

The load-deflection information given in 3.4 is based on static loading of the Speedway cable ladder installation and does not take into account dynamic effects such as earthquake loading, etc.

In designing a cable ladder installation it is good practice to allow at least a 20% excess capacity in a new installation for future expansion. Such a provision is of great economic advantage when there is a later need for additional cables.

2.2 Support Spacing

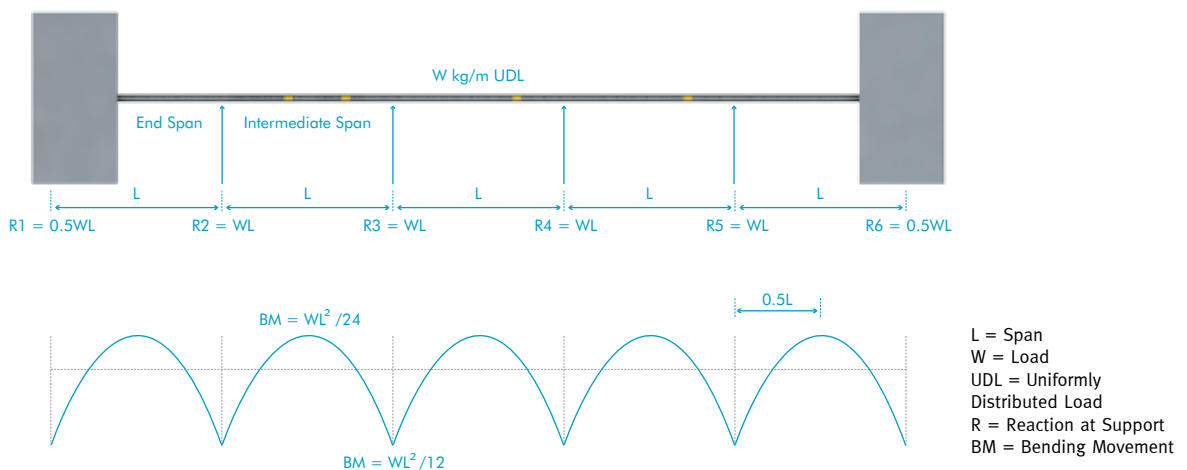
The space between the supports of a cable ladder installation is referred to as the span. Supports for cable ladder should, as far as practicable, be spaced so as to create the most economical load/span ratio to suit the capacity of the cable ladder system. This will give the most advantageous solution when considering procurement and installation costs. As a general rule of thumb, the load-carrying capability of the Speedway Cable Ladder system increases as the span decreases, so a lighter duty cable ladder system can be specified for shorter spans. Conversely, a heavier duty Speedway Cable Ladder system will need to be specified for longer spans.

When considering support positions it should be remembered that it is necessary to support accessories when a change of direction takes place i.e. bends, tees, risers etc. This is to ensure that undue 'corner' cantilever reaction is minimised. Recommendations for the location of supports for Speedway Cable Ladder fittings are given in section 2.4.

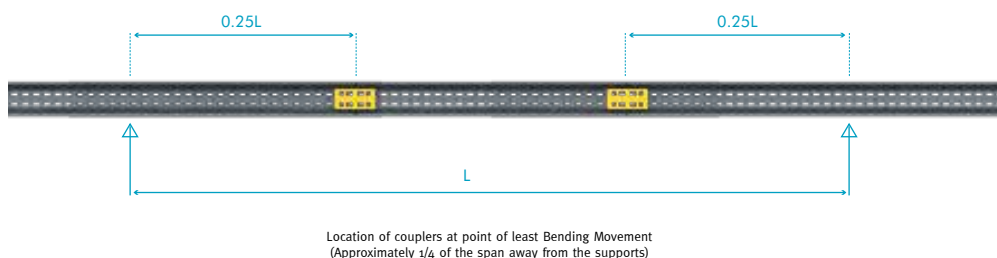
> 2.3 Location of Couplers

The maximum bending moments acting on a cable ladder run occur in the cable ladder side members at the supports and at the mid span position. For this reason it is good practice to avoid locating couplers in a cable ladder run either directly on supports or at the mid span position. It is also good practice to avoid locating couplers in the end span of a continuous beam installation as the bending moments in the end span are, for simple end support installations, much higher than those found in the intermediate spans.

These limitations cannot always be achieved in a cable ladder installation and are not a mandatory requirement for the Speedway coupling system where the loading information given in 3.3 is valid irrespective of the location of the couplers. The ideal positions to locate the connections in a cable ladder run are at approximately a quarter of a span from the supports where the bending moment, and hence the stress, are minimal. Positioning the couplers at the quarter span positions is of benefit during installation, assisting in alignment of the cable ladders and allowing unhindered securing of the cable ladder to the supports.



Bending Movement distribution for a continuous beam with fixed ends
(The Bending Movement for ends spans in a continuous beam with simple end supports will be higher than that shown)



> 2.4 Support Locations for Speedway Fittings

The following illustrations show the recommended support positions when installing Speedway cable ladder fittings.

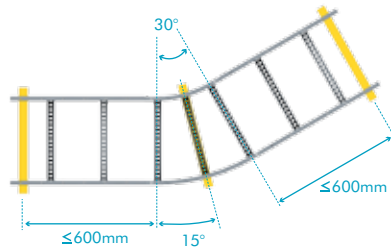
The supports should be fully fixed to provide maximum support for the Speedway cable ladder fitting.

For more specific recommendations relating to particular site installations please contact our Design Team.

2.4.1 Speedway Flat Elbows

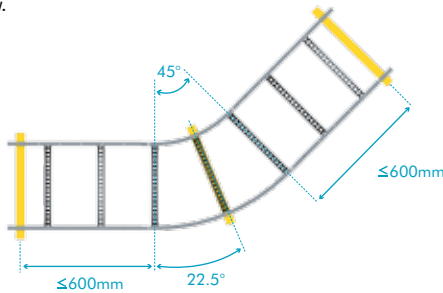
Speedway 30° Flat Elbows

For 30° flat elbows, supports should be placed within 600mm of the end of the flat elbow. For 30° flat elbows with radii of 450mm and above, an intermediate support should be located radially at 15° under the flat elbow.



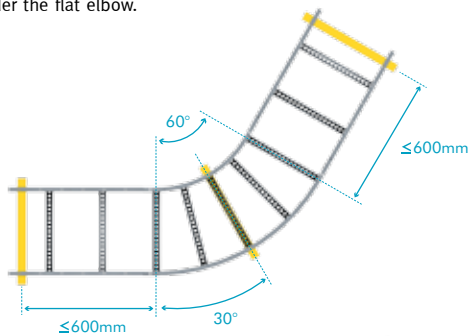
Speedway 45° Flat Elbows

For 45° flat elbows, supports should be placed within 600mm of the end of the flat elbow. For 45° flat elbows with radii of 450mm and above, an intermediate support should be located radially at 22.5° under the flat elbow.



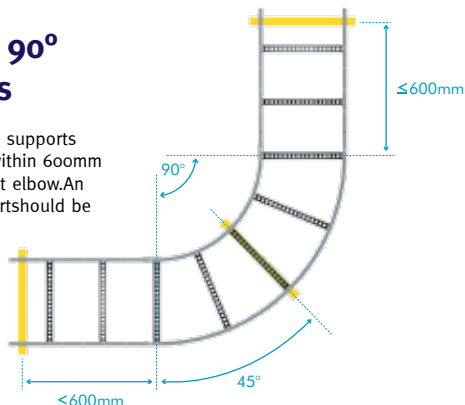
Speedway 60° Flat Elbows

For 60° flat elbows, supports should be placed within 600mm of the end of the flat elbow. An intermediate support should be located radially at 30° under the flat elbow.



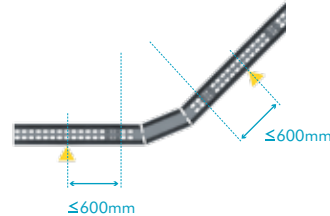
Speedway 90° Flat Elbows

For 90° flat elbows, supports should be placed within 600mm of the end of the flat elbow. An intermediate support should be located radially at 45° under the flat elbow.



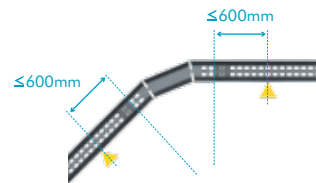
2.4.2 Speedway Inside & Outside Risers

Speedway Inside Risers (all angles)



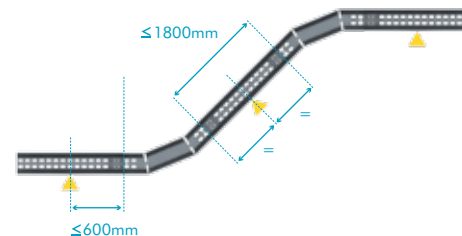
For inside risers (30°, 45°, 60° & 90°) supports should be placed within 600mm of the end of the inside riser.

Speedway Outside Risers (all angles)

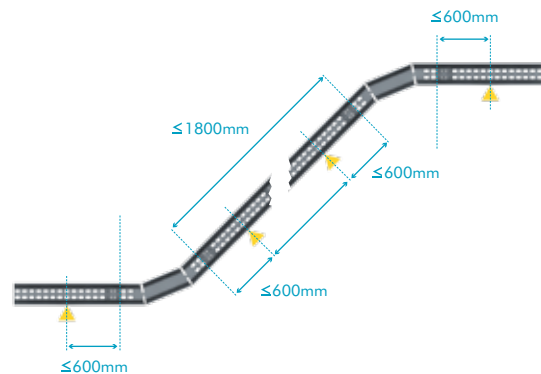


For inside risers (30°, 45°, 60° & 90°) supports should be placed within 600mm of the end of the inside riser.

Speedway Inside & outside Risers in Offset Arrangement



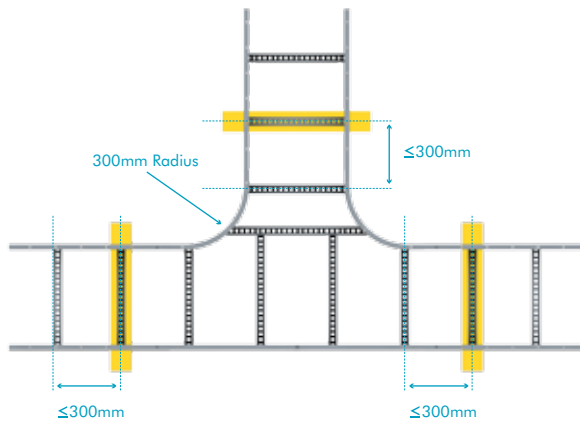
For inside & outside risers (30°, 45°, 60° & 90°) forming an offset of length up to 1800mm, supports should be placed within 600mm of the end of the offset and centrally on the inclined cable ladder.



For inside & outside risers (30°, 45°, 60° & 90°) forming an offset of length over 1800mm, supports should be placed within 600mm of the ends of the inside & outside risers. The inclined cable ladder should be supported in accordance with the support recommendations for a straight cable ladder run.

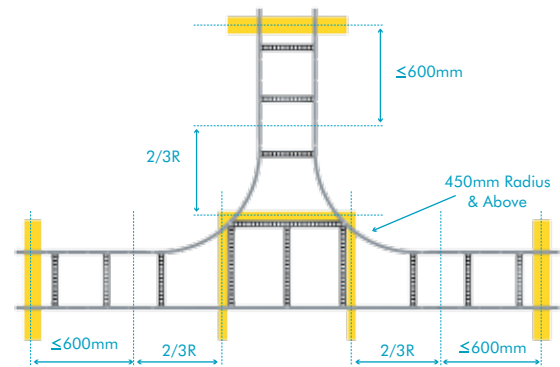
> 2.4.3 Speedway Equal & Unequal Tees

Speedway Equal & Unequal Tees (300mm Radius)



For equal and unequal tees with radii of 300mm, supports should be located within 300mm of the tee on each branch in the cable ladder run.

Speedway Equal & Unequal Tees (450mm Radius & Above)

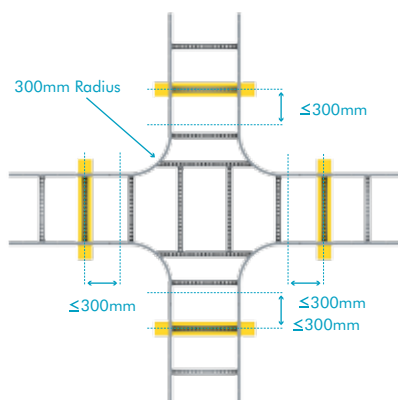


For equal and unequal tees with radii of 450mm and above, supports should be located within 600mm of the tee on each branch in the cable ladder run.

Intermediate supports should be placed at approximately $\frac{2}{3}$ of the radius (R) on each branch of the tee as shown.

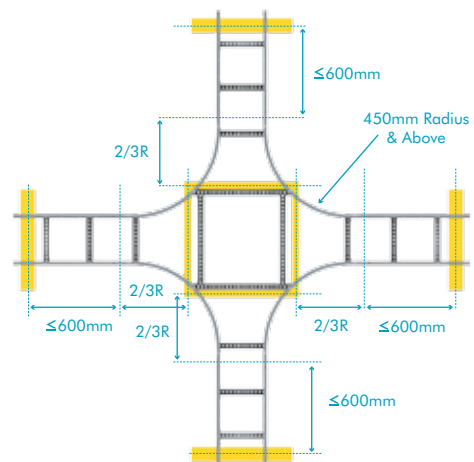
> 2.4.4 Speedway Crosses

Speedway Crosses (300mm Radius)



For crosses with radii of 300mm, supports should be located within 300mm of the cross on each branch in the cable ladder run.

Speedway Crosses (450mm Radius & Above)



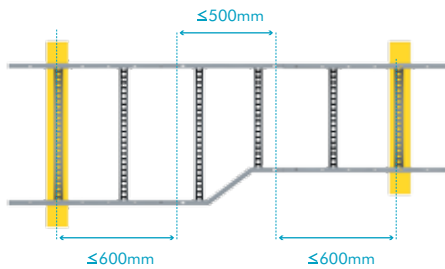
For crosses with radii of 450mm and above, supports should be located within 600mm of the cross on each branch in the cable ladder run.

Intermediate supports should be placed at approximately $\frac{2}{3}$ of the radius (R) on each branch of the cross as shown.

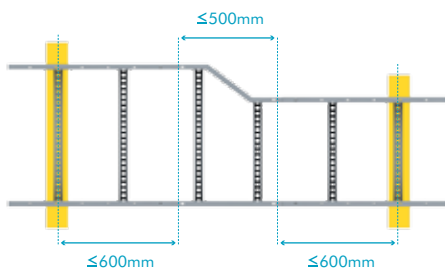
› 2.4.5 Speedway Reducers

For all widths of straight reducer, left-hand reducer, and right-hand reducer, supports should be located on the cable ladder run within 600mm of the reducer as shown.

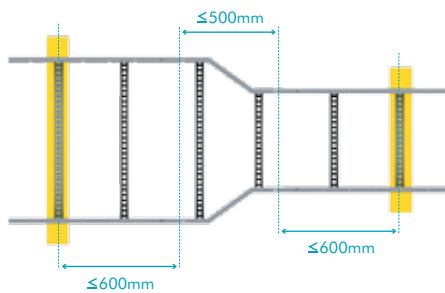
Speedway Right-Hand Reducer



Speedway Left-Hand Reducer



Speedway Straight Reducer



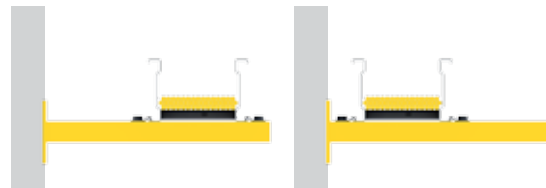
Speedway cable ladder, care should be taken to position the cable ladder as close to the backplate of the cantilever as the installation routing will allow.

Where the Speedway cable ladder is not filled to capacity, or is carrying heavy cables, care should be taken to position the cables as close to the cantilever backplate as the installation routing will allow.

For those installations where the routing of the cable ladder or the position of heavy cable loads cannot be undertaken in accordance with the above, the IC/PROP/Size cantilever arm prop should be used to correctly support the cantilever arm.

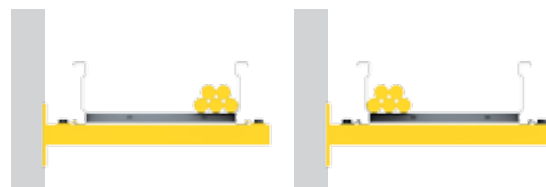
More details on the Safe Working Load of Speedway supports can be found in the Supports Section.

For further information and guidance on the loading of supports please contact our Design Team.



Avoid locating cable ladder on the end of cantilever support

Locate cable ladder close to the cantilever backplate



Avoid placing unsymmetrical cable loads on the extremes of cantilever supports

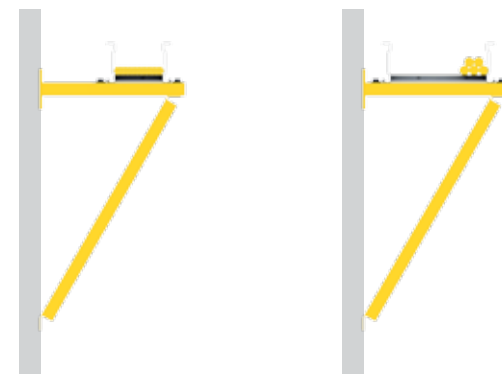
Locate unsymmetrical cable loads close to the cantilever backplate

› 2.5 Loading of Supports

It is important that cable ladder and cable ladder supports are loaded in a symmetrical manner such that undue stresses are kept to a minimum.

The safe working load figures for the Speedway cable ladder and the Speedway cantilever type supports is based on a uniform loading within the Speedway cable ladder and on the assumption that the correct length of cantilever is used in each case.

Where cantilevers of additional length are used to support



Use the cantilever prop (IC/PROP/Size – See page 213) to support offset cable ladder or unsymmetrical cable loads.

> 2.6 Electrical Continuity Characteristics

In tests conducted to verify the electrical continuity characteristics of the Speedway cable ladder it has been established that the standard Speedway coupling system provides adequate electrical continuity, ensuring equipotential bonding and connection to earth.

The Speedway cable ladder system has been tested for electrical continuity to BS EN 61537 (Section 11.1). Details are given in the following table.

Electrical Continuity to BS EN 61537

Ladder Type	Material & Finish	Impedance across joint	Impedance per metre length
Speedway SW4	Hot Dip Galvanized	<50mΩ	<5mΩ
	Stainless Steel		
Speedway SW5	Hot Dip Galvanized		
	Stainless Steel		
Speedway SW6	Hot Dip Galvanized		
	Stainless Steel		

BS EN 61537 requires a maximum impedance of 50mΩ across the coupled joint and 5mΩ per metre length without a joint

The electrical continuity of the Speedway cable ladder joints has been tested to NEMA VE (Section 5.1). Details are given in the following table.

Electrical Continuity to NEMA VE 1

Ladder Type	Material & Finish	Resistance across joint
Speedway SW4	Hot Dip Galvanized	<33mΩ
	Stainless Steel*	
Speedway SW5	Hot Dip Galvanized	
	Stainless Steel*	
Speedway SW6	Hot Dip Galvanized	
	Stainless Steel	

NEMA VE 1 requires a net resistance of no more than 33mΩ across the coupled joint. * Requires use of earth bonding strap EBS01

Earth continuity bonding straps (part number EBS01) of cross sectional area 16 mm² are available for use with Speedway cable ladder where a non-conductive surface finish i.e. epoxy coated etc, has been specified or where the installation requires an additional means of bonding.

> 2.7 Electromagnetic Compatibility (EMC)

In normal use Speedway cable ladder can be considered to be passive in respect of electromagnetic influences, emission and immunity. When Speedway cable ladder is installed as part of a wiring installation, the installation may emit or may be influenced by electromagnetic signals. The degree of influence will depend on the nature of the installation within its operating environment and the electrical equipment connected by the wiring. As a minimum precaution to minimise the occurrence of electromagnetic influences, power and data/signal cables should be run on separate cable routings or at least separated by means of dividers.

Our Design Team should be consulted for further information on electromagnetic compatibility issues.

> 2.8 Assembly Recommendations

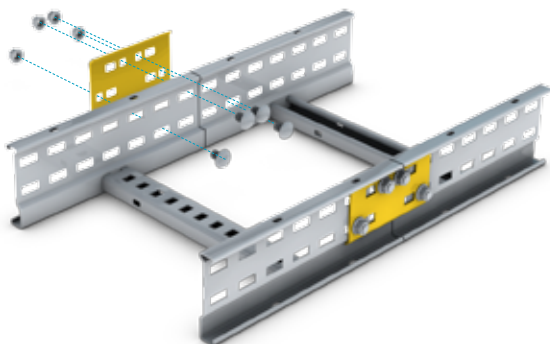
Instructions for the correct assembly of Speedway straight couplers and expansion couplers are given below.

Speedway Straight Couplers

The Speedway straight couplers are supplied with the correct number of fixing sets (4 for Speedway SW4 and 8 for Speedway SW5 & SW6), each comprising of an M10 x 20 square shouldered bolt and an M10 serrated flanged nut.

- 1 Locate the Speedway straight coupler on the outside of the two abutting components of the Speedway cable ladder installation (ladder to ladder) with the profile of the straight coupler aligned to the central ribbed profile on the abutting components.
- 2 Position the Speedway straight coupler over the two components such that a series of square apertures are created by the alignment of the slot patterns in the coupler and the slot patterns in the two abutting components. For joints between uncut Speedway cable ladders, the straight coupler should sit centrally across the joint. For connecting cut sections of Speedway cable ladder it may be necessary to reposition the coupler to create the series of square apertures.

- 3 Insert an M10X16/18 square shouldered bolt into one of the square apertures from the inside of the Speedway cable ladder with the threaded portion of the bolt protruding



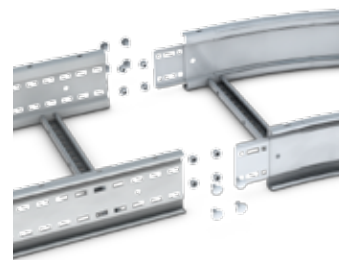
- 4 Fit an M10 Serrated Flange Nut onto the threaded portion of the bolt.
- 5 Tighten the fixing assembly by hand.
- 6 Repeat for the remaining fixing sets.
- 7 Fully secure the abutting components to the supporting structure.
- 8 Check the alignment of the Speedway straight coupler and the abutting components and adjust as necessary to give a fair and true alignment.
- 9 Tighten the hex nuts on the Speedway straight coupler to a torque of 46Nm.

Speedway Integral Coupler Assembly

Speedlok Speedway Fittings are supplied with the correct number of fixing sets for that type of fitting, each comprising of an M10 x 20 square shouldered bolt, an M10 serrated flange nut.

1. Position the Straight Length of Speedway Cable Ladder on the inside of the Integral Couplers of the Speedway fitting with the Integral Coupler lying over the web of the Speedway profile.
2. Position the Speedway Integral Coupler so that a series of square apertures are created by the alignment of the slot patterns in the coupler and the straight ladder.
3. Insert an M10 x 20 square shouldered bolt into one of the square apertures from the inside of the Speedway cable ladder with the threaded portion of the bolt protruding through the side wall of the ladder and the Speedway Integral Coupler.

4. Fit an M10 Serrated Flange Nut onto the threaded portion of the bolt.
5. Tighten the fixing assembly by hand.
6. Repeat for the remaining fixing sets.
7. Fully secure the abutting components to the supporting structure.
8. Check the alignment of the Speedway Integral Coupler and the abutting components and adjust as necessary to give a fair and true alignment.
9. Tighten the flange nuts on the Speedway straight coupler to a torque of 46Nm.



Speedway Expansion Couplers

The Speedway expansion couplers are supplied with 8 fixing sets, each comprising of an M10 x 25 square shouldered bolt, an M12 flat washer, an M10 shake-proof washer and an M10 hex nut. Refer to page 247 for details on the spacing between expansion couplers and the required gap setting procedure at the time of installation.

1. Locate the Speedway expansion coupler on the outside of the two abutting Speedway cable ladders with the profile of the expansion coupler aligned to the central ribbed profile on the Speedway cable ladders. NOTE: the expansion coupler should not be used to connect cut sections of cable ladder.
2. Position the Speedway expansion coupler equally over the two abutting Speedway cable ladders such that a series of square apertures are created by the alignment of the slot pattern in the coupler and the slot pattern in the cable ladders.
3. Insert an M10 x 25 square shouldered bolt into one of the square apertures from the inside of the Speedway cable ladder with the threaded portion of the bolt protruding through the Speedway cable ladder and the Speedway expansion coupler.
4. Fit a M12 flat washer and a M10 hex nut onto the threaded portion of the M10x25 bolt.
5. Tighten the fixing assembly by hand such that it is free to move within the slots of the Speedway cable ladder and the Speedway expansion coupler (some light resistance to movement is preferable).
6. Repeat for the remaining fixing sets.
7. Check the alignment of the Speedway expansion

coupler and the Speedway cable ladders and adjust as necessary to give a fair and true alignment.

8. Check the setting gap (See page 247)
9. Secure the Speedway cable ladders to the supporting structure using external flange clamps (SW/EFC See page 75) and nylon spacer pads (315AN10 See page 236).
10. Fit a second M10 hex nut onto each of the hand tightened assemblies. Using a M10 spanner to hold the first M10 hex nut in place, tighten the second M10 hex nut to a torque of 46Nm. Check that the completed

assembly is free to move (some light resistance to movement is preferable).

11. Repeat for the remaining fixing sets.
12. Check the installed Speedway expansion coupler for freedom of movement (some light resistance to movement is preferable).

Consult our Technical Team for installation instructions for the Speedway full moment expansion coupler.

3. Loading Information

To enable the selection of the most appropriate Speedway cable ladder for a particular installation it is necessary to consider the loads which must be supported and the distance between supports (the span). These loads are broadly classed as dead loads, imposed loads (see page 251) and point loads.

3.1 Dead Loads

Dead loads include the weight of any cables, pipes and secondary equipment carried on or installed on the cable ladder plus the self weight of the cable ladder and any component of the cable ladder (covers, connectors, accessories, etc.).

Weight data for cables is readily available from the cable manufacturer or supplier and is usually quoted in terms of kilograms per metre (kg/m). The weight per metre from the cables (or pipes, etc) is the sum of the individual cable (or pipe, etc) weights. Weight data for secondary equipment should also be readily available from the equipment manufacturer or supplier and is usually quoted in terms of kilograms (kg). The unit weight for the secondary equipment can be converted into a equivalent weight per metre by using the following formula:

$$\text{Equivalent weight per metre } W_m = \frac{2 \times \text{unit of equipment (kg)}}{\text{Span (m)}} \text{ kg/m}$$

For example, a secondary item of equipment with a weight of 12kg has an equivalent weight per metre W_m of 8kg/m for a span of 3m. This figure should be added to the sum of the individual cable weights (or pipe, etc). When determining the location of secondary items of equipment, care should be taken to either mount these items centrally across the cable ladder using the Speedway mounting plates, or place these items adjacent to, or directly onto, the cable ladder side members and as close to the cable ladder supports as the installation will allow.

The allowable loading figures given in the tables overleaf include the self weight of the Speedway cable ladder. The weight data for additional installed components (covers, mounting accessories, etc) for the Speedway cable ladder system can be provided on request by our Design Team.

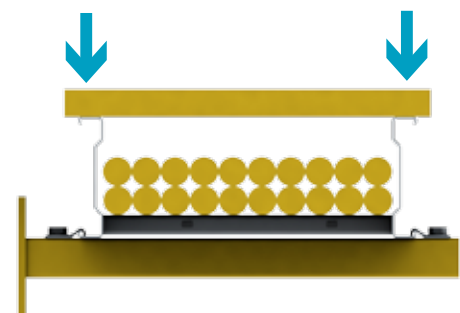
3.2 Point Loads

Point loads are often applied to the cable ladder during installation, cable pulling and in-service inspection.

An allowance can be made for the influence of point loads at the design stage when determining the total load to be carried by the Speedway cable ladder system. Typical point loads are in the order of 75kg to 150kg. When specifying a point load requirement it should be noted that the value of the point load should be kept to a minimum as incorporating the point load will reduce the allowable cable load for the Speedway cable ladder. Loading graphs which include the influence of a mid span point load are available on request.

Speedway cable ladder is not intended to be used as a walkway and on no account should point loads be applied to the rungs. On those occasions where it is necessary to apply a point load care should be taken to apply the load evenly onto the two side members, preferably using a board or similar support to distribute the load over as long a section of the cable ladder as possible.

Correct application of point load onto Speedway cable ladder using a board to spread the load evenly onto the side members



► 3.3 Load-Deflection Tables

When correctly mounted and secured, cable ladder can be considered to be a 'continuous beam'. This implies that the cable ladder run is regularly supported and that the cable ladders at the extremities of the run are firmly anchored. The following tables are used to calculate the safe working load and have been verified by testing in accordance to BS EN 61537. The load bearing capacity of a cable ladder is limited by the lesser of the maximum allowable stress induced in the side members and rungs or the maximum deflection acceptable in the same members. The maximum allowable stress is usually limited by the materials lower yield stress; this gives a safety factor of 1.7 against the ultimate tensile strength.

Maximum deflection, (in the absence of a particular customer need) is not allowed to exceed 1/360th of the distance between supports (span) longitudinally or 1/200th of the rung length (cable ladder width) transversely.

Although unusual, there may be occasions when it is difficult or indeed impossible to anchor the cable ladder securely in position. Under these circumstances the ladder is 'simply supported' and its load bearing ability is substantially reduced. As a rough guide maximum loads should be limited to two thirds of those shown in the loading tables and increased deflection values should be accepted for each span.

The data given in the tables is for Vantrunk cable ladder installed as a continuous beam and allows for the weight of the ladder itself. The safe working load values represent a uniformly distributed load and a factor of 1.7 as recommended in the cable ladder European standard. This information is given for guidance only and larger safety factors can be used depending on the installation. The Speedway Cable Ladder system, components and accessories have been tested to BS EN ISO 61537.

Further details are can be provided by our Design Team.

Loading Data - Vantrunk Extreme Steel Hot Dip Galvanized Finish

Ladder Type	Width w mm	Span & Safe Working Load kg/m									
		2m	2.5m	3m	3.5m	4m	4.5m	5m	5.5m	6m	
SW4/SL/150/G	150	542	346	239	175	133	-	-	-	-	
SW4/SL/300/G	300	542	345	238	174	132	-	-	-	-	
SW4/SL/450/G	450	541	345	238	173	132	-	-	-	-	
SW4/SL/600/G	600	470	344	237	173	131	-	-	-	-	
SW4/SL/750/G	750	369	343	236	171	130	-	-	-	-	
SW4/SL/900/G	900	254	254	235	171	129	-	-	-	-	
SW4/SL/1050/G	1050	184	184	184	170	128	-	-	-	-	
SW5/SL/150/G	150	-	-	491	359	274	215	173	-	-	
SW5/SL/300/G	300	-	-	491	359	273	214	172	-	-	
SW5/SL/450/G	450	-	-	490	358	273	214	172	-	-	
SW5/SL/600/G	600	-	-	490	358	272	213	171	-	-	
SW5/SL/750/G	750	-	-	367	356	271	212	170	-	-	
SW5/SL/900/G	900	-	-	251	251	251	211	169	-	-	
SW5/SL/1050/G	1050	-	-	181	181	181	181	168	-	-	
SW6/SL/150/G	150	-	-	-	-	357	280	226	185	155	
SW6/SL/300/G	300	-	-	-	-	356	280	225	185	154	
SW6/SL/450/G	450	-	-	-	-	355	279	224	184	153	
SW6/SL/600/G	600	-	-	-	-	354	278	223	183	152	
SW6/SL/750/G	750	-	-	-	-	354	277	222	182	152	
SW6/SL/900/G	900	-	-	-	-	251	251	222	182	151	
SW6/SL/1050/G	1050	-	-	-	-	181	181	181	181	150	

Loading Data - 1.4404 Stainless Steel (316 Marine Grade)

Ladder Type	Width w mm	Span & Safe Working Load kg/m									
		2m	2.5m	3m	3.5m	4m	4.5m	5m	5.5m	6m	
SW4/SL/150/SS	150	473	301	208	152	115	-	-	-	-	
SW4/SL/300/SS	300	473	301	208	151	115	-	-	-	-	
SW4/SL/450/SS	450	472	300	207	151	114	-	-	-	-	
SW4/SL/600/SS	600	445	300	207	150	114	-	-	-	-	
SW4/SL/750/SS	750	282	282	206	150	113	-	-	-	-	
SW4/SL/900/SS	900	194	194	194	149	113	-	-	-	-	
SW4/SL/1050/SS	1050	140	140	140	140	112	-	-	-	-	
SW5/SL/150/SS	150	-	-	429	314	239	188	152	-	-	
SW5/SL/300/SS	300	-	-	429	313	239	188	151	-	-	
SW5/SL/450/SS	450	-	-	428	313	238	187	150	-	-	
SW5/SL/600/SS	600	-	-	427	312	237	186	149	-	-	
SW5/SL/750/SS	750	-	-	350	312	238	186	150	-	-	
SW5/SL/900/SS	900	-	-	240	240	237	186	149	-	-	
SW5/SL/1050/SS	1050	-	-	174	174	174	174	149	-	-	
SW6/SL/300/SS	300	-	-	-	-	311	244	196	161	134	
SW6/SL/450/SS	450	-	-	-	-	310	243	196	160	134	
SW6/SL/600/SS	600	-	-	-	-	309	243	195	160	133	
SW6/SL/750/SS	750	-	-	-	-	308	242	194	159	132	
SW6/SL/900/SS	900	-	-	-	-	308	241	194	158	131	
SW6/SL/1050/SS	1050	-	-	-	-	237	237	193	158	131	
SW6/SL/3/1050/G	1050	-	-	-	-	171	171	171	157	130	

Loading Data - Silicon-rich Steel Deep Galvanized Finish

Ladder Type	Width w mm	Span & Safe Working Load kg/m									
		2m	2.5m	3m	3.5m	4m	4.5m	5m	5.5m	6m	
SW4/SL/150/GX	150	681	435	301	220	167	-	-	-	-	
SW4/SL/300/GX	300	681	434	300	219	167	-	-	-	-	
SW4/SL/450/GX	450	680	433	299	219	166	-	-	-	-	
SW4/SL/600/GX	600	456	433	299	218	166	-	-	-	-	
SW4/SL/750/GX	750	288	288	288	216	164	-	-	-	-	
SW4/SL/900/GX	900	197	197	197	197	163	-	-	-	-	
SW4/SL/1050/GX	1050	142	142	142	142	142	-	-	-	-	
SW5/SL/150/GX	150	-	-	619	453	346	272	219	-	-	
SW5/SL/300/GX	300	-	-	618	452	345	271	219	-	-	
SW5/SL/450/GX	450	-	-	617	452	344	271	218	-	-	
SW5/SL/600/GX	600	-	-	454	451	344	270	217	-	-	
SW5/SL/750/GX	750	-	-	287	287	287	269	216	-	-	
SW5/SL/900/GX	900	-	-	196	196	196	196	196	-	-	
SW5/SL/1050/GX	1050	-	-	141	141	141	141	141	-	-	
SW6/SL/450/GX	450	-	-	-	-	449	353	285	234	195	
SW6/SL/600/GX	600	-	-	-	-	448	352	284	233	195	
SW6/SL/750/GX	750	-	-	-	-	447	351	283	232	194	
SW6/SL/900/GX	900	-	-	-	-	446	351	282	232	193	
SW6/SL/1050/GX	1050	-	-	-	-	355	350	281	231	192	
SW6/SL3/900/GX	900	-	-	-	-	242	242	242	230	191	
SW6/SL3/1050/GX	1050	-	-	-	-	174	174	174	174	174	