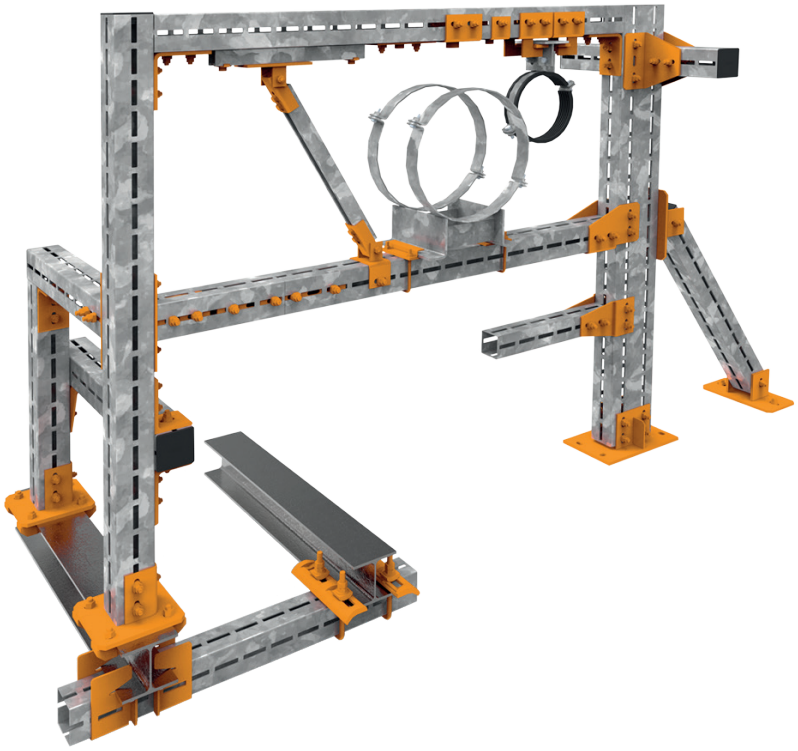


MODULAR STEEL FRAME SYSTEM

SEISMIC GUIDE

TekSpAn®

JANUARY 2023

Preliminary remark

This guide is intended to provide support in the design of pipe routes and heavy pipeline construction taking seismic influences into account.

It only represents a recommendation for action. The planning and execution of fastening solutions must always be carried out under the technical and legal requirements of the respective country.

The specified loads are only valid for the respective installation examples shown.

Fundamentals for the seismic design of internals and components of pipe fixation

Seismic phenomena and causes of damage

An earthquake causes rapid ground movements (ground vibrations) in all directions, whereby the movements in the horizontal direction usually predominate. The building, i.e. the supporting structure and all other building elements, are caused to vibrate by the ground shaking. Each floor slab experiences a different movement (see examples on page 8). As a rule, the horizontal accelerations and movements are greatest on the top floors. The horizontal differential deformations between the storeys (storey misalignment) are often greatest in the lowest storeys. The magnitude of building movements and storey skew depends not only on ground movements but also on the characteristics of the building as a whole. Buildings that are stiff in the horizontal direction experience higher accelerations and smaller storey misalignments than buildings that are soft in the horizontal direction, which experience smaller accelerations but larger storey misalignments for the same ground movements.

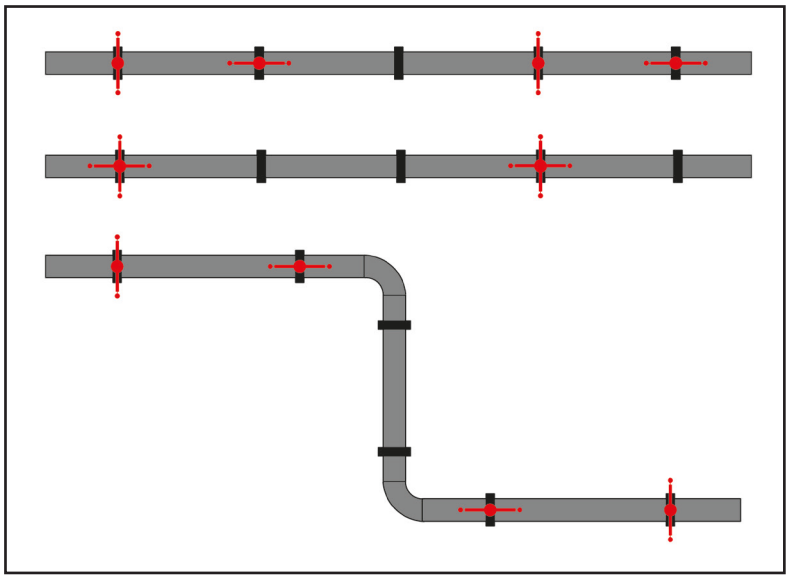
Pipelines, ventilation and cable ducts

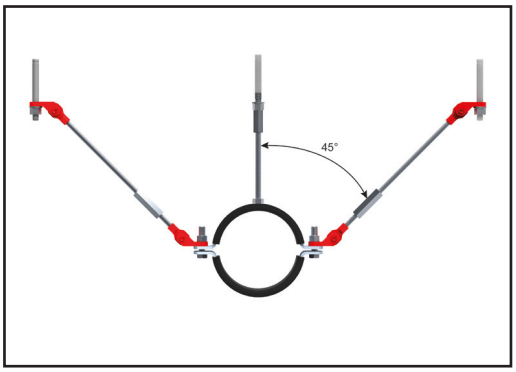
Pipes are sensitive to both deformation and acceleration. Inadequately fixed pipes can collide with other objects or fall down.

Damage occurs especially with large differential displacements between fix points. Connections, joints, bends, breakthroughs and butt joints are vulnerable. Line bridges are also frequently damaged, e.g. by failure of the steel profiles or the anchoring. This can result in danger to persons, damage to property, impaired functionality (due to heavy fixtures falling over), blocking of escape routes (especially with high superstructure heights) and damage to the environment.

Important notes on pipeline installation

Bracing for pipelines may be required in longitudinal and transverse directions. Rails, brackets or pipe bridges should also be braced and anchored. Possible options are either bending-resistant fixings or diagonal pendulum bars (optimum angle of inclination = 45°).





Fundamentals for the seismic design of internals and components of pipe fixation

Seismic phenomena and causes of damage

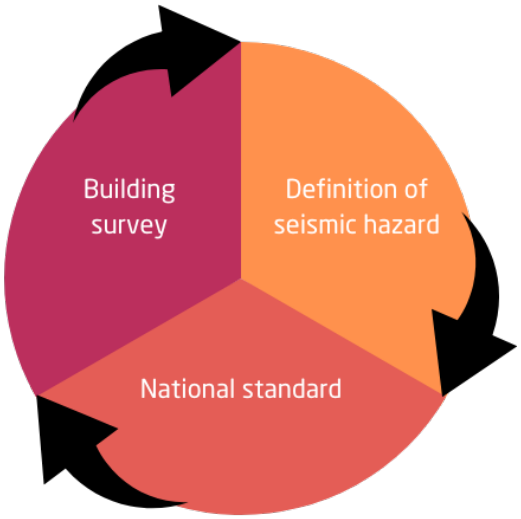
- Wall openings can also be used to transfer the horizontal forces, provided that no excessive relative displacements are to be expected. If no support is available, sufficient clearance should be left between the opening and the pipe.
- At least one longitudinal brace should be arranged per straight pipe run and one cross brace each at the beginning and end. In the longitudinal direction, the transmission of force from the pipe to the bracing should be taken into account.
- Interaction by larger elements mounted within the system should be considered. As a rule, one arranges a strut on both sides of the element.
- Risers should be fixed at regular intervals. In the case of penetrations, the pipes should be supported on the ceiling, possibly with springs in the case of large thermal expansions. Sufficient clearance should be provided for relative floor displacements.
- Flexible connections, ductile sealing material and movable joints may be necessary where large relative displacements are expected, e.g. between two structures or storeys, in dilatations, in connections to vibration-isolated or rigidly fixed equipment. The choice depends on the type and diameter of the pipe and the size of the expected displacement.

(Source: Federal Office for the Environment BAFU, „Erdbebensicherheit sekundärer Bauteile und weiterer Installationen und Einrichtungen", 2016)

Fundamentals for the seismic design of internals and components of pipe fixation

Initial situation

The basis for all earthquake-compatible or earthquake-proof installations of HVAC installations and heavy pipeline construction is the local definition of the earthquake hazard, the respective country-specific standard and the respective specifications of the building owner, which are usually summarised in a building report.



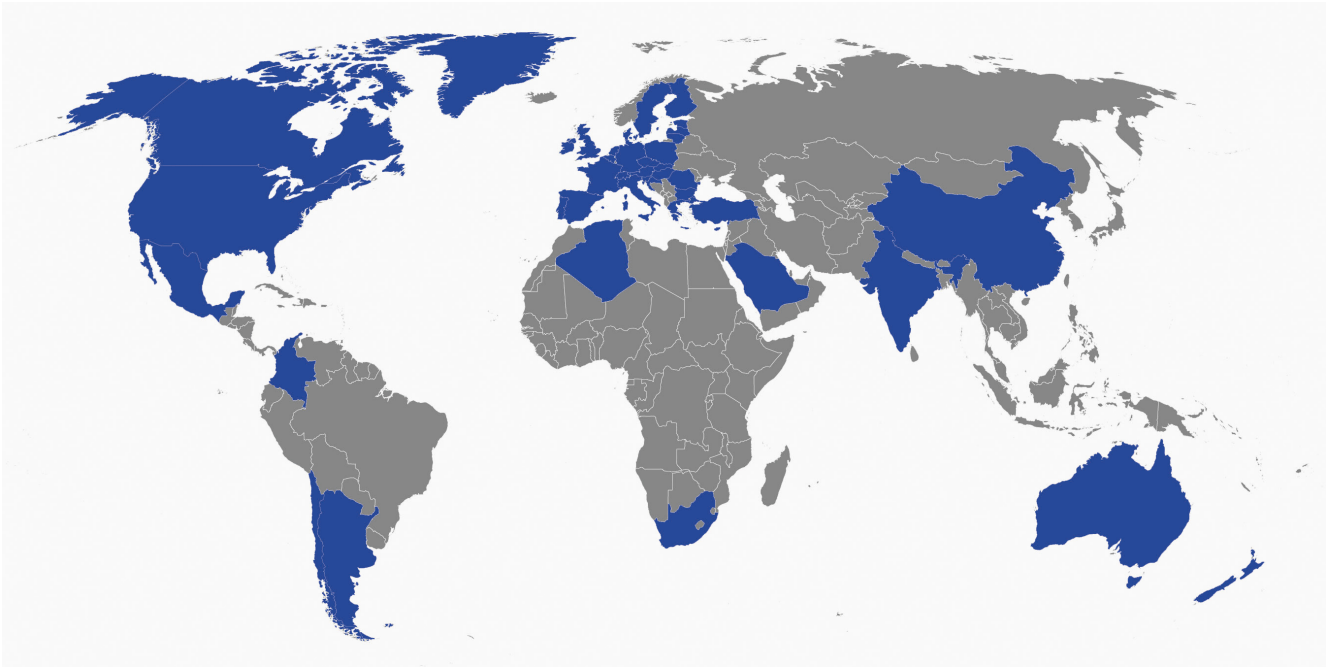
The building survey or comparable documentation is the safest basis for the route design. The following information should be included:

Building type: For residential and non-residential buildings as well as industrial facilities, the general specifications from the country-specific standard apply. For special buildings such as nuclear power plants, separate specifications must often be observed.

Protection goal: During planning, attention must be paid to whether an earthquake-compatible design is specified or an earthquake-resistant design. In earthquake-resistant construction, the primary protection goal is to keep escape and rescue routes open. Earthquake-resistant construction has the failure safety of the system (e.g. smoke extraction or sprinkler system) as a protection goal. In DIN EN 1998-1, the protection goals are defined as follows: „ ...that human life is protected; damage remains limited and important structures remain functional for the protection of the population".

Calculation basis: The building report must show which calculation methods and seismic loads were used as a basis.

National standards



Country	Standard
EU	EN 1998-1:2010 + A1:2013
Germany	DIN EN 1998-1
Austria	ÖNORM B 4015:2007-02
Switzerland	SIA 261/1:2003
	SIA 261/1:2020
Italy	NTC 2018
Spain	NCSE-02
Argentina	CIRSOC 103
Chile	NCh 433 1996
Canada	NBC 2015
Columbia	NSR - 10
Mexico	CFE Sismo 08
USA	IBC 2000
	IBC 2009-ASCE/SEI 7-05
	IBC 2012/15 - ASCE/SEI 7-10
	IBC 2018 - ASCE / SEI 7-16
Algeria	DTR B C 2-48
	DTR RPA99
South Africa	SANS 10160 4 2010
China	GB 50011 - 2001
	GB 50011 - 2010
India	IS 1893:2002
Saudi Arabia	SBC 301:2007
Turkey	O.G. 23089 + O.G. 23390
Australia	AS1170.4
New Zealand	NZS 4219:2009

Country	Supplements to EN 1998-1
Belgium	BN - ENV 1998-1-1: 2002 NAD-E/N/F
Germany	DIN EN 1998-1/NA:2011-01
France	NF EN 1998-1-1/NA:2014-09
Italy	UNI-EN 1991-1-1/NA:2007
Norway	NS-EN 1998-1:2004+A1:2013/NA:2014
Austria	ÖNORM EN 1991-1-1:2011-09
Portugal	NP EN 1998-1/NA:2009
Romania	SR EN 1998-1/NA:2004
Slovakia	STN EN 1998-1/NA:2008
Slovenia	SIST EN 1998-1:2005/A101:2006
Czech Rep.	ČSN EN 1998-1/NA:2007
UK	NA to BS EN 1998-1:2004:2008
Cyprus	CYS EN 1998-1/NA:2004

There is no claim to the topicality or completeness of this listing, any liability for this information is excluded.

Building survey

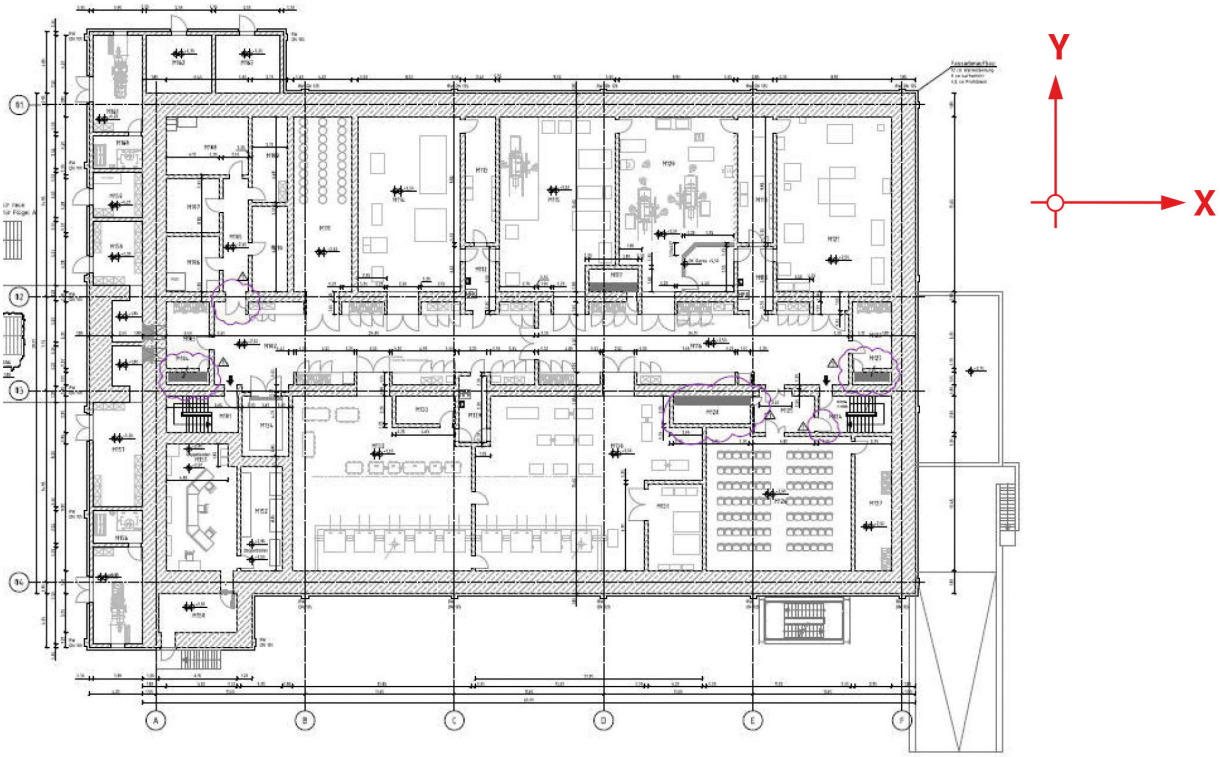
As mentioned in the first section, a building survey is the best basis for planning.

In addition to the information on the building type, the protection goals and other data such as the assumed wind and snow loads, the information on the calculation basis is the most important component.

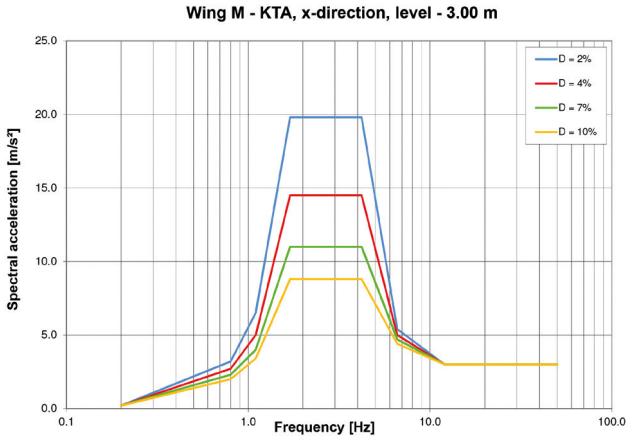
As a rule, the response spectrum is used. The response spectrum is a term from dynamics. It is a diagram that describes the response of a single-mass or multiple single-mass vibrator to a vibration excitation (source: dlubal.com). The spectra are based on an assumed earthquake (e.g. according to KTA 2201.4). On this basis, response spectra are then calculated for the different floors of the building in the X, Y and Z axes.

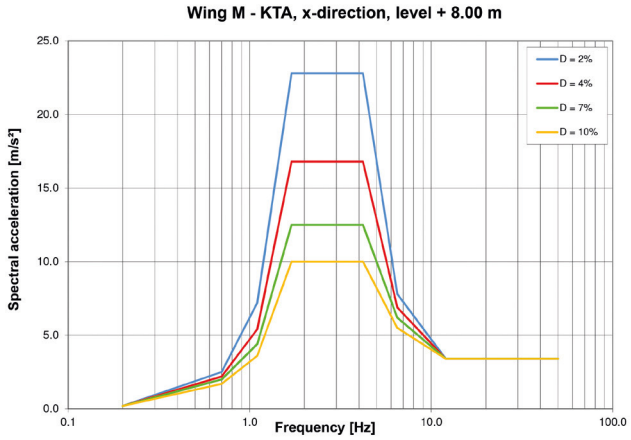
The following example shows the floor spectra for a real building on different levels. The increase of the spectral acceleration [m/s2] with the floor heights can be clearly seen. Of the calculated values for the three axes, the worst value is always used as a basis for the design of the fastening technology.

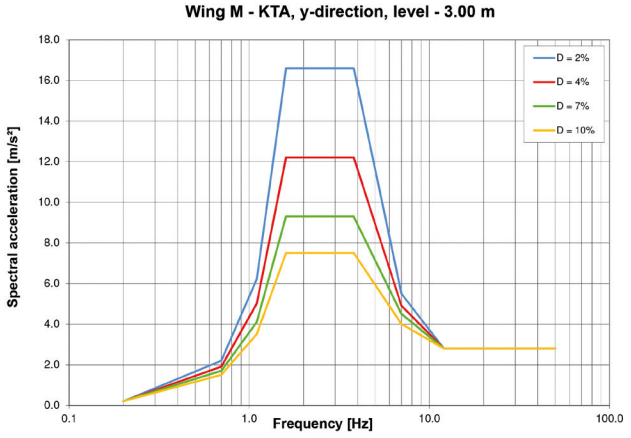
Case study - New construction of the wing of a laboratory and storage building with 3 floors (basement, ground floor and upper floor). Floor area of approx. 60 m x 40 m, outer shell of 180 cm reinforced concrete. The building is located in Germany and lies in earthquake zone 1, where a calculated intensity of 6.5 to >7 is to be expected. As radioactive materials are used in the building, the calculations are based on KTA 2201.4 (Design of nuclear power plants against seismic effects) and DIN EN 1998-1.

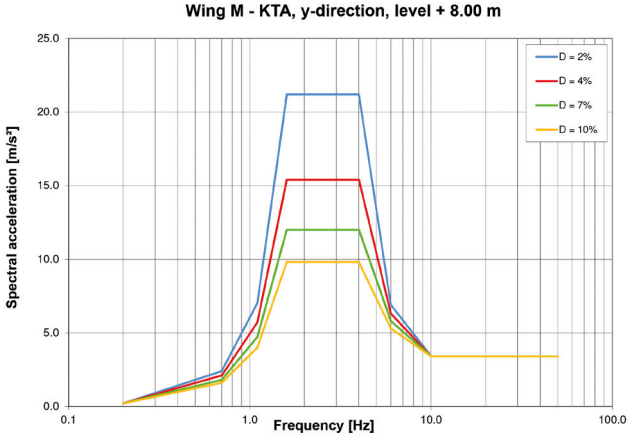


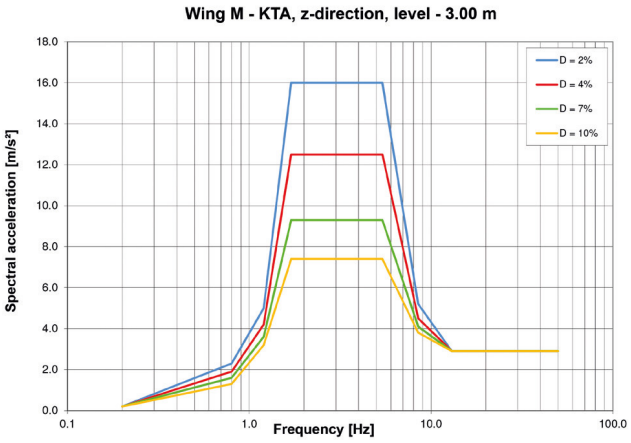
Building survey

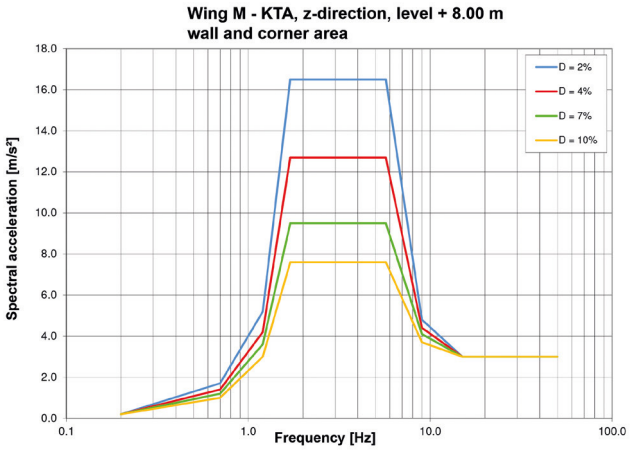






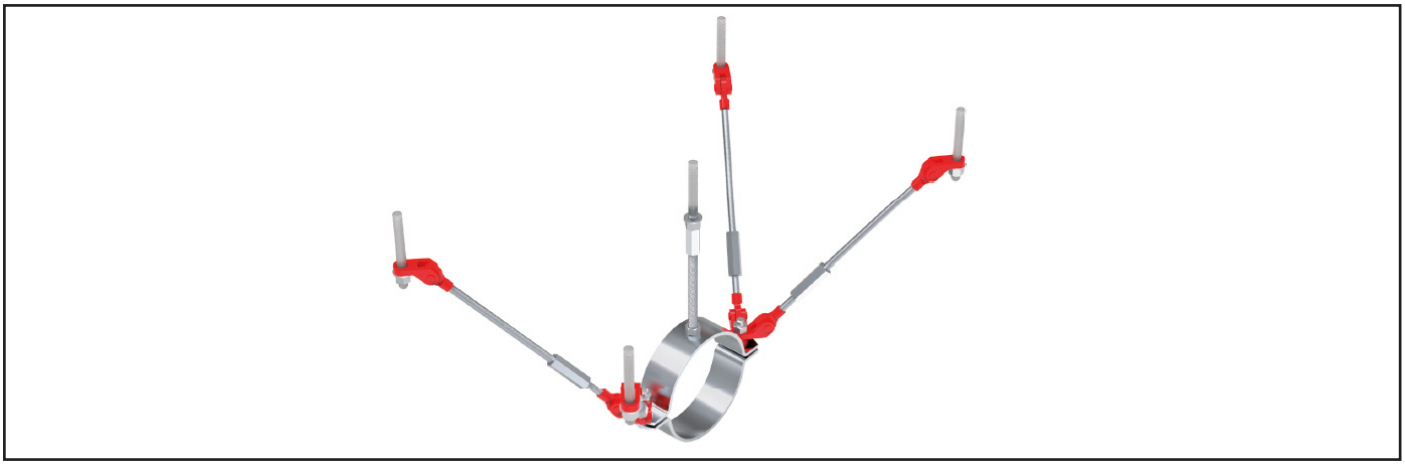


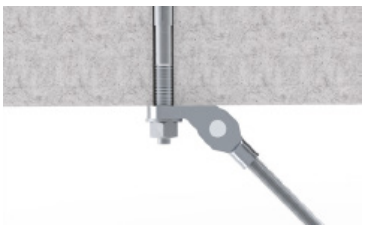
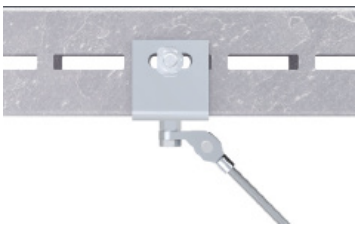
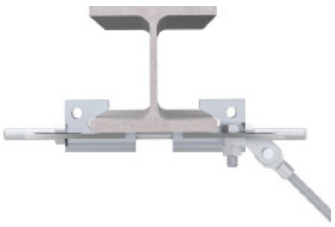
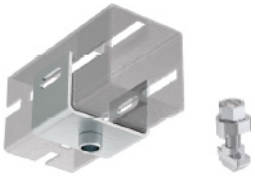
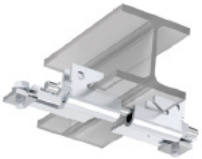




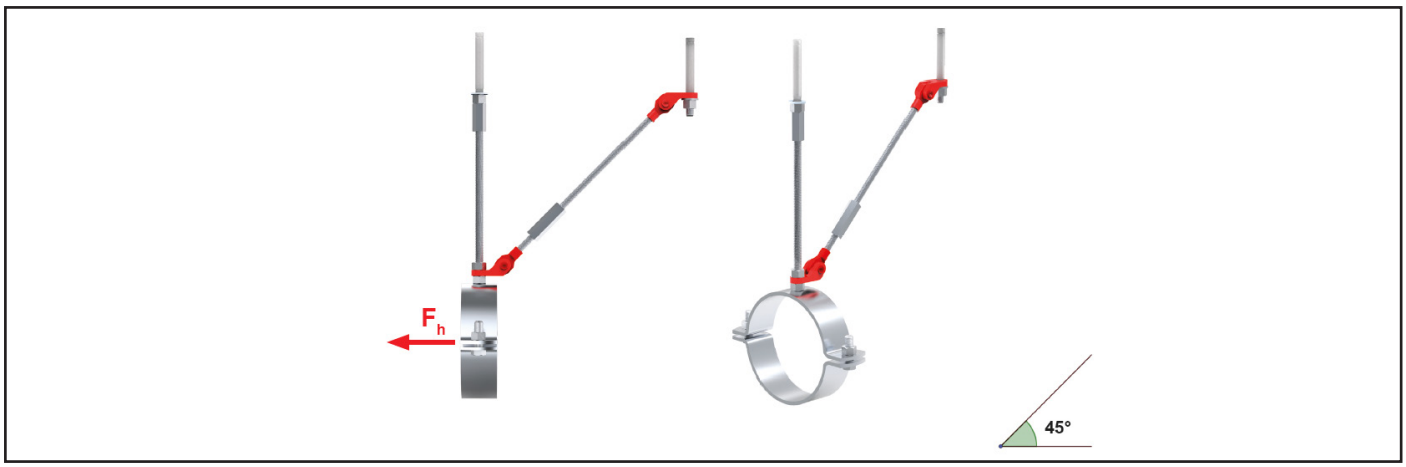
The client's structural engineer then subsequently specifies which values are to be used to calculate the seismic loads from the response spectra. These values are transferred to structural analysis software, such as RSTAB, to determine the loads for the fastening solutions. In these programs, one can select the applicable standard. Since dynamic loads are difficult to represent, many standards use the equivalent load method. Instead of the inertial forces caused by the earthquake, horizontal, static equivalent loads are used.

Single pipe installation



	Concrete	TekSpan	Steel beam
Anchor or **Holder**			
			
Support joint			
Threaded pin and **Threaded rod**			
Pipe clamps u-bolt	   		

Single pipe installation (single, axial)



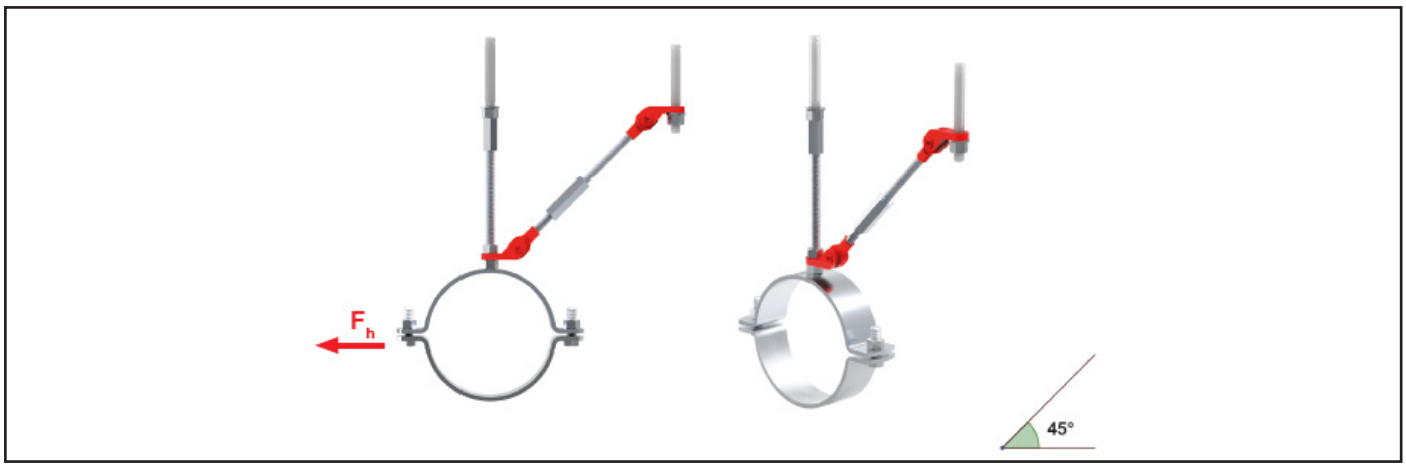
Permissible load per fixing system (without taking the anchor technique into account)

	Concrete	TekSpan	Steel beam
Length brace (mm)	**max. load F_h [kN]**	**max. load F_h [kN]**	**max. load F_h [kN]**
200	2,8	2,8	2,8
400	2,8	2,8	2,8
600	2,8	2,8	2,8
800	1,8	1,8	2,8

Element	Quantity	Identification
Suspension (Concrete)	2	Bolt anchor BZ plus M12
	1	Threaded rod M12
	1	Threaded coupling hexagon
Bracing	2	Support joint
	1	Hexagon screw M12
	1	Turnbuckle nut
	1	Thearded pin left/right
	1	Threaded rod M10
Pipe holder	1	Pipe clamp Titan HD, M12

	Pipe	Steel pipe
	Pipe-Ø	139,4 mm / DN 125
	Insulated	Yes
	Filled	Yes
	Weight	42kg/m
	Fastening distance	3m
	Pipe load (F_z)	1,26 kN
	Pipe clamp	Titan HD
	Dimension	140mm
	Lining	None
	Max. load	6 kN

Single pipe installation (single, radial)



Permissible load per fixing system (without taking the anchor technique into account)

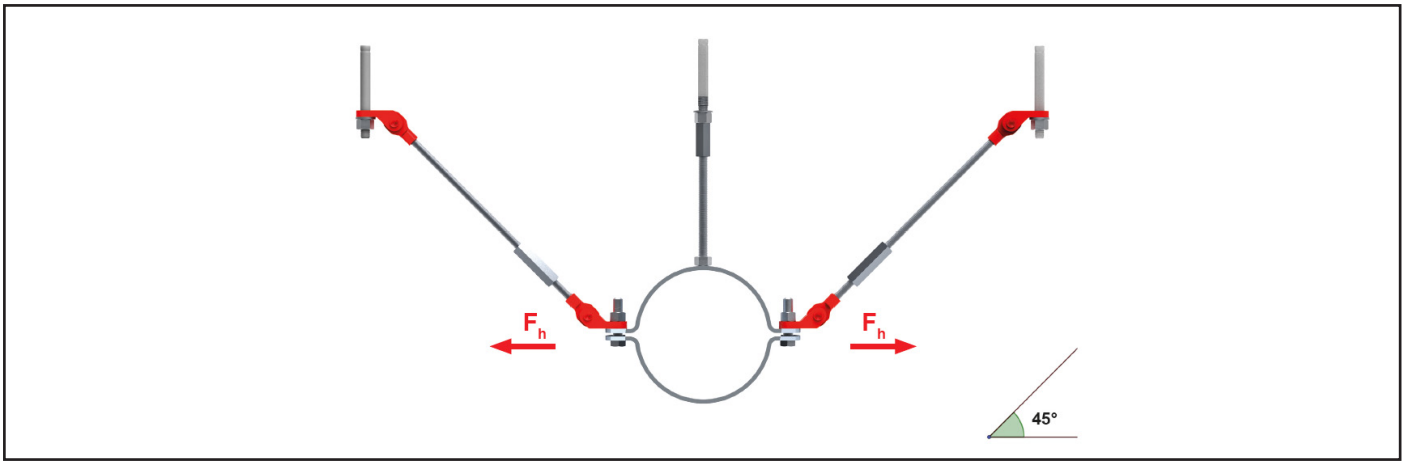
	Concrete	TekSpan	Steel beam
Length brace (mm)	**max. load F_h [kN]**	**max. load F_h [kN]**	**max. load F_h [kN]**
200	2,8	2,8	2,8
400	2,8	2,8	2,8
600	2,8	2,8	2,8
800	1,8	1,8	2,8

Element	Quantity	Identification
Suspension (Concrete)	2	Bolt anchor BZ plus M12
	1	Threaded rod M12
	1	Threaded coupling hexagon
Bracing	2	Support joint
	1	Hexagon screw M12
	1	Turnbuckle nut
	1	Thearded pin left/right
	1	Threaded rod M10
Pipe holder	1	Pipe clamp Titan HD, M12

Pipe	Steel pipe
Pipe-Ø	139,4 mm / DN 125
Insulated	Yes
Filled	Yes
Weight	42kg/m
Fastening distance	3m
Pipe load (F_z)	1,26 kN

Pipe clamp	Titan HD
Dimension	140mm
Lining	None
Max. load	6 kN

Single pipe installation (double, radial)



Permissible load per fixing system (without taking the anchor technique into account)

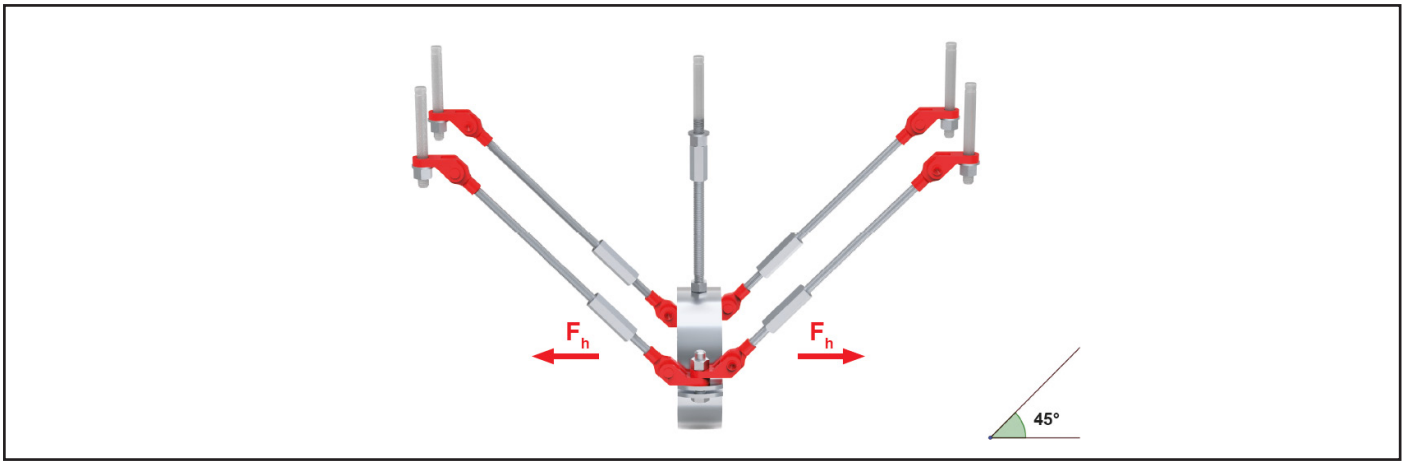
	Concrete	TekSpan	Steel beam
Length brace (mm)	**max. load F_h [kN]**	**max. load F_h [kN]**	**max. load F_h [kN]**
200	3,2	3,0	3,0
400	2,8	2,8	2,8
600	2,8	2,8	2,8
800	1,8	1,8	2,8

Element	Quantity	Identification
Suspension (Concrete)	3	Bolt anchor BZ plus M12
	1	Threaded rod M12
	1	Threaded coupling hexagon
Bracing	4	Support joint
	2	Turnbuckle nut
	2	Thearded pin left/right
	2	Threaded rod M10
Pipe holder	1	Pipe clamp Titan HD, M12

Pipe	Steel pipe
Pipe-Ø	139,4 mm / DN 125
Insulated	Yes
Filled	Yes
Weight	42kg/m
Fastening distance	3m
Pipe load (F_z)	1,26 kN

Pipe clamp	Titan HD
Dimension	140mm
Lining	None
Max. load	6 kN

Single pipe installation (fourfold, radial)



Permissible load per fixing system (without taking the anchor technique into account)

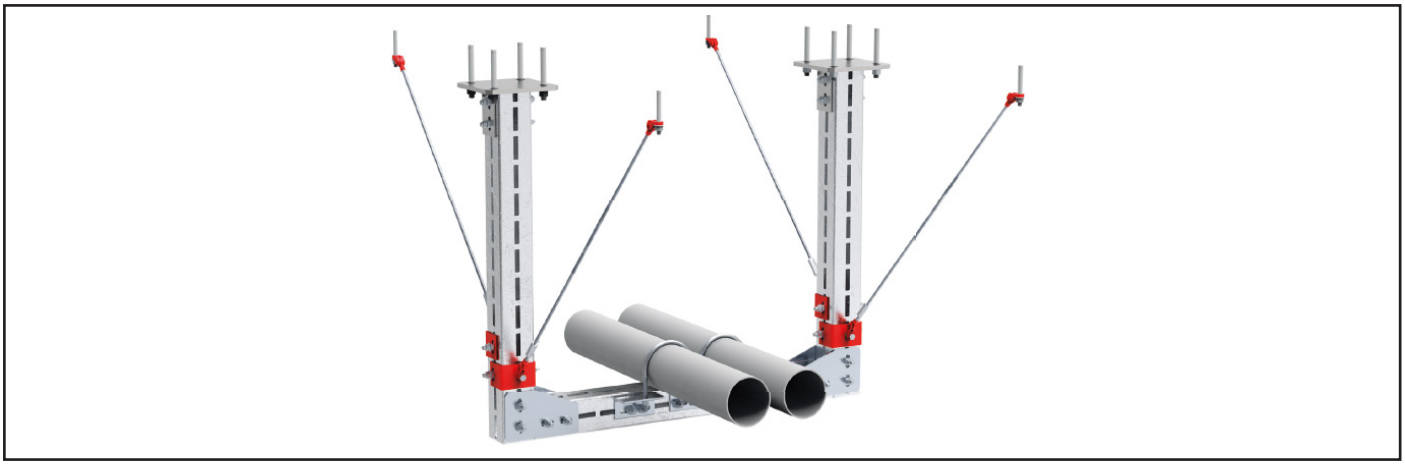
	Concrete	TekSpan	Steel beam
Length brace (mm)	**max. load F_h [kN]**	**max. load F_h [kN]**	**max. load F_h [kN]**
200	5,0	5,0	5,0
400	5,0	5,0	5,0
600	3,3	3,3	3,3
800	1,8	1,8	1,8

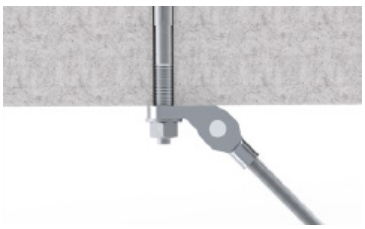
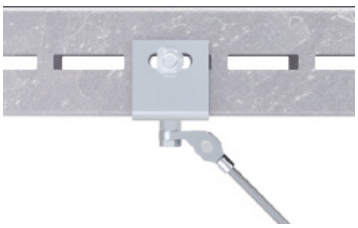
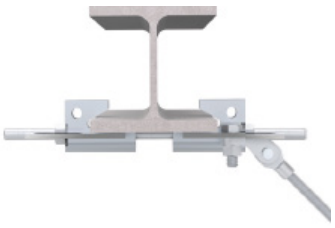
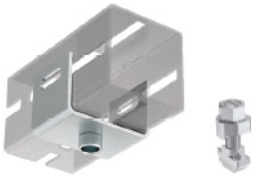
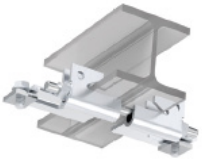
Element	Quantity	Identification
Suspension (Concrete)	5	Bolt anchor BZ plus M12
	1	Threaded rod M12
	1	Threaded coupling hexagon
Bracing	8	Support joint
	4	Turnbuckle nut
	4	Thearded pin left/right
	4	Threaded rod M10
Pipe holder	1	Pipe clamp Titan HD, M12

Pipe	Steel pipe
Pipe-Ø	139,4 mm / DN 125
Insulated	Yes
Filled	Yes
Weight	42kg/m
Fastening distance	3m
Pipe load (F_z)	1,26 kN

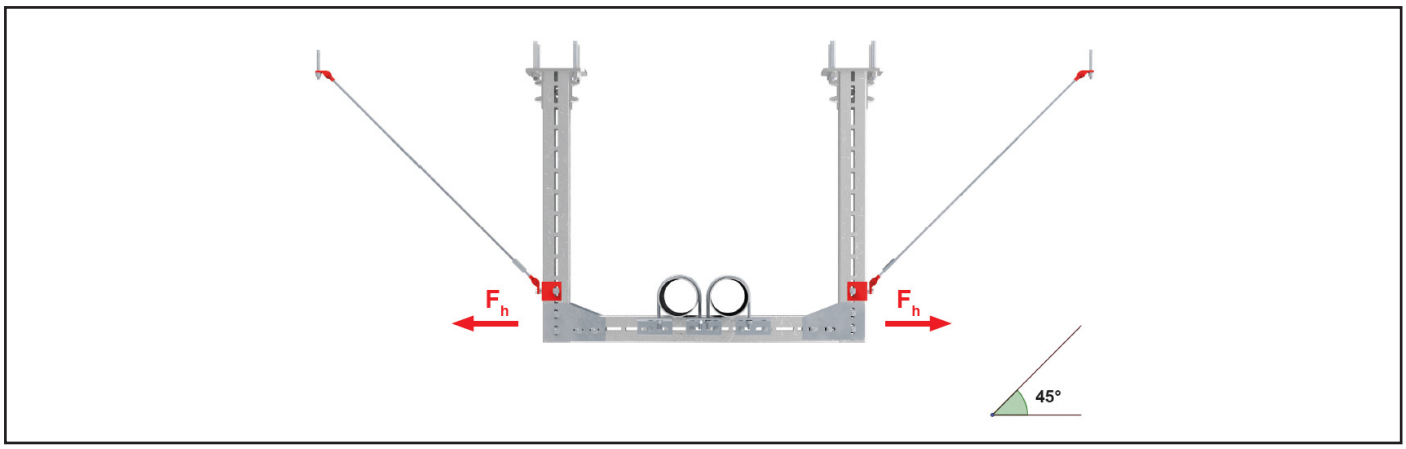
Pipe clamp	Titan HD
Dimension	140mm
Lining	None
Max. load	6 kN

Multiple pipe installation, with Support joint



	Concrete	TekSpan	Steel beam
Anchor or **Holder**			
			
Support joint			
Threaded pin and **Threaded rod**			
TekSpan pipe holder u-bolt			

Multiple pipe installation (double, radial)



Permissible load per fixing system (without taking the anchor technique into account)

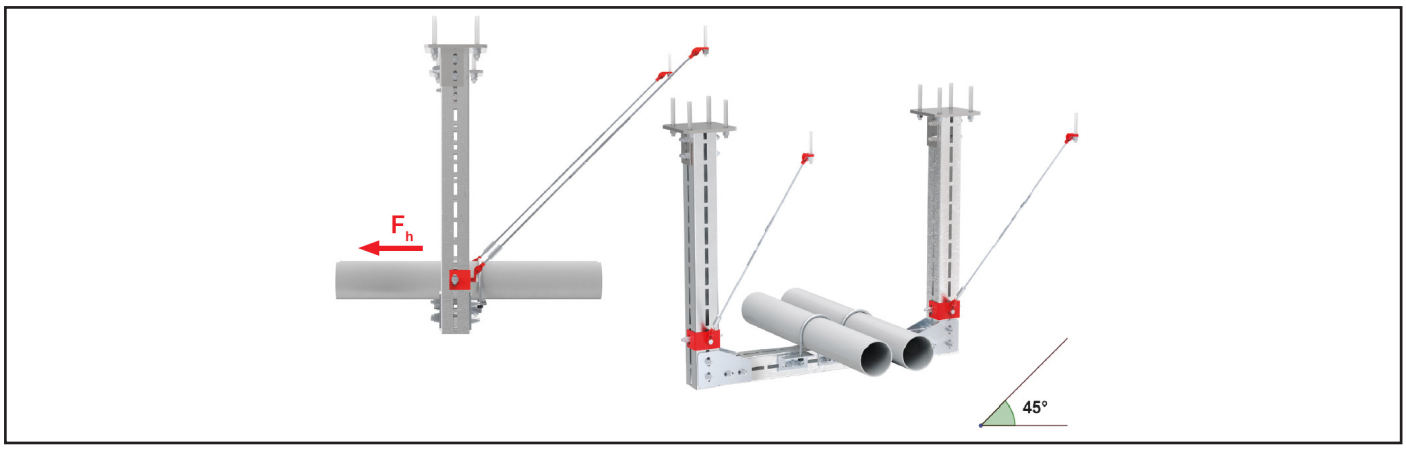
	Concrete	TekSpan	Steel beam
Length brace (mm)	**max. load F_h [kN]**	**max. load F_h [kN]**	**max. load F_h [kN]**
500	14,0	14,0	14,0
1000	6,0	6,0	6,0
1500	4,6	4,6	4,6
2000	4,2	4,2	4,2

Element	Quantity	Identification
Suspension (Concrete)	10	Bolt anchor BZ plus M12
	2	TekSpan® Holder XL 100
	3	TekSpan® Profile XL 100
	4	TekSpan® Corner plate L
	24	TekSpan® T-lock head
Bracing	2	TekSpan® Thread connector
	2	Hexagon screw M12x16
	4	TekSpan® T-lock head
	4	Support joint
	2	Turnbuckle nut
	2	Thearded pin left/right
	2	Threaded rod M10
Pipe holder	3	TekSpan® Pipe holder
	6	TekSpan® T-lock head
	4	Hexagon nut M12
	2	U-bolt M12

Pipe	Steel pipe
Pipe-Ø	139,4 mm / DN 125
Insulated	Yes
Filled	Yes
Weight	42kg/m
Fastening distance	3m
Pipe load (F_z)	2,52kN

Pipe clamp	U-bolt
Dimension	139,7mm
Lining	None
Max. load	-

Multiple pipe installation (double, axial)



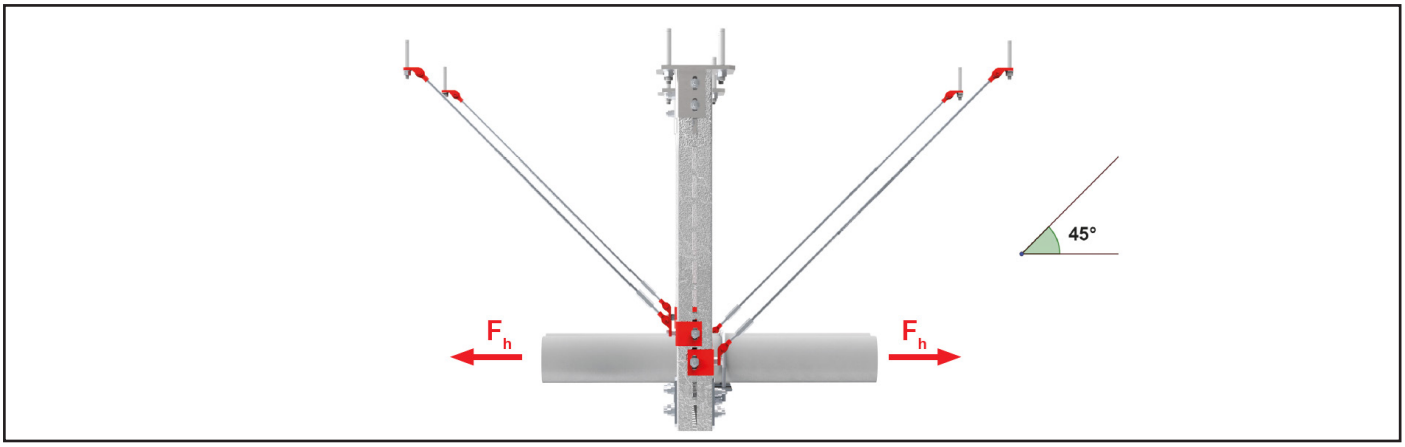
Permissible load per fixing system (without taking the anchor technique into account)

	Concrete	TekSpan	Steel beam
Length brace (mm)	**max. load F_h [kN]**	**max. load F_h [kN]**	**max. load F_h [kN]**
500	6,4	6,4	6,4
1000	6,4	6,4	6,4
1500	6,4	6,4	6,4
2000	6,4	6,4	6,4

Element	Quantity	Identification
Suspension (Concrete)	10	Bolt anchor BZ plus M12
	2	TekSpan® Holder XL 100
	3	TekSpan® Profile XL 100
	4	TekSpan® Corner plate L
	24	TekSpan® T-lock head
Bracing	2	TekSpan® Thread connector
	2	Hexagon screw M12x16
	4	TekSpan® T-lock head
	4	Support joint
	2	Turnbuckle nut
	2	Thearded pin left/right
	2	Threaded rod M10
Pipe holder	3	TekSpan® Pipe holder
	6	TekSpan® T-lock head
	4	Hexagon nut M12
	2	U-bolt M12

	Pipe	Steel pipe
	Pipe-Ø	139,4 mm / DN 125
	Insulated	Yes
	Filled	Yes
	Weight	42kg/m
	Fastening distance	3m
	Pipe load (F_z)	2,52kN
	Pipe clamp	U-bolt
	Dimension	139,7mm
	Lining	None
	Max. load	-

Multiple pipe installation (fourfold, axial)



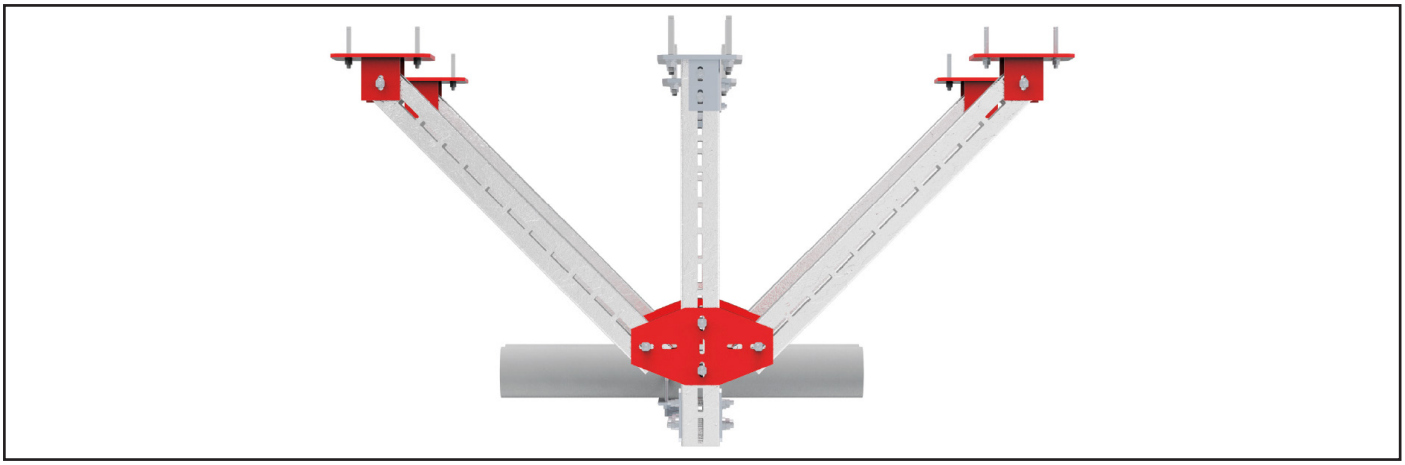
Permissible load per fixing system (without taking the anchor technique into account)

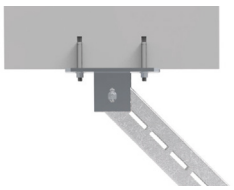
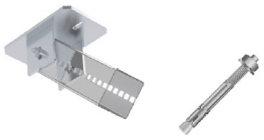
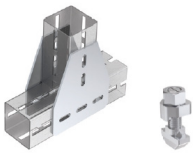
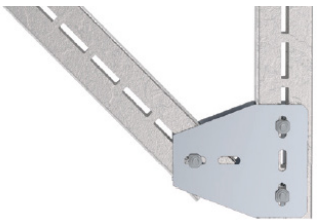
Length brace (mm)	Concrete max. load F_h [kN]	TekSpan max. load F_h [kN]	Steel beam max. load F_h [kN]
500	6,4	6,4	6,4
1000	6,4	6,4	6,4
1500	6,4	6,4	6,4
2000	6,4	6,4	6,4

Element	Quantity	Identification
Suspension (Concrete)	12	Bolt anchor BZ plus M12
	2	TekSpan® Holder XL 100
	3	TekSpan® Profile XL 100
	4	TekSpan® Corner plate L
	24	TekSpan® T-lock head
Bracing	4	TekSpan® Thread connector
	4	Hexagon screw M12x16
	8	TekSpan® T-lock head
	8	Support joint
	4	Turnbuckle nut
	4	Thearded pin left/right
	4	Threaded rod M10
Pipe holder	3	TekSpan® Pipe holder
	6	TekSpan® T-lock head
	4	Hexagon nut M12
	2	U-bolt M12

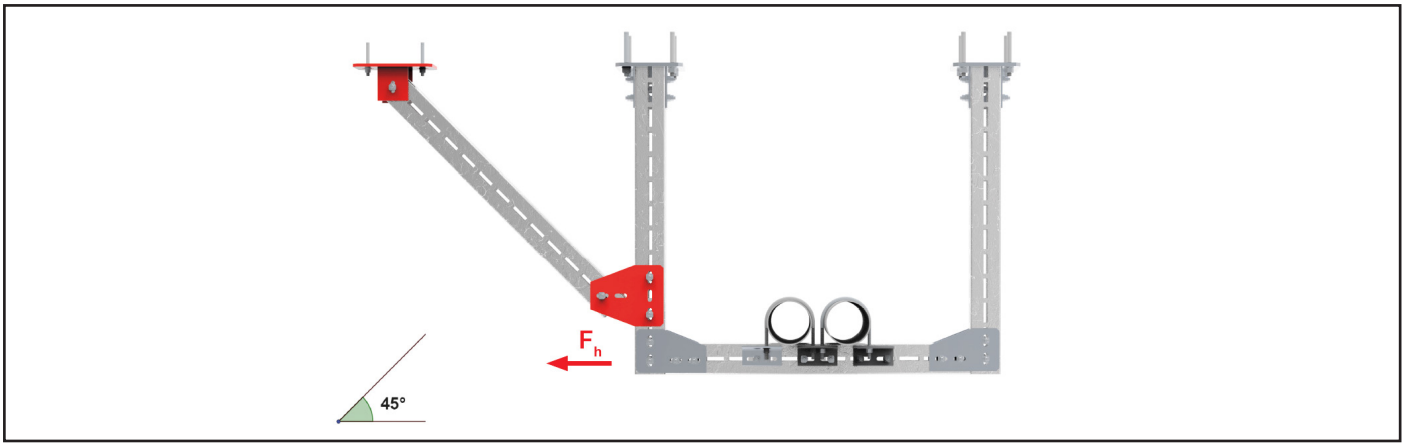
	Pipe	Steel pipe
	Pipe-Ø	139,4 mm / DN 125
	Insulated	Yes
	Filled	Yes
	Weight	42kg/m
	Fastening distance	3m
	Pipe load (F_z)	2,52kN
	Pipe clamp	U-bolt
	Dimension	139,7mm
	Lining	None
	Max. load	-

Multiple pipe installation, with TekSpan Joint



	Concrete	TekSpan	Steel beam
Anchor or **Holder**			
			
TekSpan joint			
Threaded pin and **Threaded rod**			

Multiple pipe installation (single, radial)



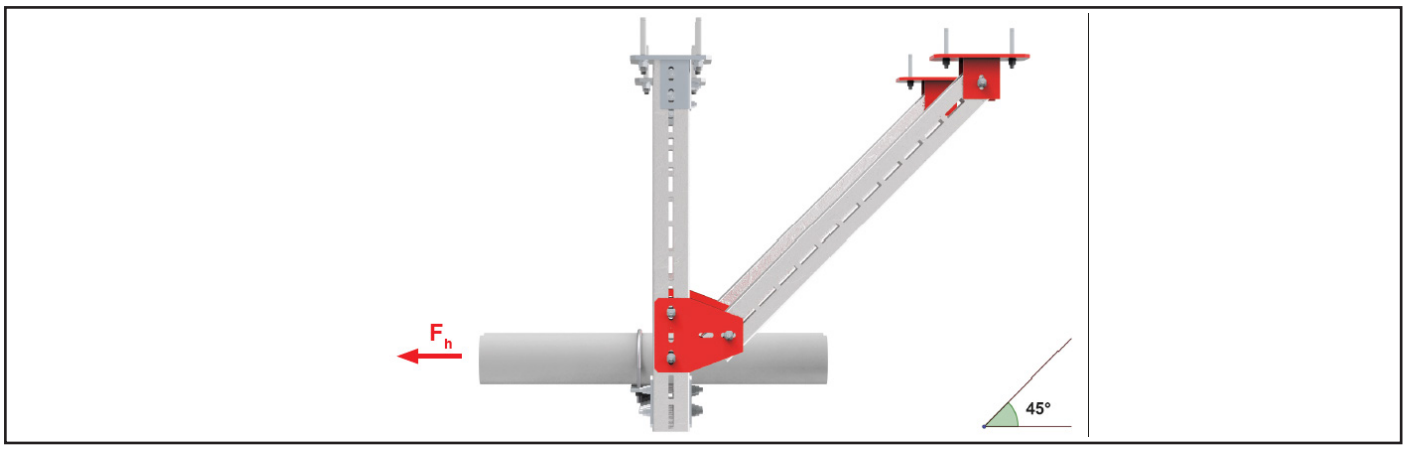
Permissible load per fixing system (without taking the anchor technique into account)

Length brace (mm)	Concrete max. load F_h [kN]	TekSpan max. load F_h [kN]	Steel beam
1000	12,0	12,0	
1500	11,0	11,0	
2000	10,0	10,0	

Element	Quantity	Identification
Suspension (Concrete)	12	Bolt anchor BZ plus M12
	2	TekSpan® Holder XL 100
	3	TekSpan® Profile XL 100
	4	TekSpan® Corner plate L
	24	TekSpan® T-lock head
Bracing	2	TekSpan® T-Plate
	1	TekSpan® Joint holder vertical
	1	TekSpan® Profile XL 100
	8	TekSpan® T-lock head
Pipe holder	3	TekSpan® Pipe holder
	6	TekSpan® T-lock head
	4	Hexagon nut M12
	2	U-bolt M12

	Pipe	Steel pipe
	Pipe-Ø	139,4 mm / DN 125
	Insulated	Yes
	Filled	Yes
	Weight	42kg/m
	Fastening distance	3m
	Pipe load (F_z)	2,52kN
	Pipe clamp	U-bolt
	Dimension	139,7mm
	Lining	None
	Max. load	-

Multiple pipe installation (double, axial)



Permissible load per fixing system (without taking the anchor technique into account)

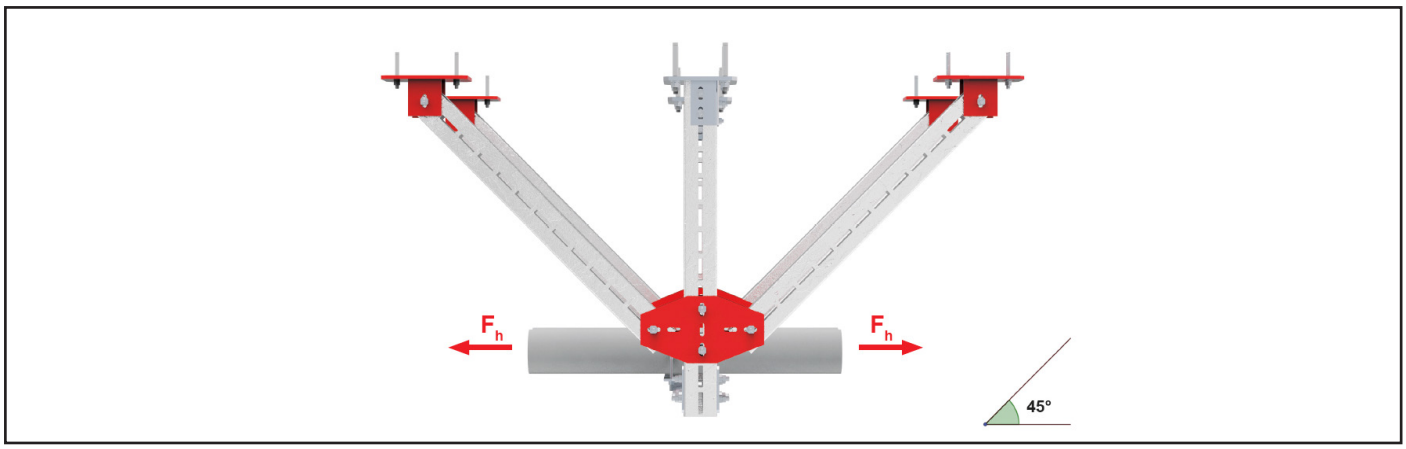
Length brace (mm)	Concrete max. load F_h [kN]	TekSpan max. load F_h [kN]	Steel beam
1000	20,0	20,0	
1500	20,0	20,0	
2000	20,0	20,0	

Element	Quantity	Identification
Suspension (Concrete)	16	Bolt anchor BZ plus M12
	2	TekSpan® Holder XL 100
	3	TekSpan® Profile XL 100
	4	TekSpan® Corner plate L
	2	TekSpan® Angle 4-hole
	32	TekSpan® T-lock head
Bracing	2	TekSpan® T-Plate
	1	TekSpan® Joint holder vertical
	1	TekSpan® Profile XL 100
	8	TekSpan® T-lock head
Pipe holder	3	TekSpan® Pipe holder
	6	TekSpan® T-lock head
	4	Hexagon nut M12
	2	U-bolt M12

Pipe	Steel pipe
Pipe-Ø	139,4 mm / DN 125
Insulated	Yes
Filled	Yes
Weight	42kg/m
Fastening distance	3m
Pipe load (F_z)	2,52kN

Pipe clamp	U-bolt
Dimension	139,7mm
Lining	None
Max. load	-

Multiple pipe installation (double, axial)



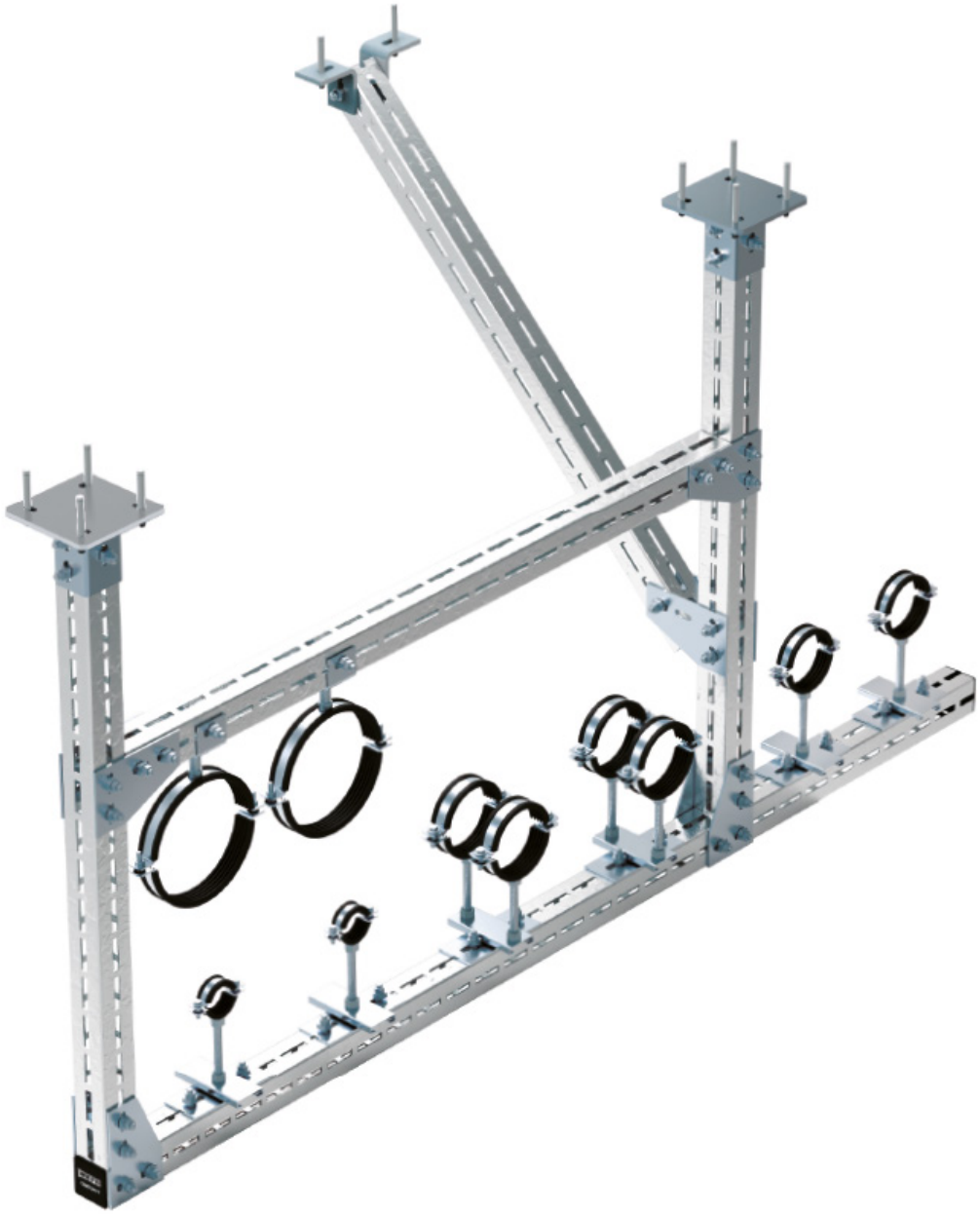
Permissible load per fixing system (without taking the anchor technique into account)

Length brace (mm)	Concrete max. load F_h [kN]	TekSpan	Steel beam
1000	40,0		
1500	40,0		
2000	40,0		

Element	Quantity	Identification
Suspension (Concrete)	24	Bolt anchor BZ plus M12
	2	TekSpan® Holder XL 100
	3	TekSpan® Profile XL 100
	4	TekSpan® Corner plate L
	4	TekSpan® Angle 4-hole
	40	TekSpan® T-lock head
Bracing	4	TekSpan® Cross Plate
	4	TekSpan® Joint holder vertical
	4	TekSpan® Profile XL 100
	8	TekSpan® T-lock head
Pipe holder	3	TekSpan® Pipe holder
	6	TekSpan® T-lock head
	4	Hexagon nut M12
	2	U-bolt M12

	Pipe	Steel pipe
	Pipe-Ø	139,4 mm / DN 125
	Insulated	Yes
	Filled	Yes
	Weight	42kg/m
	Fastening distance	3m
	Pipe load (F_z)	2,52kN
	Pipe clamp	U-bolt
	Dimension	139,7mm
	Lining	None
	Max. load	-

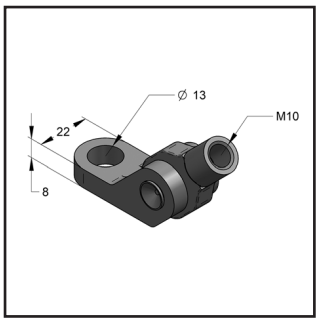
Best practice



Best practice

Components for applications with seismic loading

Support joint



Support joint

Support joint with bracing

Specification

Applications area:
- Support joint foot with eye nut M10
- Bracing of threaded rod M10 with arbitrary angularity
- Bracing of pipe clamps (Titan) or profile rails
- Connection thread or closing flange from pipe

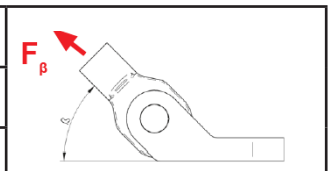
Technical data

Material: Steel
Surface: Zinc-Nickel

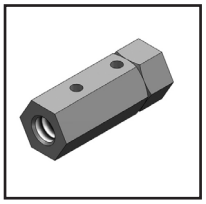
** Loads referring to component, not to connection*

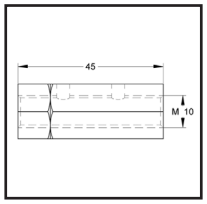
	Hole-ø =	Thread	Angle β	Weight [kg/pc]	Quantity
Support joint	13	M10	0 - 60°	0,138	20

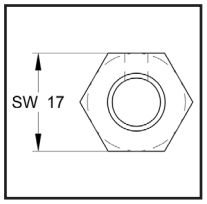
Admissable load at angle β		
Angle β	0 - 45°	45 - 60°
F_{β}.* [kN]	10	4



Hexagonal turnbuckle DIN 1479







Specification

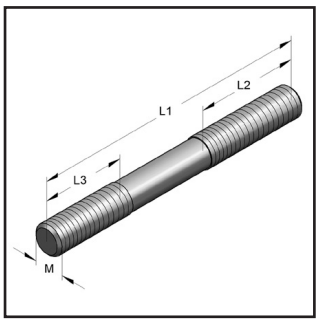
Applications area: Adjustment of tensioning
Accessory: Support joint, threaded rods and bolts left right

Technical data

Material: Steel
Surface: Galvanised

	Thread	Dimension L [mm]	Adjustability [mm]	Tensile load	Width across nut SW	Weight [kg/pc]	Quantity
Hexagon Turnbuckle	M10	45	21	11	17	0,058	20

Threaded rod left / right



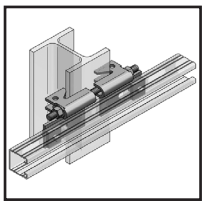
Threaded rod left / right

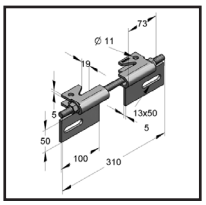
Specification
Applications area: Adjustment of tensioning
Accessory: Support joint, threaded rods and Hexagonal turnbuckle

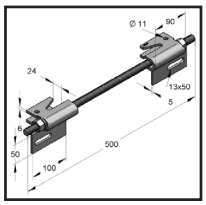
Technical data
Material: Steel
Surface: Galvanised
FK: 4.6

	Dimension [mm]				Tensile load	Weight	Quantity
Threaded rod left / right M10	L1	L2	L3	L4	[kN]	[kg/pc]	[pcs]
	60	25	25	M10	14,20	0,0212	10

Beam connection vertical







Specification
Applications area: Vertical clamping connection of profile rails at steel girder

Recommended Accessory:
2 x guide cleat
1 x threaded rod
2 x nut
2 x washer

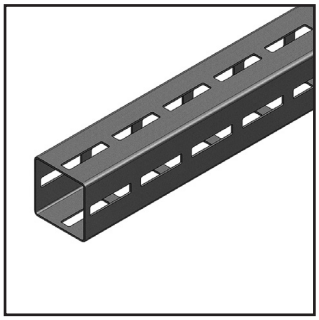
Mounting instruction: Fix buttstraps on load anticipated side. Can be combined with rail system 45. Screwing of profile rail on buttstrap of guide cleat thru profile base with 2 screws M12 x 25, washers and threaded square plates or tooth plate

Technical data
Material: Steel
Material type: S235JR (clamps)

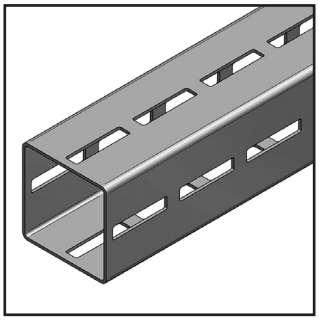
Surface
Clamps: Hot dip galv
Screw connection: Zinc-nickel

	Clamping thickness flange	Clamping range flange	Threaded rod	Tightening torque	Load			Weight	Quantity
	[mm]	[mm]	[mm]	[Nm]	F_z [kN]	F_x [kN]	F_y [kN]	[kg/set]	
Typ D III	8-15	100-220	M12x310	64	4,0	4,0	4,0	1,14	1
Typ D IV	13-20	110-360	M16x500	64	4,0	4,0	4,0	2,05	1

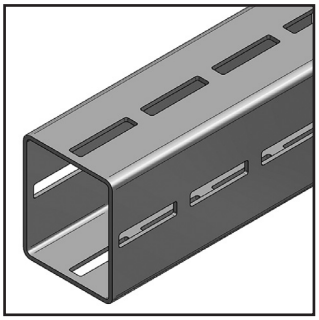
TekSpan Square profile



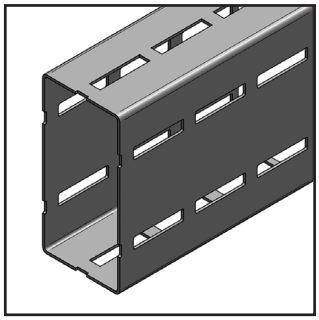
TekSpan profile XL 80



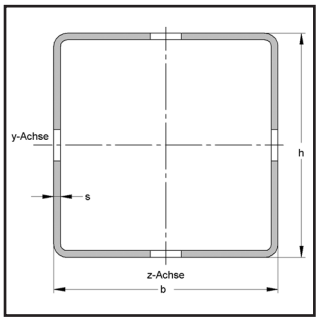
TekSpan profile XL 100



TekSpan profile XL 120



TekSpan profile XL 200



Identification of system
- modular system
- 4-sided without raster in connection with mounting parts
- torsion stiffness XL 80 - XL 120s: S275
- high load capacity Material type XL 200: S235

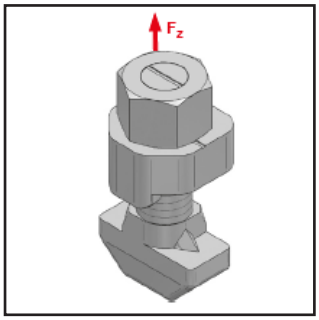
** At 8 m delivery length special delivery conditions

Technical data
Material: Steel
Material type
XL80 - XL 120s: S275
XL200: S235
Surface: hot-dip galvanized according to DIN EN ISO 1461

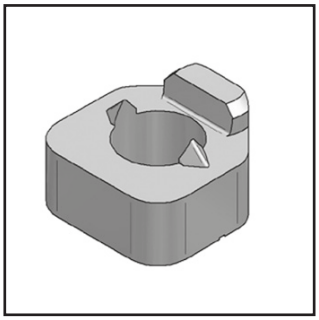
	Dimensions	Profile thickness	Perforation	Lenght	Weight	Bundle	Packing
	hxb [mm]	s [mm]		L [mm]	[kg/m]	[m]	[m]
XL 80	80x80	2,5	4-sided	6	5,51	150	6
XL 100	100x100	3	4-sided	6	8,46	96	6
XL 120	120x120	5	4-sided	6	12,20	72	6
XL 120s	120x100	5	4-sided	6	14,83	72	6
XL 200	200x100	5	4-sided	6	20,46	24	6
XL 200 WST	200x100	5	4-sided	8**	20,46	32	6

	Cross section area	Section modulus of torsion	Geometrical moment of inertia		Section modulus		Gyration radius	
	A_k	W_t	IY-Y	I_{z-z}	W_{y-y}	W_{z-z}	i_y	i_z
	cm^2	cm^3	cm^4	cm^4	cm^3	cm^3	cm	cm
XL 80	6,19	36,04	64,51	64,51	16,13	16,13	3,23	3,23
XL 100	9,73	56,40	157,14	157,14	31,43	31,43	4,02	4,02
XL 120	14,45	89,10	310,55	237,23	51,76	47,44	4,64	4,05
XL 120s	17,55	109,25	372,76	284,42	62,12	56,88	4,61	4,03
XL 200	24,15	24,15	1255,68	433,47	125,56	86,69	7,21	4,24

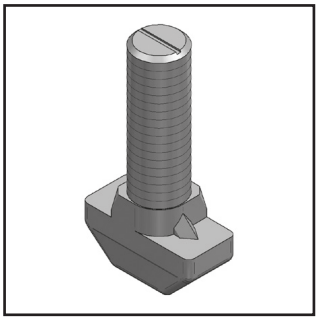
TekSpan T-Lock head, toothed



T-lock head



Lock washer



T-lock bolt

Specification

Profile type: XL 80, XL 100, XL 120 & XL 200
Features: Immovable and form-locking connection
Safety γ: 2
Application: T-profile connector (at hole Ø ≥ 14 mm)

	F_x	F_y	F_z
XL80	8kN	8kN	3kN
XL100	10kN	10kN	3kN

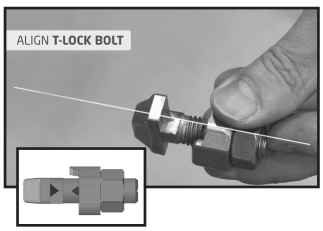
Technical data

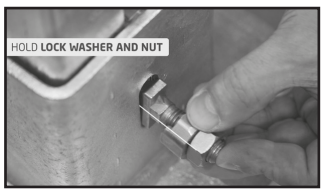
Material: Steel
Surface: Zinc-nickel

	Property class	Recommended tightening torque [Nm]		Weight [kg/pc]	Packing [pcs]
		XL80	From XL 100		
T-lock head M12x40, toothed	10.9			0,120	50
Conisting of					
Lock Washer	10	-	-	0,031	100
T-lock bolt, toothed	10.9	90	120	0,064	50
Hex nut M12 FK10, DIN EN ISO 4032	10	9	-	0,017	100

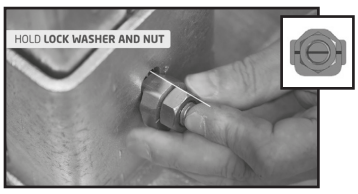
TekSpan T-Lock head assembly instructions

Positioning





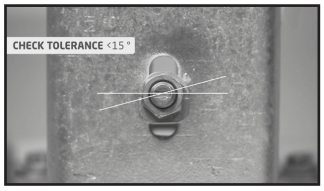
Insert T-lock head through component and profile, position as required.

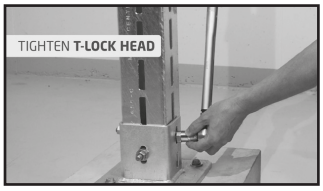


Turn T-lock head 90° (marking notch stands diagonally to the elongated hole).

Adjustment

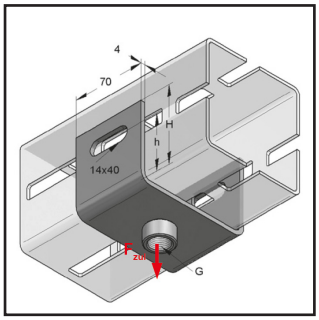
Tilt forward T-lock head, so that guide wedge of Lock washer snaps in elongated hole. Then tighten by screwing the nut (hand-tight).



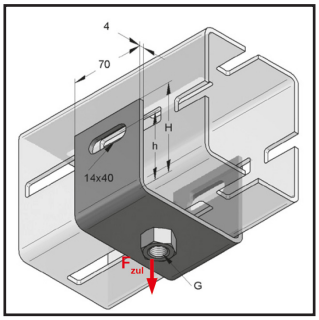


Wrench size 19 mm. Recommended torque XL 80: 90 Nm. Recommended torque XL 100: 120 Nm. T-lock head must not be used again after dismantling.

TekSpan Thread connector



Thread connector
XL 80 / XL 100 1/2"



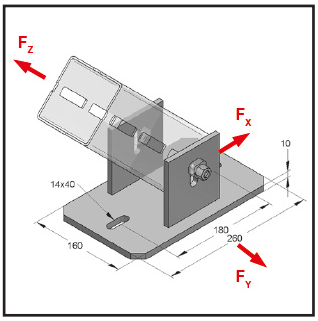
Thread connector
XL 120 M16

Specification
Profile type: XL 80, XL 100, XL 120 & XL 200
Required accessories: 2 x T-lock head, toothed, M12/40

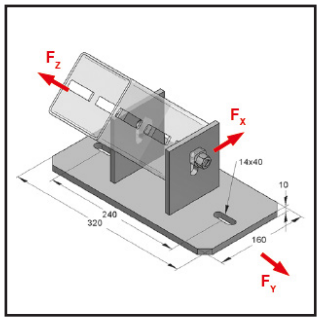
Technical data
Material: Steel
Material type: S235JR
Surface: Zinc-nickel
Safety factor: 1,54

	Profile type	Thread	Max. load	H	h	Weight	Packing
		G	F_{zul} [kN]	[mm]	[mm]	[kg.pc]	[pc]
Thread connector	XL 80	M16	5,0	64	40	0,480	1
	XL 80	1/2"	5,0	64	40	0,470	1
	XL 80	1"	5,0	64	40	0,520	1
	XL 100 / XL 200	M12	5,0	74	50	0,550	1
	XL 100 / XL 200	M16	5,0	74	50	0,557	1
	XL 100 / XL 200	1/2"	5,0	74	50	0,557	1
	XL 100 / XL 200	1"	5,0	74	50	0,610	1
	XL 120	M16	5,0	84	60	0,620	1
	XL 120	1/2"	5,0	84	60	0,610	1
	XL 120	1"	5,0	84	60	0,660	1

TekSpan Joint holder



Joint holder
XL 100 vertical



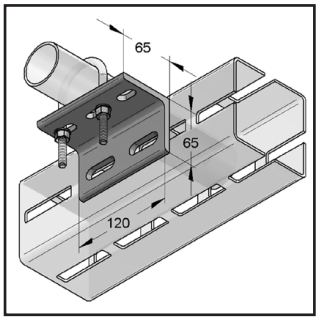
Joint holder
XL 100 horizontal

Specification
Profile type: XL 100, XL 120
Required accessories: T-lock head, toothed, M12/40
Tightening torque: 60 Nm
Delivery: On request

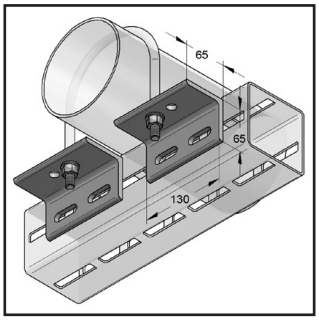
Technical data
Material: Steel
Material type: S235JR
Surface: Hot-dip galvanised
Safety factor: 1,54

	Max load			Center hole plate	Dimension plate	Weight	Packing
	F_X [kN]	F_Z [kN]	F_Y [kN]		LxBxS	[kg/pc]	[pc]
Joint holder XL 100 vertical	6,3	20	11	180	260x160x10	4,89	1
Joint holder XL 100 horizontal	6,3	20	11	240	320x160x10	5x72	1

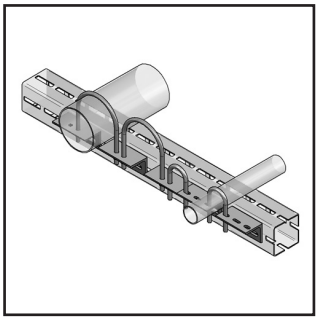
TekSpan Pipe holder



Pipe holder
Pipe-Ø 21,3 - 76,1



Pipe holder
Pipe-Ø 88,9 - 219,1



Combined example

Specification

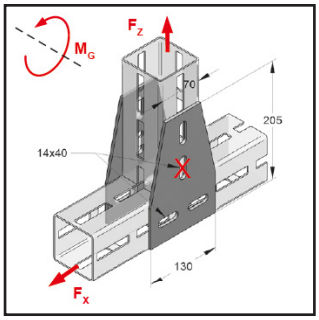
Pipe diameter:	21,3 - 219,1mm
Mounting instruction:	Pipe must overlie
Advantage:	Installation of different pipe diameter
Accessory needed:	T-lock head and u-bolt
Delivery time:	On request

Technical data

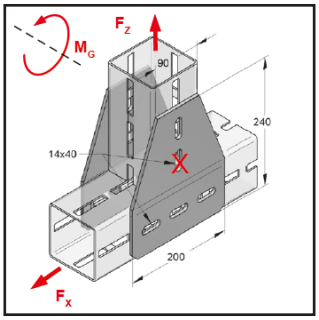
Material:	Steel
Material type:	S235JRG2
Surface:	Hot-dip galv

	for pipe-Ø	Length	Height	Thickness	Weight	Packing
		[mm]	[mm]	[mm]	[kg/pc]	[pcs]
Pipe holder	21,3 - 76,1	120	65	7	0,81	1
	88,9 - 219,1	130	65	7	1,80	2

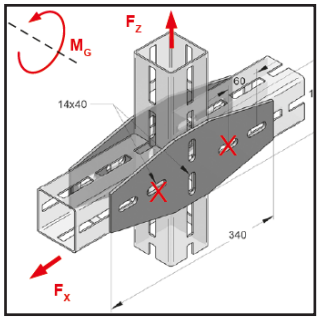
TekSpan T-plate



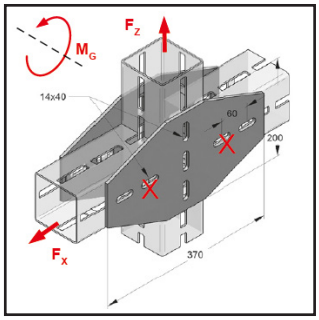
T-plate XL 80



T-plate XL 100



Cross plate XL 80



Cross plate XL 100

Specification

Profile type:	XL 80, XL 100, XL 120, XL 200
Required accessories:	T-lock head, toothed, M12/40

Technical data

Material:	Steel
Material type:	S235JR
Surface:	Hot-dip galvanised
Safety factor:	1,54

Remark: For M_G = 0 only one screw per side at X

1) by using of all screw holes 2) use in pairs

	Profile type	Max load		Max limited torque	Weight	Packing
		F_X [kN]	F_z [kN]	M_G [kNm]	[kg/pc]	[pc]
T-plate XL 80	XL 80	32	32	0,95[1)]	0,92	1
T-plate[2)]	XL 100	40	40	1,20[1)]	1,97	1
Cross plate XL 80[2)]	XL 80	32	32	0,95[1)]	1,47	1
Cross plate[2)]	XL 100	40	40	1,20[1)]	2,89	1

TekSpAn®

PIONEER HOUSE, HILLSONS RD, BOTLEY, SOUTHAMPTON, SO30 2DY
01329 222 345 | ENQUIRIES@TEKSPAN.CO.UK | WWW.TEKSPAN.CO.UK

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