sikla

Seismic

Guideline

Contents

Foreword	3
Introduction	4
Mounting - Single pipe	13
Mounting - Channel/Threaded strut	24
Mounting - Channel /MS strut	36
Mounting instructions	53
Annex A	59
Annex B	62

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Foreword

Experience from around the world shows that failure of engineering services due to insufficient structural design of fixings of equipments, hangers and supports of pipes, ducts and electrical conduits in case of seismic actions have an significant effect on life safety and economic loss.

In order to avoid the collapse of engineering systems a professional design of the seismic performance of these systems requires the layout and arrangement within a building.

This guideline provides information needed by those carrying out the design work for seismic proof installations of the engineering service. It is based on a non-specific design process using ready-made solutions for standard situations.

This includes typical:

- pipe bracing
- duct bracing
- fan coil unit bracing
- cable tray bracing
- floor mounted components
- light fitting details.

This guideline does not apply to Fire Fighting Systems.

As the seismicity is different from site to site and country the nationally determined Building codes and standards to be applied have to be considered for the design process.

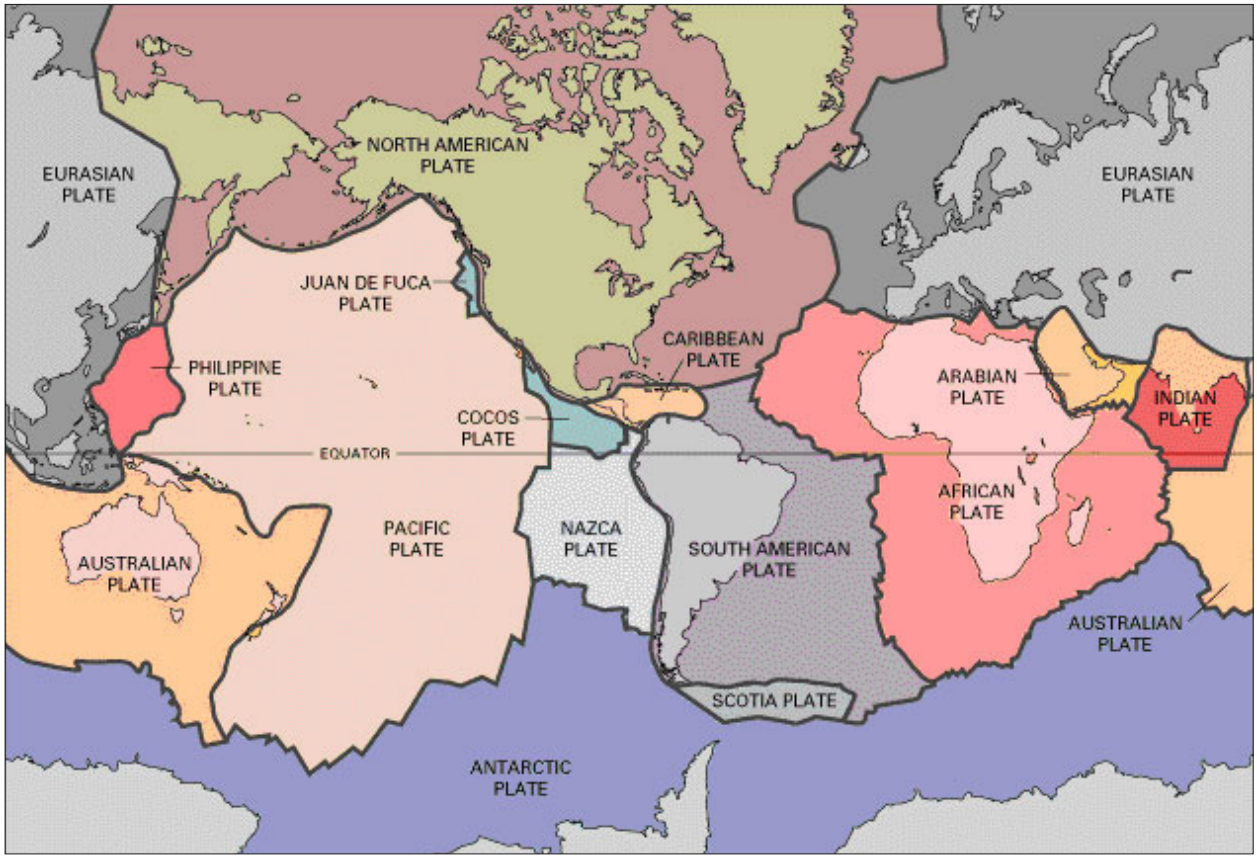
Understandable design examples and principle solutions to restraint installations have been given.

Introduction

Earthquakes

It is estimated that around 500,000 earthquakes occur every year which are detected with current instrumentation. But only 100,000 of these are felt.

Most of these earthquakes are caused by global movement of the Earth´s tectonic plates.

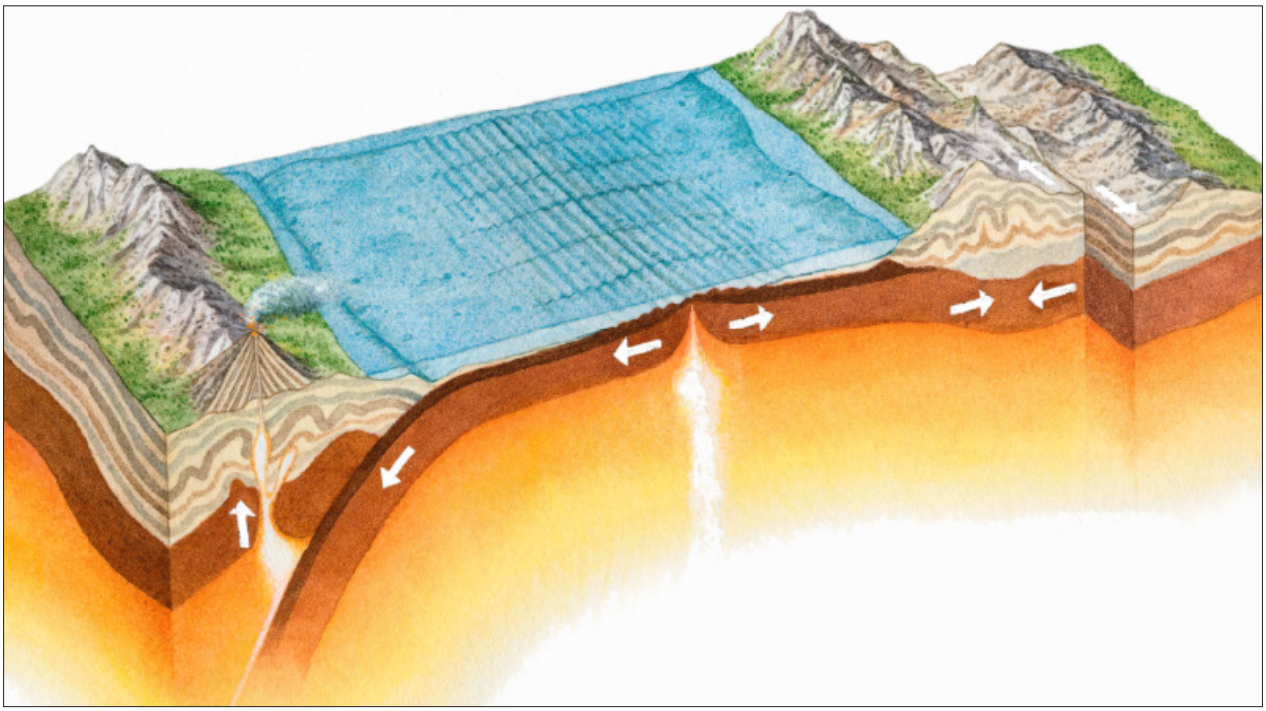


(Source: https://en.wikipedia.org/wiki/Plate_tectonics)

Tectonic earthquakes occur anywhere in the earth where there is sufficient stored elastic strain energy to drive fracture propagation along a fault plane.

A fault is a fracture in the earth´s crust

The sides of a fault can move past each other in three different ways as shown.



(Source: https://www.dkfindout.com/us/earth/tectonic-plates/)

Earthquakes caused by slippage alongside the tectonic plates are called interplate earthquake.

All tectonic plates have also internal stress fields caused by their interactions with neighboring plates. These stresses may be sufficient to cause failures along existing fault plane, giving rise to intraplate earthquakes.

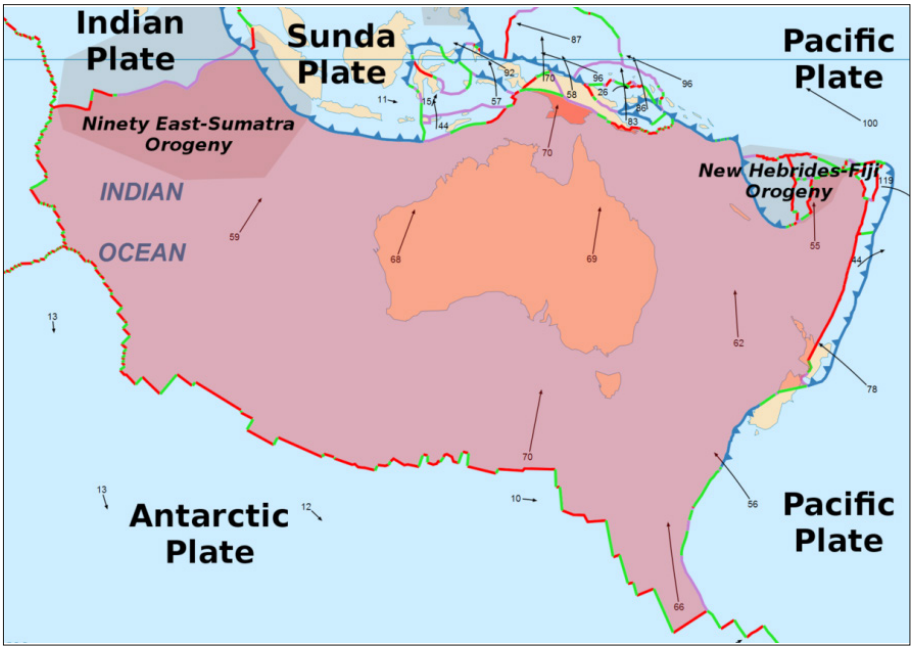
The movement caused by the slippage creates waves in the earth´s crust, traveling away from the fault plane. These waves change throughout the duration of the earthquake, add to one another and result in extremely complicated wave motion and vibrations. The direction of forces on structures can be horizontal, vertical or rotational. In terms of their effect on a given building, they are not only unpredictable in direction but also unpredictable in strength and duration.

The structural load is proportionally to the intensity of shaking and to the weight of the supported elements.

Seismic loads are the horizontal and vertical forces exerted on a structure during an earthquake. They can act in any direction. Therefore the primary emphasis in seismic design is on longitudinal and transversal forces.

General

Seismicity in the Region Australia- New Zealand



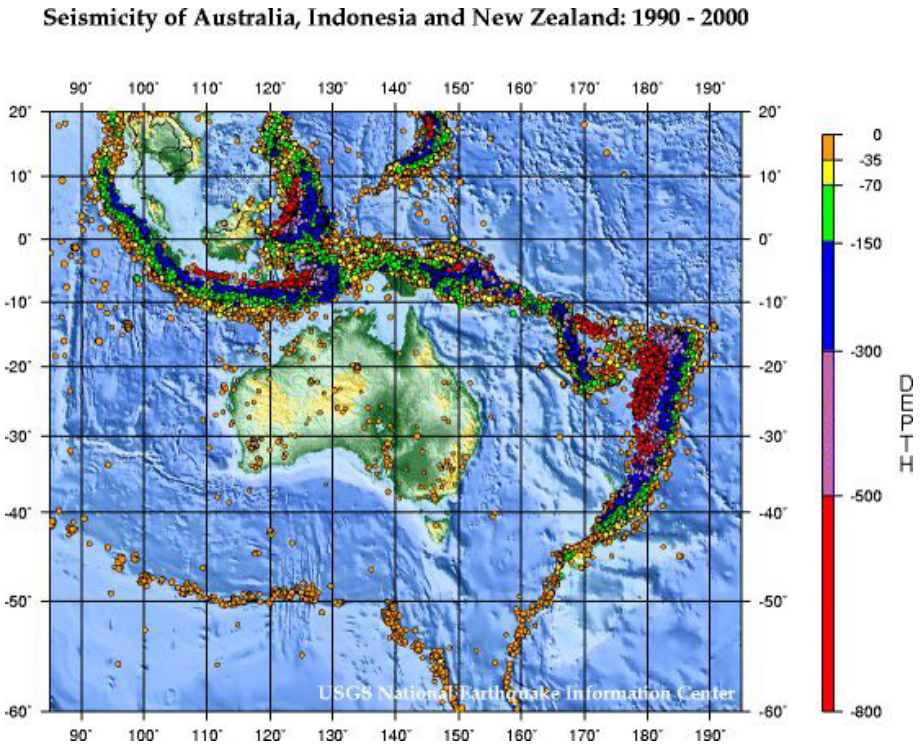
(Source: https://commons.wikimedia.org/wiki/File:Ausseis.jpg)

The seismicity in Australia and New Zealand is quite different and therefore are the regulations different as well.

Even though there are joint Australian-New Zealand standards for structural design like the AS/NZS 1170 the parts of this standard family dealing with earthquake are separate.

The Australien earthquakes are most intraplate whereas the earthquakes in New Zealand are most interplate ones.

The picture below shows the difference.



(Source: https://commons.wikimedia.org/wiki/File:Ausseis.jpg)

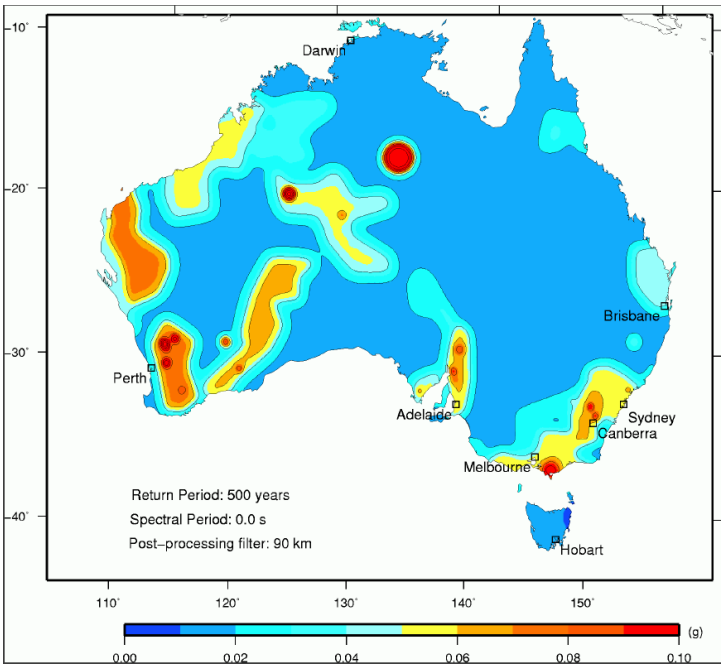
Seismicity in Australia

Australia is a country of low to moderate seismicity with a number of Magnitude 6.8 events recorded and a moderate 5.6 Magnitude event in Newcastle 1989 that killed 13 people and caused in excess of $2 Billion damage.

Australia lies within the Indo-Australian plate, which is thin, significantly fractured shell moving northwards at around 100 mm/yr.

The Indo-Australian plate experiences high compression stresses caused by the plate colliding with the adjacent tectonic plates north of New Guinea, which is the cause of the intraplate earthquakes experienced in Australia.

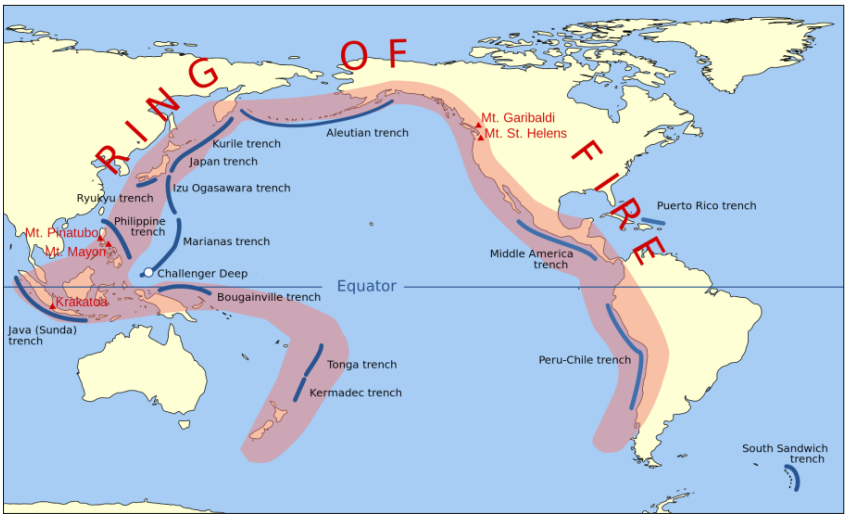
Seismic Hotspots in Australia



(Source: http://www.britsabroad.com/f10/earthquake-hot-spots-australia-3640/)

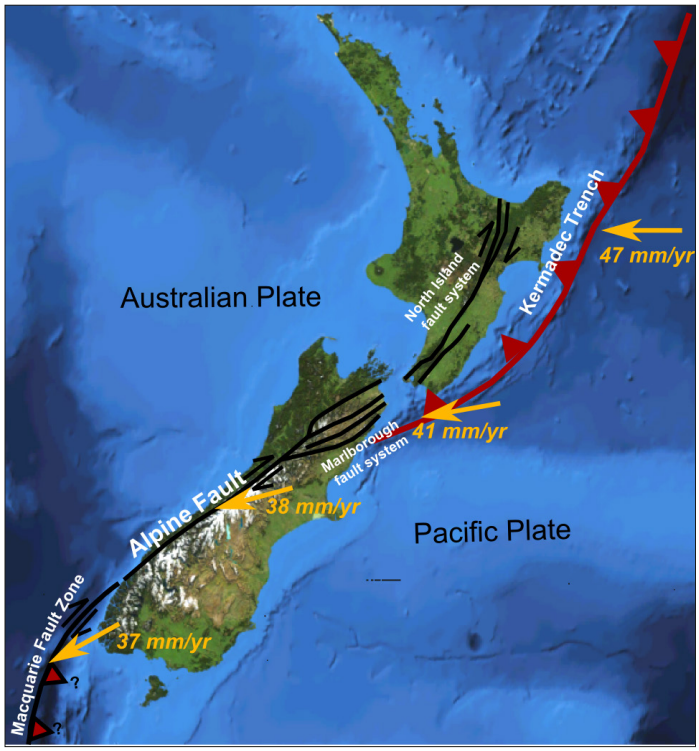
Seismicity in New Zealand

New Zealand is located on the edge of a zone of intense seismic activity known as the Ring of Fire.



(Source: https://en.wikipedia.org/wiki/Ring_of_Fire)

The country lies along the convergent boundary of the westward- moving Pacific Plate and the northward-moving Australian Plate.

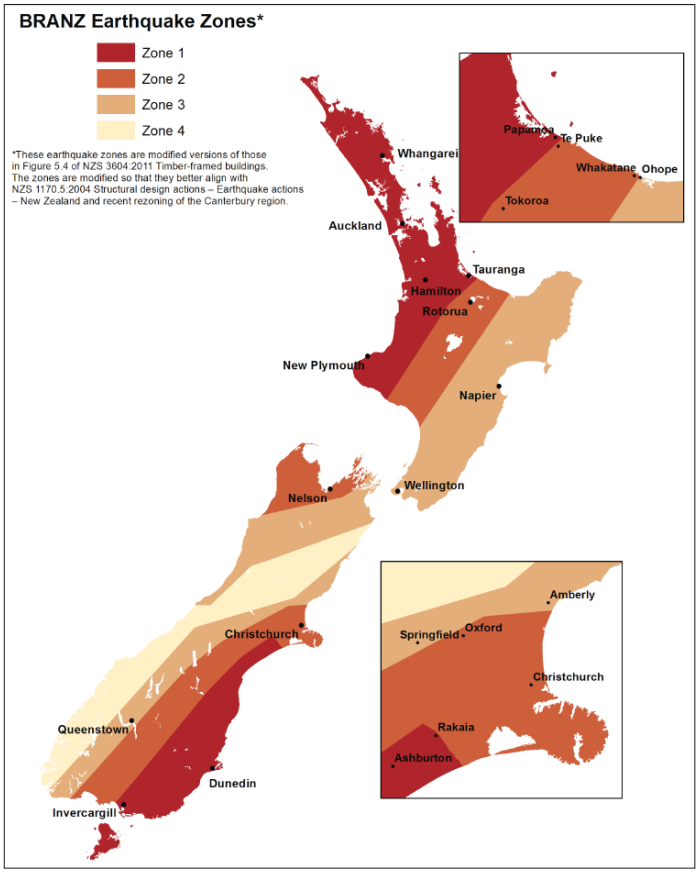


(Source: http://www.seismicresilience.org.nz/topics/seismic-science-and-site-influences/seismicity-in-new-zealand/)

Most of the earthquake activities usually occur in regions where these processes take place.

Especially in built-up areas an earthquake can cause widespread damage as the earthquake in Christchurch (2010-2011) demonstrated where the whole CBD was destroyed.

Depending on the risk 4 Earthquake Zones have been set up and updated in the Canterbury region.



(Source: http://www.seismicresilience.org.nz/topics/seismic-science-and-site-influences/seismicity-in-new-zealand/)

Earthquake Design Process of Non-Structural Elements

Non-structural elements (NSE)

Non-structural elements are considered to be not part of the supporting framework of the building. Typical non-structural elements are building claddings, facades or suspended ceilings, but also installations and equipment of engineering service such as pipelines, ductwork, cable trays, bus bars, fan coil units and floor mounted components.

Equivalent lateral force procedure

Most international standards allow the so called “equivalent static force method” to be used for calculation the seismic forces.

The seismic actions on non-structural elements are considered as quasi static action, not dynamic.

But in any case the national standards have to be considered in terms of exclusions and additional requirements for verification of the effects of the actions.

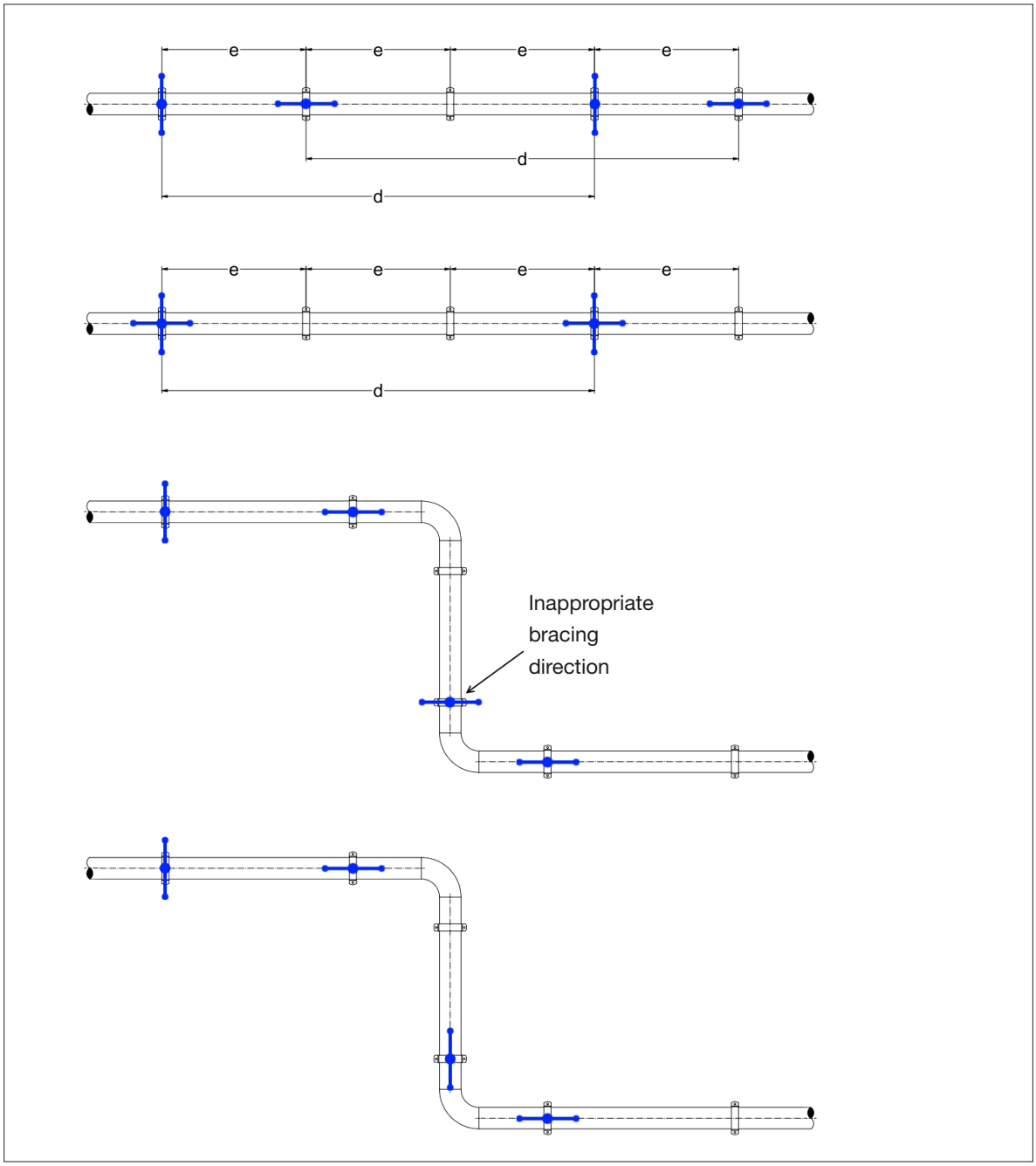
Seismic restraint layout of Engineering Services- Basic rules

Braces or restraints for earthquake resistant installations can be divided into 3 types:

1. Longitudinal bracing:

2. Transversal bracing:

3. 4-way-bracing



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Features of the Australian Earthquake Design Standard

AS 1170.4:2007 ‚Structural design actions- Earthquake actions- Australia' must be read in conjunction with the ‚importance level' specified in the BCA, the robustness clauses of AS 1170.0.

Calculation of the horizontal seismic force

1st step: Establish the importance level of the building using the definitions given in table B1.2a and B1.2b of the National Construction Code (NCC).

Table 2· Combination oftab/es 81 2a and 81 2b from the National Construction Code

Importance Level	**Buildingtype**	**Examples of bulldlng types**	**Earthquake** Annual probability of exceedance
1	Buildings or structures presenting a low degree of hazard to life and other property in the case of failure.	Farm buildings. Isolated minor storage facilities. Minor temporary facilities.	1:250 years
2	Buildings or structures not included in Importance Levels 1, 3 and 4.	Low rise residential construction. Buildings and facilities below the limits sei for Importance Level 3.	1:500 years
3	Buildings or structures that are designed to contain a large number of people.	Buildings and facilities where more than 300 people can congregate in one area. A primary school, secondary school or day care facility with a capacity greater than 250. Colleges or adult education facilities with a capacity greater than 500. Health care facilities with a capacity of 50 or more residents but not having surgery or emergency treatment facilities. Jails and detention facilities. Any occupancy with an occupant load greater than 5000. Power generating facilities, water treatment and wastewater treatment facilities, any other public facilities not included in Importance level 4.	1:1000 years
4	Buildings or structures that are essential to post disaster recovery or associated with hazardous facilities.	Buildings and facilities designated as essential facilities or having special post disaster functions. Medical emergency or surgery facilities. Emergency service facilities: fire, rescue, police station and emergency vehicle garages. Utilities required as backup for buildings and facilities of Importance Level 4. Designated emergency shelters, centres and ancillary facilities. Buildings and facilities containing hazardous materials capable of causing hazardous conditions that extend bevond propertv boundaries.	1:1500 years

Source: Seismic restraint of engineering services, Government of South Australia, Department of Planning, Transport and Infrastructure)

2nd step: Determine whether seismic bracing of engineering services is required and the method to be used to calculate those earthquake forces F_c.

Table 3: Summary of Earthquake Force Calculations based upon Building Descrition and AS 1170.4 – 2007

Building Description	Does AS 1170.4, Section 8 Apply?	Earthquake Force calculation
Domestic dwellings with h ≤ 8.5 m	No	$F_c = 0$
Domestic dwellings with h > 8.5 m (Class 1a or 1b)	Yes	Treat as for Importance Level 2 buildings
Importance Level 1 buildings	No	$F_c = 0$
Importance Level 2 und 3 buildings with height h ≤ 15 m	Yes	$F_c = 0.1 \cdot W_c$ for non-brittle parts and components as per section 5.4.6 of AS 1170.4 – 2007
Importance Level 2 und 3 buildings with height h > 15 m	Yes	Refer Section 8.2 or 8.3 of AS 1170.4 – 2007 for more detailed calculations.

(Source: Seismic restraint of engineering services, Government of South Australia, Department of Planning, Transport and Infrastructure)

Features of the New Zealand earthquake Design Standard

References:

1. Seismic Restraint Manual- Guidelines for Mechanical Systems, Sheet Metal and Air Conditioning Contractors´ National Association, Inc. (SMACNA)
2. BRANZ FACTS: Seismically resilient non-structural elements #1 ‚Compliance and standards' August 2015
3. BRANZ FACTS: Seismically resilient non-structural elements #2: ‚Design criteria' August 2015
4. BRANZ FACTS: Seismically resilient non-structural elements #3: ‚Restraint systems', August 2015
5. BRANZ FACTS: Seismically resilient non-structural elements #5: ‚Project process', August 2015

Mounting - Single pipe

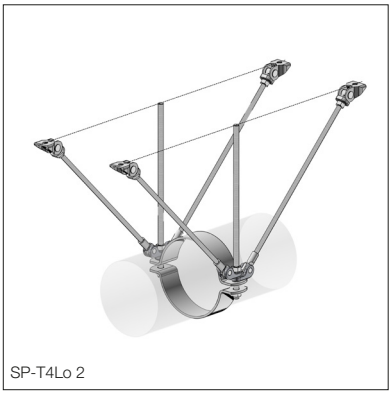
Single mounting SP

SP

Longitudinal bracing

SP-TLo

SP-T4Lo 1

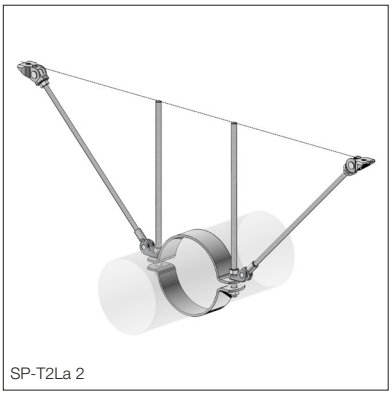


SP-T4Lo 2

Lateral bracing

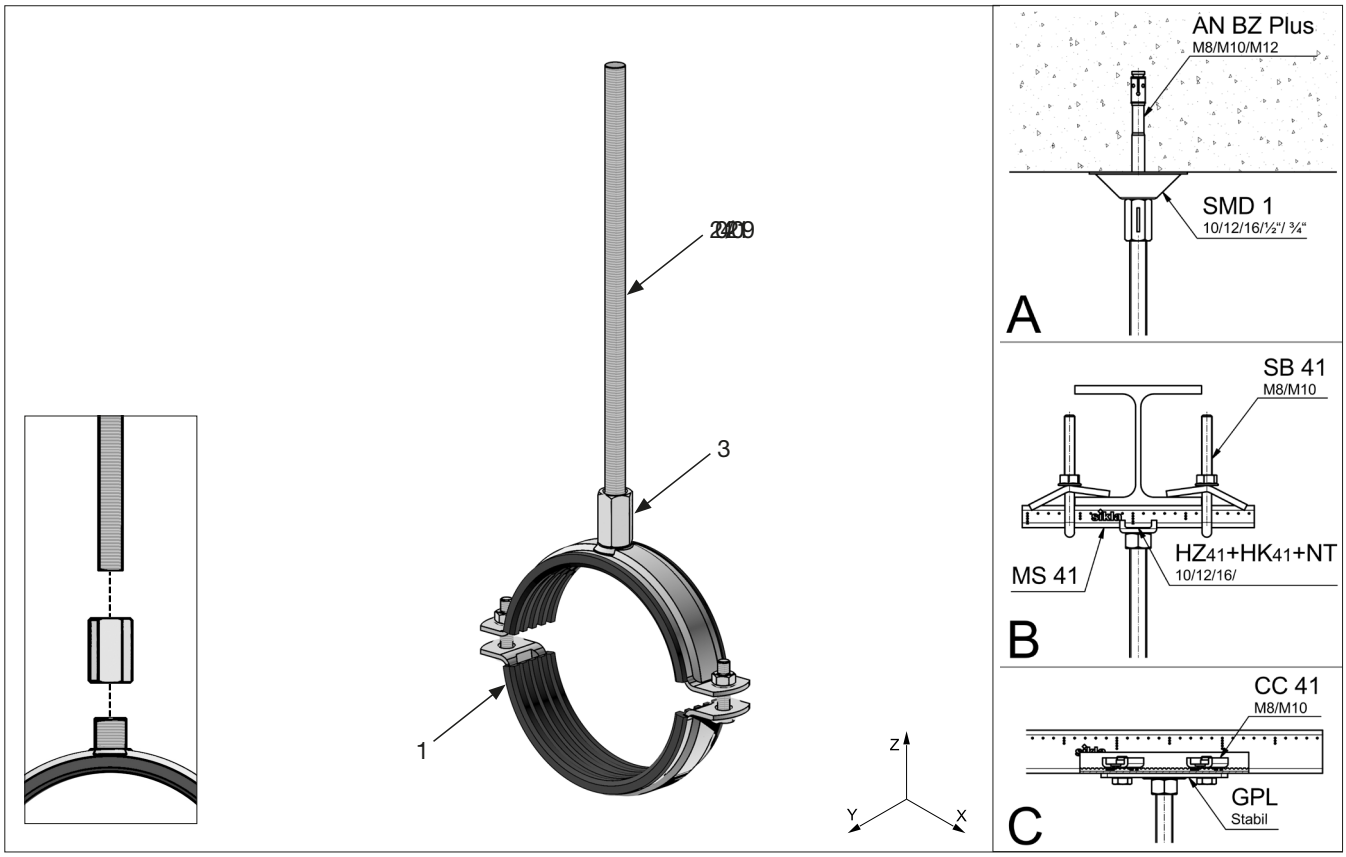
SP-TLa

SP-T2La 1



SP-T2La 2

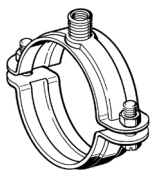
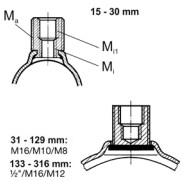
Pipe – Single mounting SP

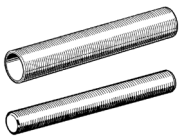
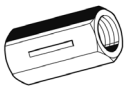


Application

Individual mounting without bracing.

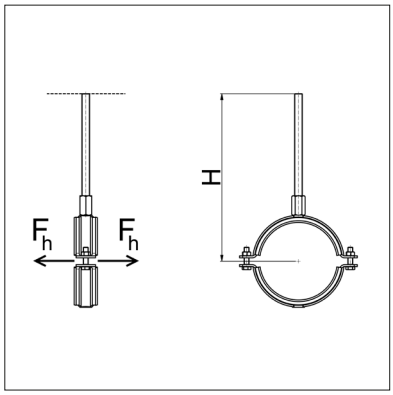
Parts list

Item 1: Stabil D-3G		Item 2: GST / GR	Item 3: AD IG/IG
$Ø_{min}$ [mm] (Part no.)	$Ø_{max}$ [mm] (Part no.)	Dimension	Dimension
15-19 (107705)	124-129 (115766)	M12, M16, ½“, ¾“, 1“	M16 → M10;M12;M16;½“;¾“;1“
133-140 (107130)	310-316 (147600)	M12, M16, ½“, ¾“, 1“	½“ → M10;M12;M16;½“;¾“;1“

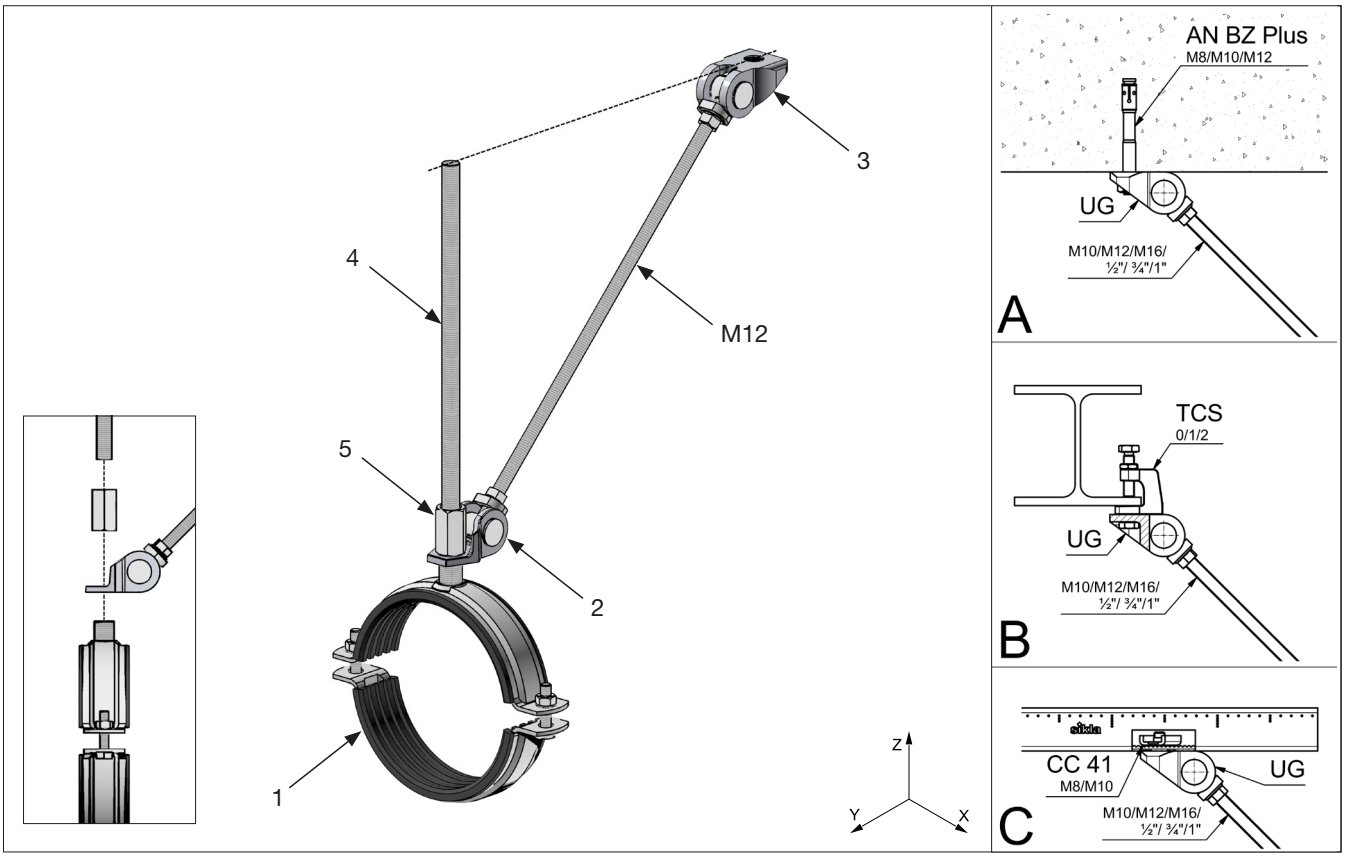
Permissible load values



Permissible load according to type of mounting [1]			
H_{max} [3] [m]	F_h [kN] [2]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	0.67	0.30	0.39
0.4	0.23	0.13	0.17
0.6	0.13	0.08	0.11
0.8	0.09	0.06	0.08

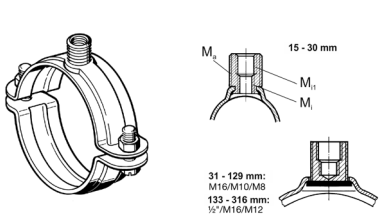
1) Values valid for mounting with Threaded Tube R ½".
Contact Sikla Application Technician for further thread types.
2) max. permissible bending moment
3) H_{max} = 0.8 m

Single pipe: Longitudinal bracing SP-TLo



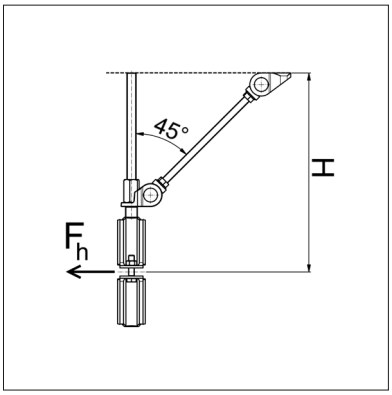
Application
Assembly for absorbing longitudinally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list



Item 1: Stabil D-3G		Item 2: UG FP	Item 3: UG	Item 4: GST / GR	Item 5: AD IG/IG
$Ø_{min}$ [mm] (Part no.)	$Ø_{max}$ [mm] (Part no.)	Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)
15-19 (107705)	124-129 (115766)	FP M12 (158093)	M12 (158075)	M16 / M10	M16x40 (124957)
133-140 (107130)	310-316 (147600)	FP M12 (158093)	M12 (158075)	1/2" / M16 / M12	M16x40 (124957)

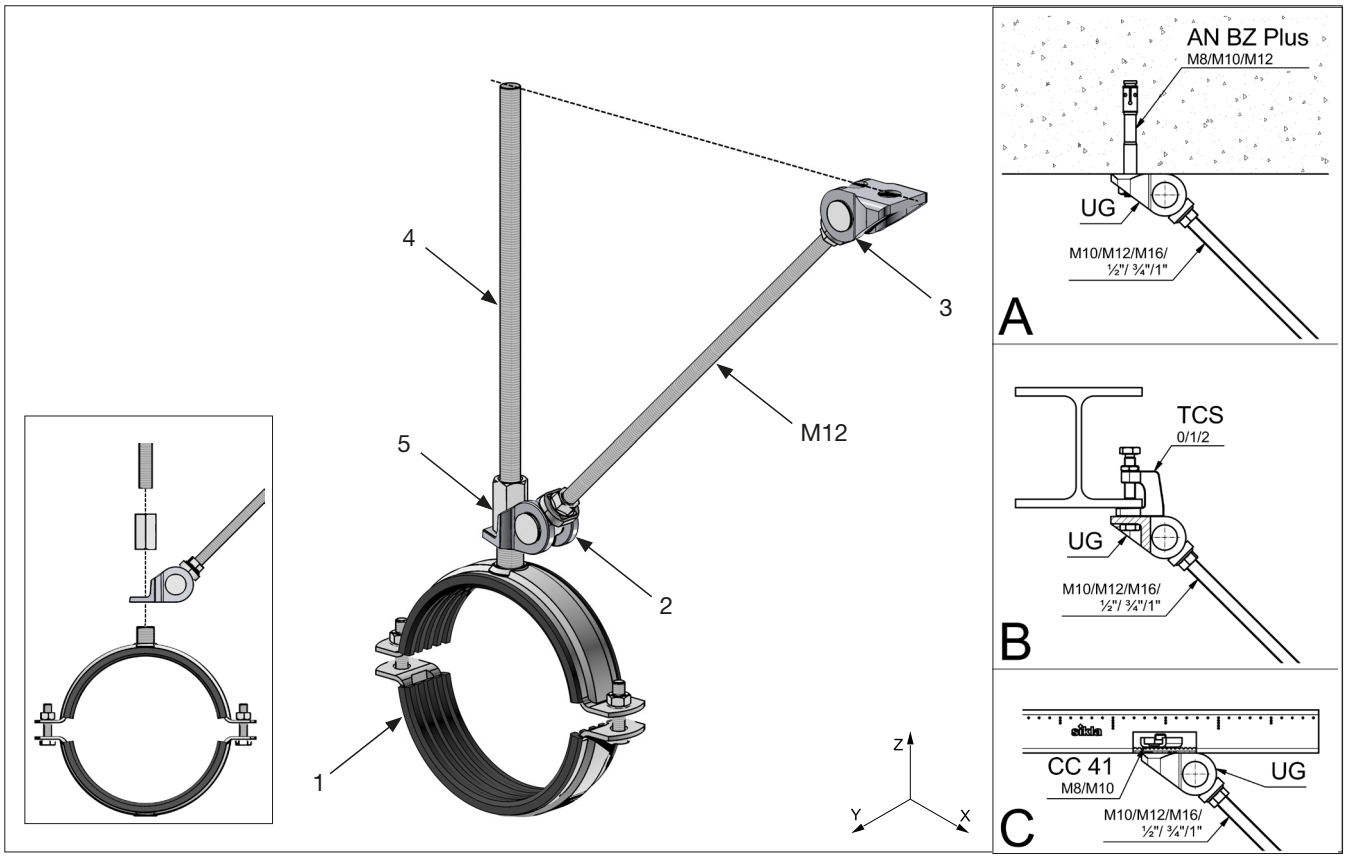
Permissible load values



Permissible load according to type of mounting [1]			
H_{max} [3] [m]	F_h [kN] [2]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	2.79	1.74	1.16
0.4	2.55	1.60	1.06
0.6	2.50	1.56	1.04
0.8	2.47	1.55	1.03

1) Values valid for mounting with M16 + M12 strut.
Contact Sikla Application Technician for further mounting types.
2) max. permissible tension / compression force of the strut
3) H_{max} = 0.8 m

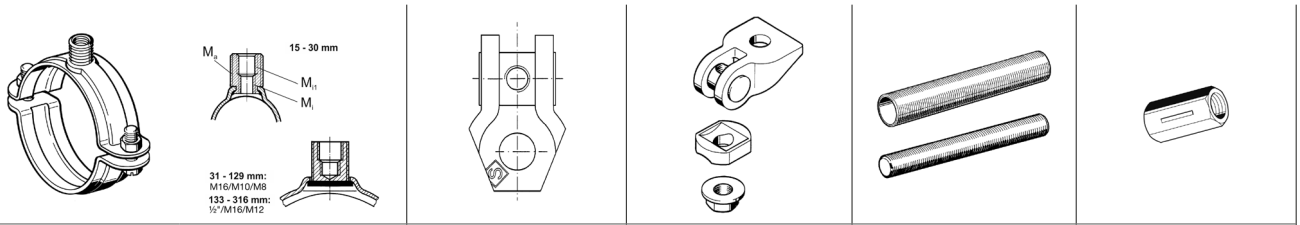
Single pipe: Lateral bracing SP-TLa



Application

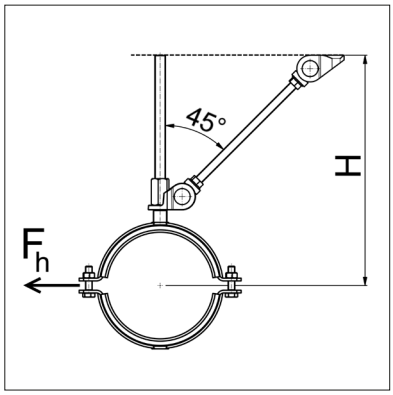
Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list



Item 1: Stabil D-3G		Item 2: UG FP	Item 3: UG	Item 4: GST / GR	Item 5: AD IG/IG
$Ø_{min}$ [mm] (Part no.)	$Ø_{max}$ [mm] (Part no.)	Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)
15-19 (107705)	124-129 (115766)	FP M12 (158093)	M12 (158075)	M16 / M10	M16x40 (124957)
133-140 (107130)	310-316 (147600)	FP M12 (158093)	M12 (158075)	1/2" / M16 / M12	M16x40 (124957)

Permissible load values



Permissible load according to type of mounting [1]			
H_{max} [3] [m]	F_h [kN] [2]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	2.79	1.74	1.16
0.4	2.55	1.60	1.06
0.6	2.5	1.56	1.04
0.8	2.47	1.55	1.03

1) Values valid for mounting with M16 + M12 strut.
Contact Sikla Application Technician for further mounting types.
2) max. permissible tension / compression force of the strut
3) H_{max} = 0.8 m

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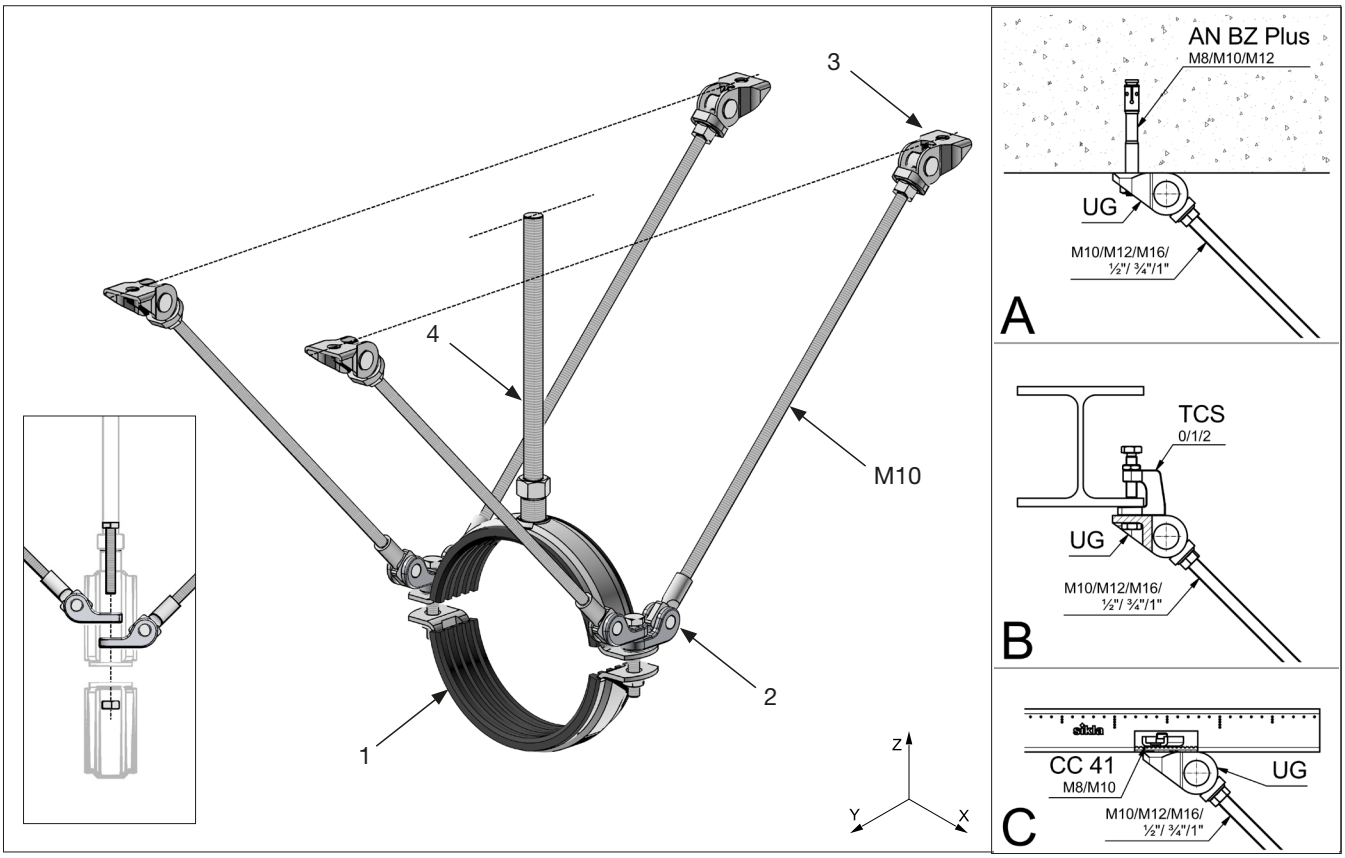
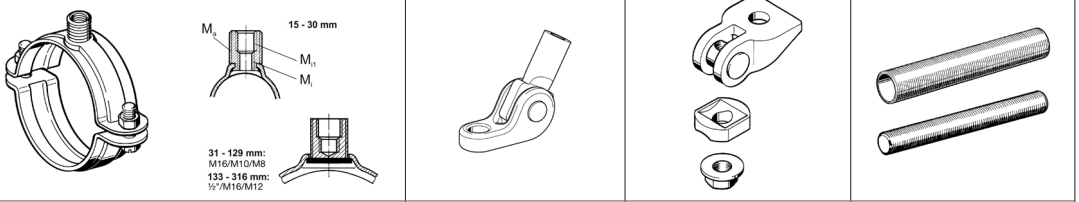
Single pipe: Longitudinal bracing SP-T4Lo 1



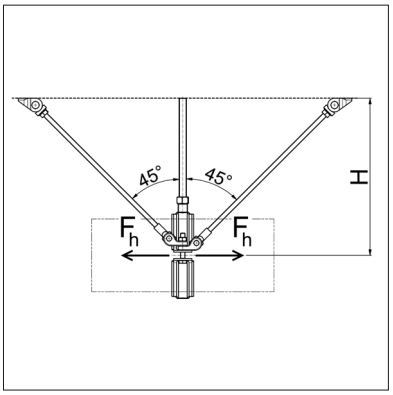
Application
Assembly for absorbing longitudinally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list



Item 1: Stabil D-3G		Item 2: SG	Item 3: UG	Item 4: GST / GR
$Ø_{min}$ [mm] (Part no.)	$Ø_{max}$ [mm] (Part no.)	Type (Part no.)	Type (Part no.)	Dimension
133-140 (107130)	167-173 (107167)	M10-11 (115044)	M10 (198643)	1/2" / M16 / M12
176-184 (107176)	310-316 (147600)	M10-13 (115045)	M10 (198643)	1/2" / M16 / M12

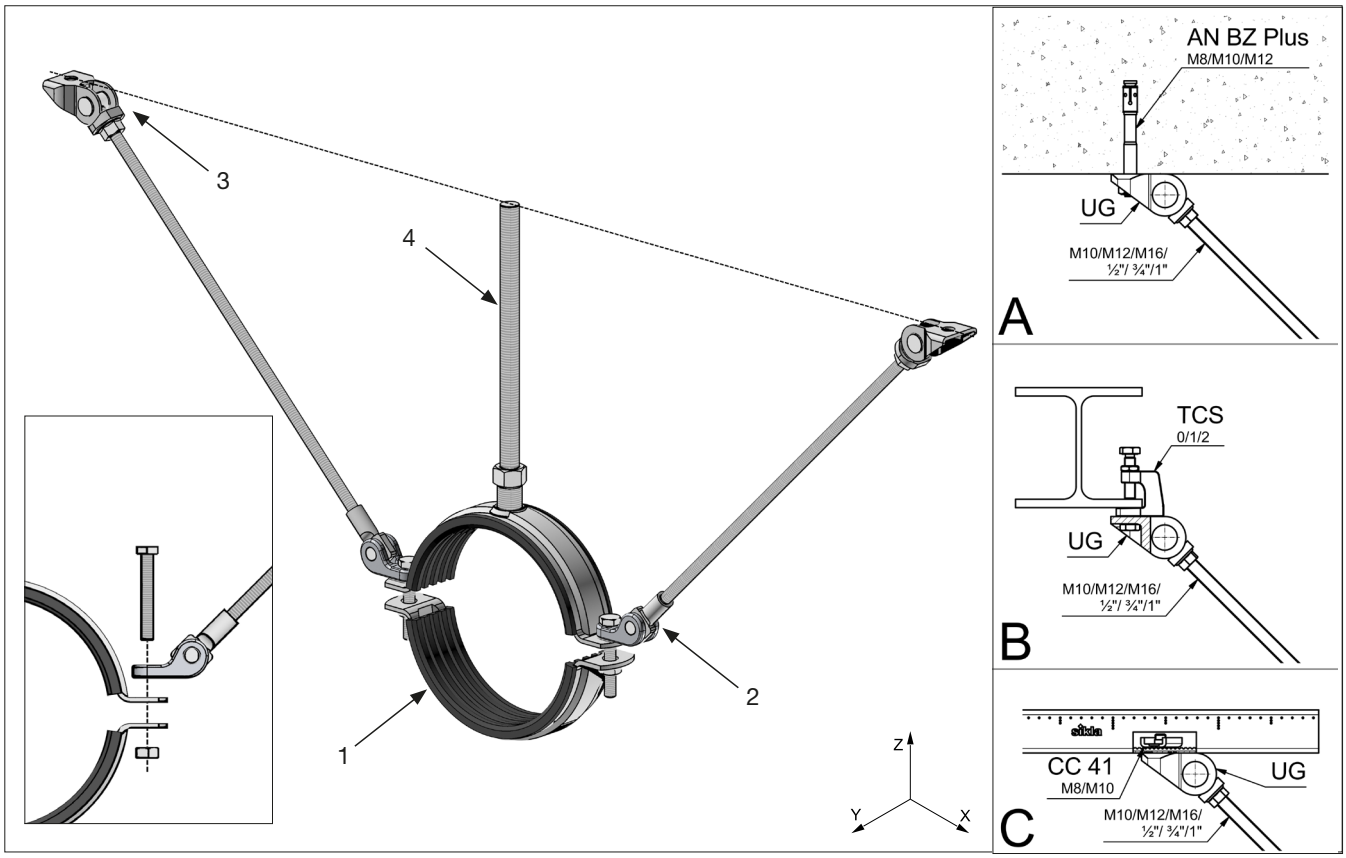
Permissible load values



Permissible load according to type of mounting [1]			
H_{max} [3] [m]	F_h [kN] [2]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	7.90	4.40	3.00
0.4	6.30	2.50	1.63
0.6	5.60	2.30	1.48
0.8	5.30	2.20	1.40

1) Values valid for mounting with M16 + 4 M10 struts.
Contact Sikla Application Technician for further mounting types.
2) max. permissible tension / compression force of the strut
3) H_{max} = 0.8 m

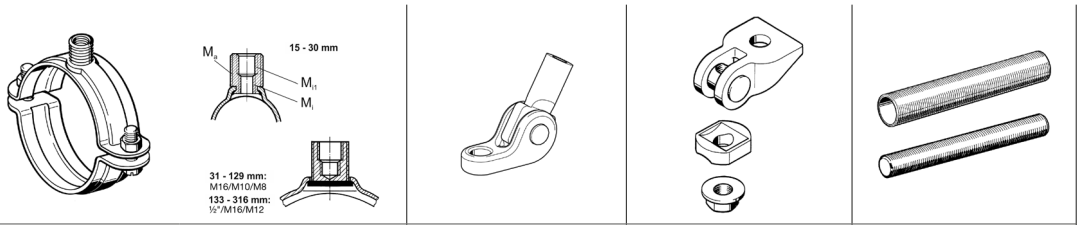
Single pipe: Lateral bracing M10 SP-T2La 1



Application

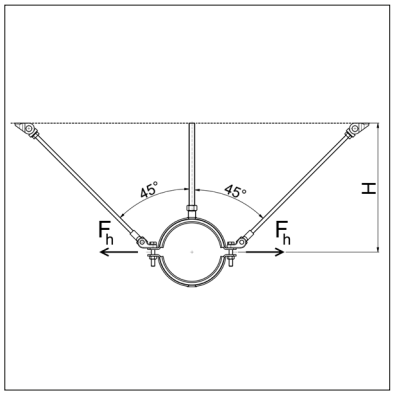
Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list



Item 1: Stabil D-3G		Item 2: SG	Item 3: UG	Item 4: GST / GR
$Ø_{min}$ [mm] (Part no.)	$Ø_{max}$ [mm] (Part no.)	Type (Part no.)	Type (Part no.)	Dimension
133-140 (107130)	167-173 (107167)	M10-11 (115044)	M10 (198643)	1/2" / M16 / M12
176-184 (107176)	310-316 (147600)	M10-13 (115045)	M10 (198643)	1/2" / M16 / M12

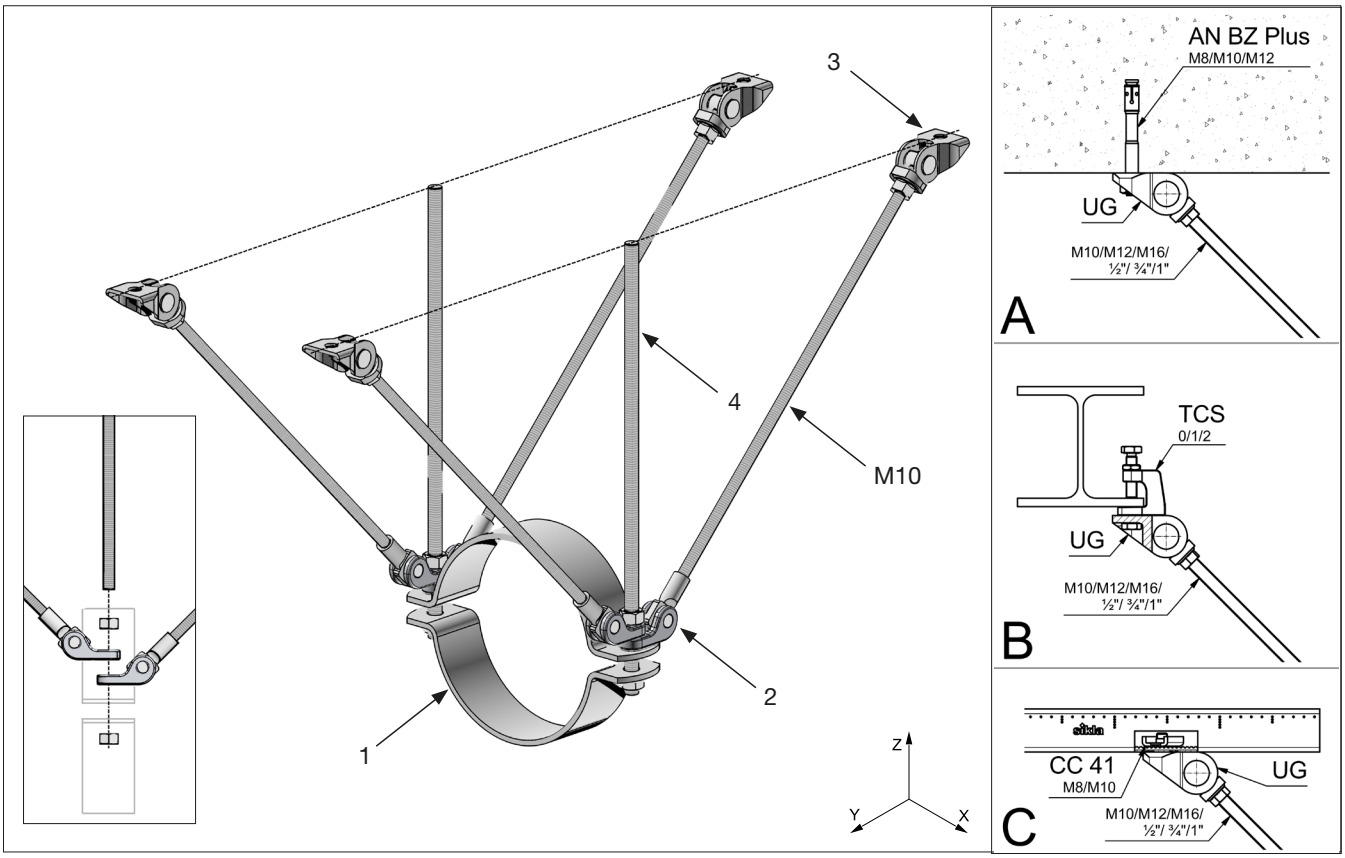
Permissible load values



Permissible load according to type of mounting [1]			
H_{max} [3] [m]	F_h [kN] [2]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	3.00	2.25	1.53
0.4	2.00	1.50	1.27
0.6	2.00	1.50	1.19
0.8	1.71	1.29	1.14

1) Values valid for mounting with M16 + 2 M10 struts.
Contact Sikla Application Technician for further mounting types.
2) max. permissible tension / compression force of the strut
3) H_{max} = 0.8 m

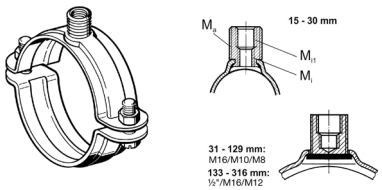
Single pipe: Longitudinal bracing SP-T4Lo 2

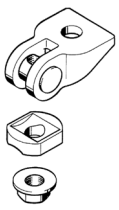


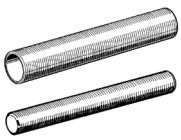
Application

Assembly for absorbing longitudinally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list

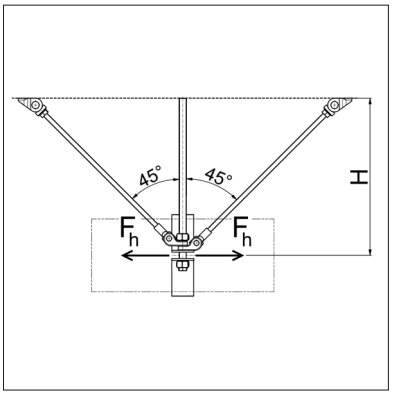






Item 1a: Stabil D-3G		Item 1b: RB-A	Item 2: SG	Item 3: UG	Item 4: GST / GR
$Ø_{min}$ [mm] (Part no.)	$Ø_{max}$ [mm] (Part no.)	$Ø_{nom}$ [mm]	Type (Part no.)	Type (Part no.)	Dimension
133-140 (107130)	167-173 (107167)	18 - 49	M10-11 (115044)	M10 (198643)	1/2" / M16 / M12
176-184 (107176)	310-316 (147600)	61 - 220	M10-13 (115045)	M10 (198643)	1/2" / M16 / M12

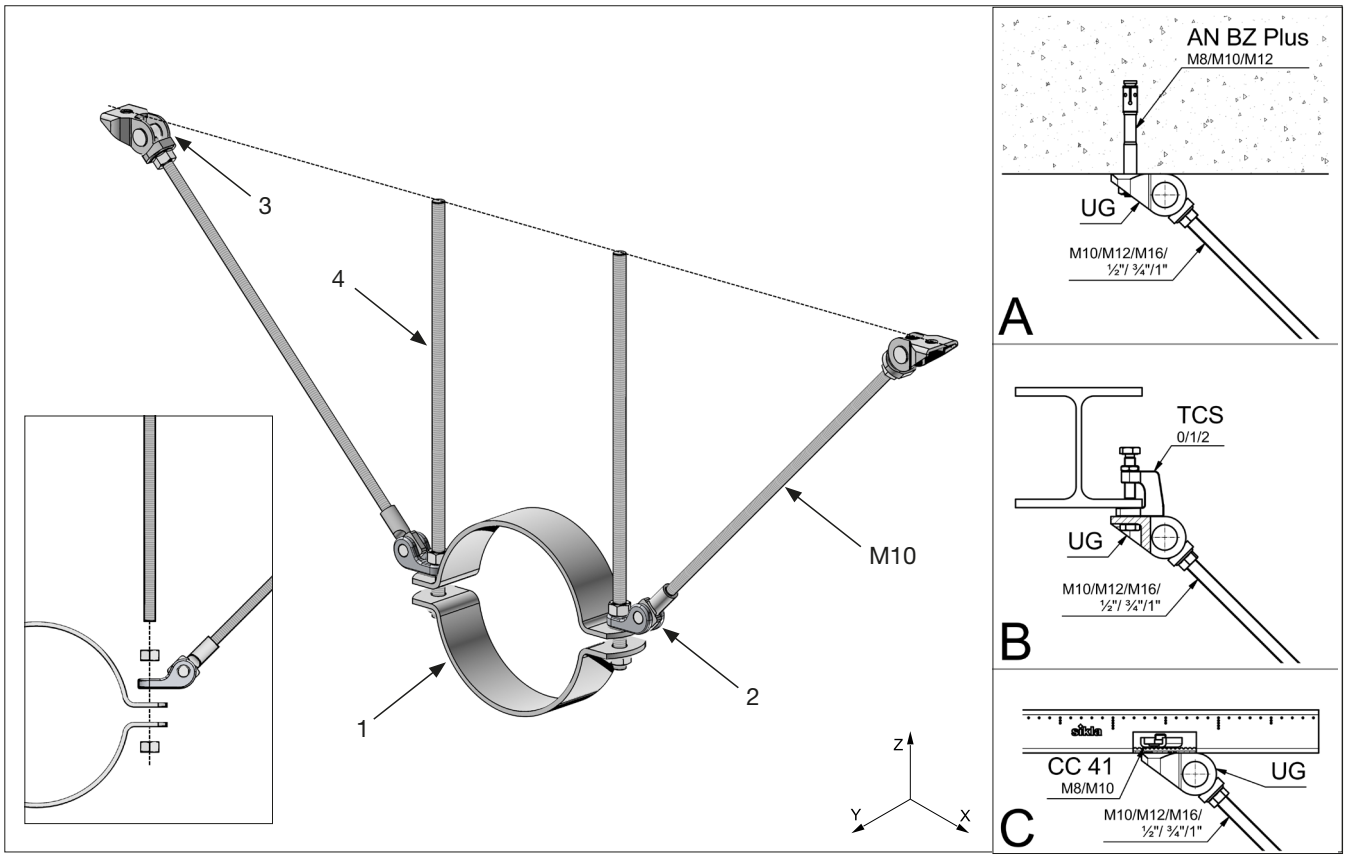
Permissible load values



	Permissible load according to type of mounting [1]		
H_{max} [3] [m]	F_h [kN] [2]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	9.10	4.40	3.00
0.4	6.50	2.50	1.63
0.6	5.75	2.30	1.48
0.8	5.37	2.20	1.40

1) Values valid for mounting with M16 + 4 M10 struts.
Contact Sikla Application Technician for further mounting types.
2) max. permissible tension / compression force of the strut
3) H_{max} = 0.8 m

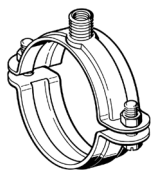
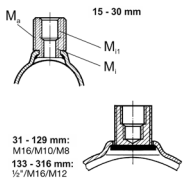
Single pipe: Lateral bracing M10 SP-T2La 2



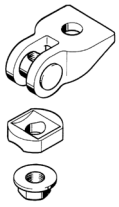
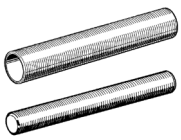
Application

Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list

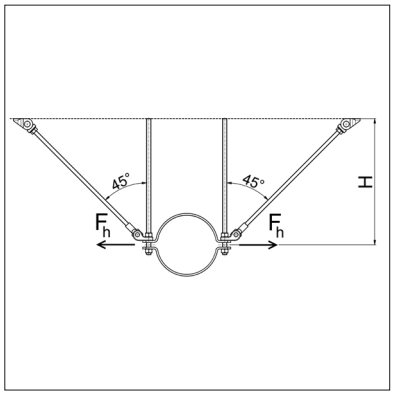





Item 1a: Stabil D-3G		Item 1b: RB-A	Item 2: SG	Item 3: UG	Item 4: GST / GR
$Ø_{min}$ [mm] (Part no.)	$Ø_{max}$ [mm] (Part no.)	$Ø_{nom}$ [mm]	Type (Part no.)	Type (Part no.)	Dimension
133-140 (107130)	167-173 (107167)	18 - 49	M10-11 (115044)	M10 (198643)	1/2" / M16 / M12
176-184 (107176)	310-316 (147600)	61 - 220	M10-13 (115045)	M10 (198643)	1/2" / M16 / M12

Permissible load values



Permissible load according to type of mounting [1]			
H_{max} [3] [m]	F_h [kN] [2]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	3.90	2.29	1.82
0.4	2.60	1.90	1.43
0.6	2.60	1.79	1.37
0.8	2.23	1.67	1.30

1) Values valid for mounting with M16 + 2 M10 struts.
Contact Sikla Application Technician for further mounting types.
2) max. permissible tension / compression force of the strut
3) H_{max} = 0.8 m

Components: Technical information

Pipe clamps Stabil D-3G w/ lining

Clamping range [mm]	$F_{Rd,s,eq}$ (V) [kN]	Tightening torque [Nm]
14-23	2.8	2
24-65	5.5	2
67-115	8.2	3
124-162	15.5	5
165-318	15.5	10

Material: Steel, electro-galvanised

Pipe clamps Stabil D-3G

Clamping range [mm]	$F_{Rd,s,eq}$ (V) [kN]
15-24	4.0
25-72	7.0
76-129	8.2
133-173	15.5
176-316	15.5

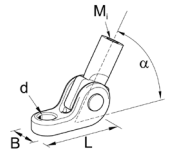
Material: Steel, electro-galv.; SBR/EPDM

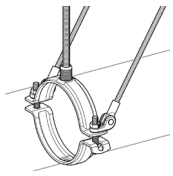
Pipe clamps Stabil RB-A

Clamping range [mm]	Tightening torque [Nm]
13-49	20
57-89	40
90-169	40
188-610	100

Material: Steel, surface black

Support joint SG

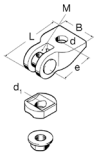




Suitable support joint / Clamp combinations:	Type	Part no.	Brace angle α	ø D [mm]	B [mm]	L [mm]
SG M10-11: Stabil D-3G (133-140 to 167-173) Stabil D-A (76-81 to 124-129) Stabil RB-A (13-18 to 45-49)	SG M10-11	115044	0 - 45° 90°	11	20	52
SG M10-13: Stabil D-3G (176-184 to 310-316) Stabil D-A (133-140 to 297-303) Stabil RB-A (57-61 to 214-220) Stabil D-M16 (218-227 and 271-277)	SG M10-13	115045	0 - 45° 90°	13	22	54
SG M10-17: Stabil D-A (316-324 to 513-521) Stabil RB-A (248-254 to 603-610)	SG M10-17	115046	0 - 45° 90°	17	27	59.5

Material: Joint: cast iron, electro-galv.; link eye: steel, electro-galv.

Universal joint UG



Type	Part no.	Pivot bolt	A [mm]	B [mm]	ø D [mm]	L [mm]	$F_{Rd,s,eq}$ (V) [kN]	$F_{Rd,s,eq}$ (H) [kN]	Maintenance unit
UG M10	198643	M10	26	40	10.5	51	14.5	5.0	Flange nut
UG M12	158075	M12	33	50	17	71	23.5	-	Flange nut
UG FP M12	158093	M16	33	50	17	71	14.5	-	Flange nut

Material: Steel, electro-galv. (M10); cast iron, electro-galv. (UG M12 + FP M12)

Threaded rod GST

Thread	Part no.	$F_{Rd,s,eq}$ (N) [kN]
M10	124568	17.0
M12	143192	20.0
M16	110817	20.0

Material: Steel class 4.8, electro-galv.

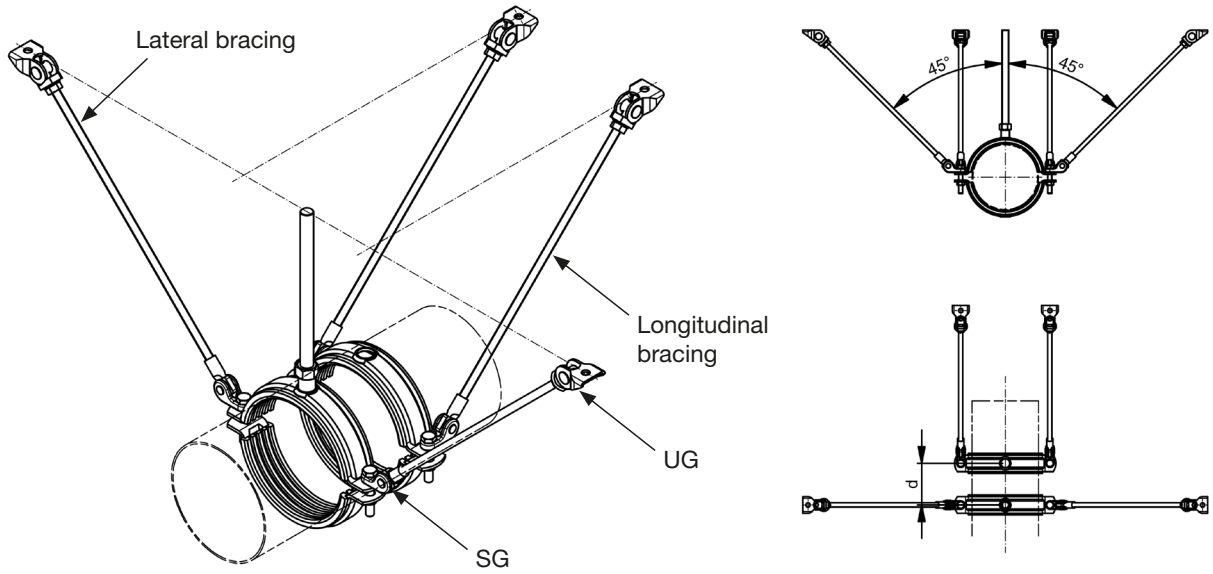
Threaded tube GR

Screw thread as per DIN EN ISO 228	Part no.
G ½“	151102
G ¾“	151111
G 1“	151120

Material: Steel, electro-galvanised

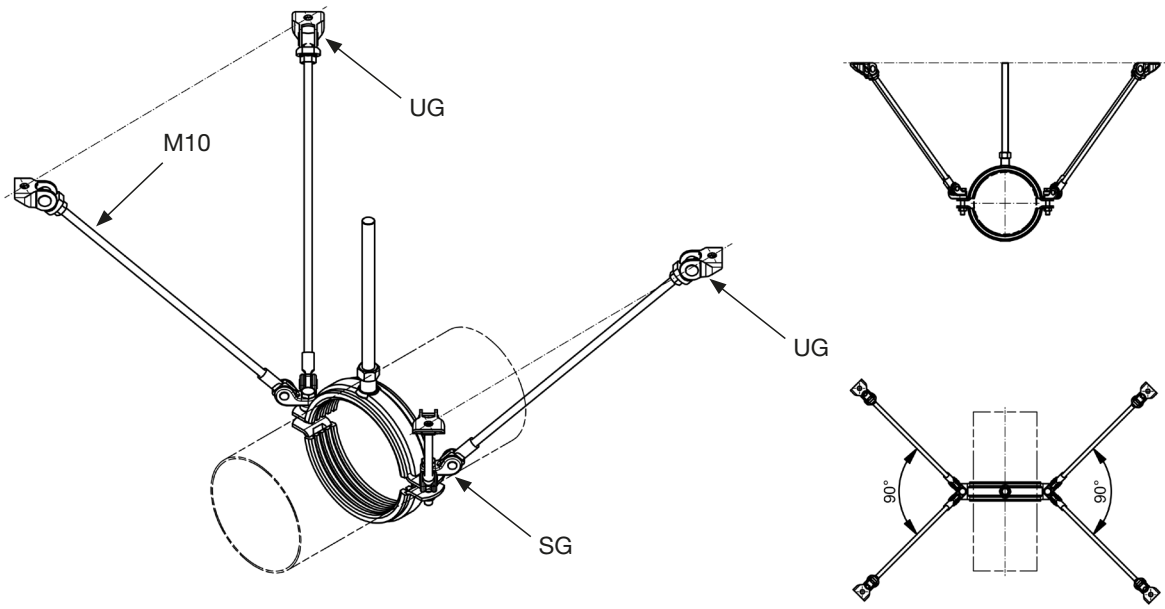
Alternative solutions

1. Lateral + longitudinal bracing with 2 pipe clamps



*For load information contact Sikla Application Technician

2. Lateral + longitudinal bracing: Trestle arrangement

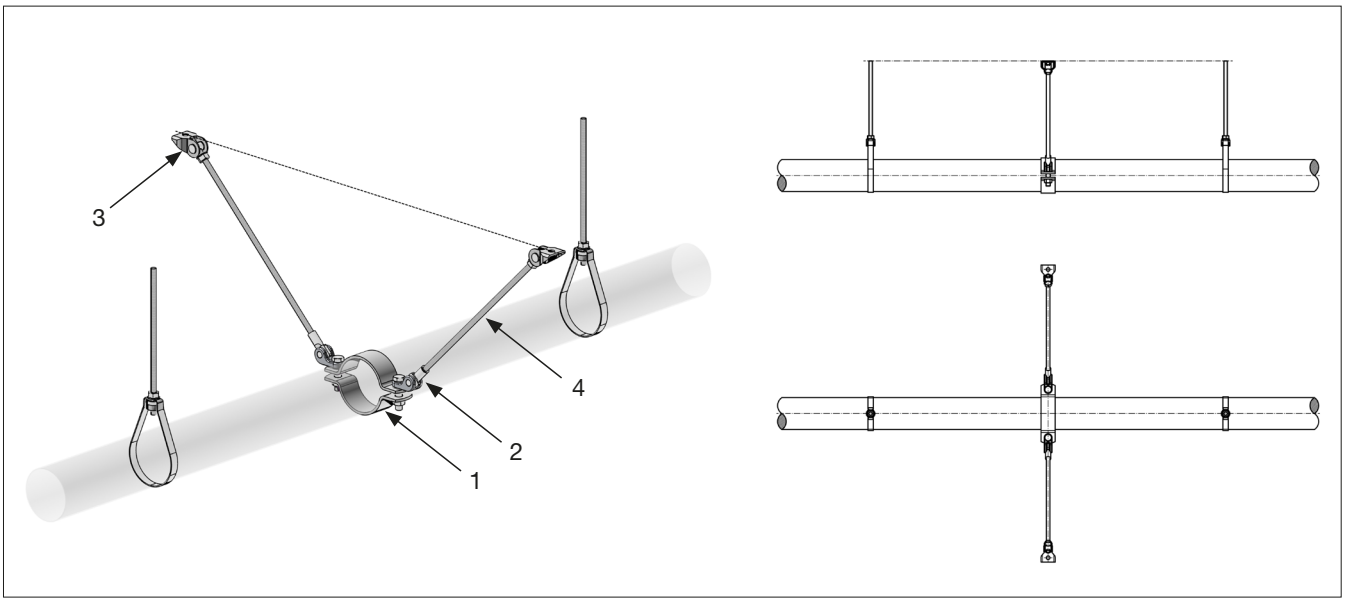


*For load information contact Sikla Application Technician

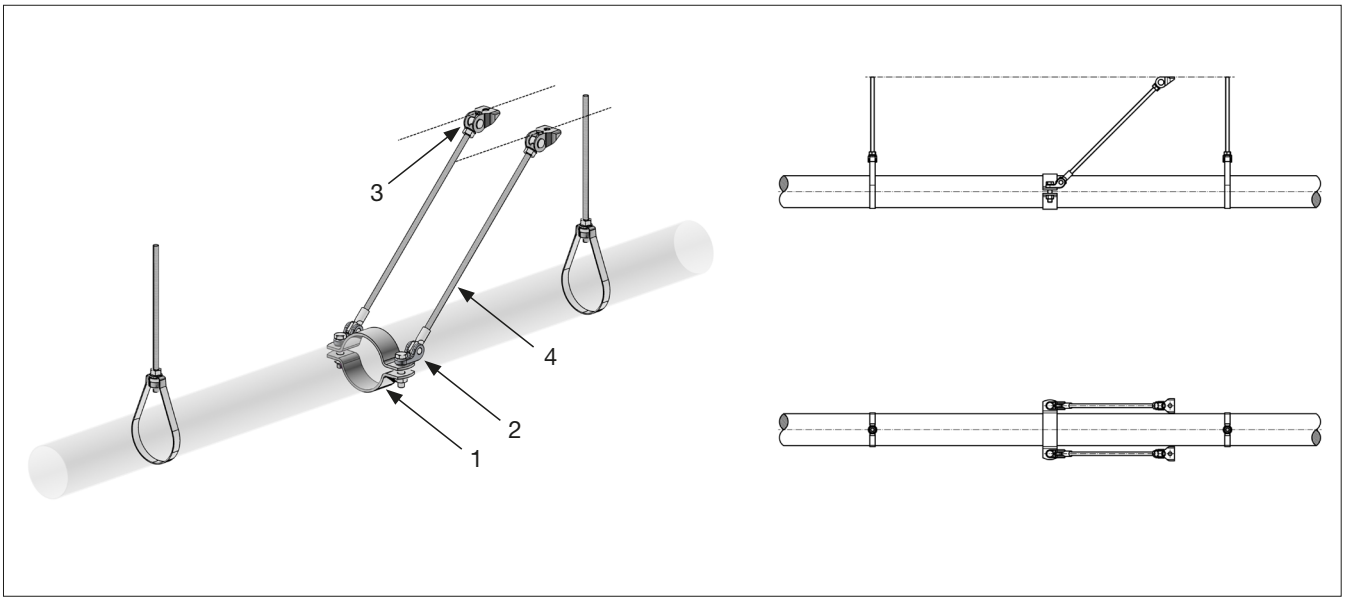
04/2019

Mounting for sprinkler system

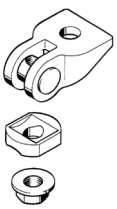
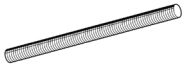
Lateral bracing



Longitudinal bracing

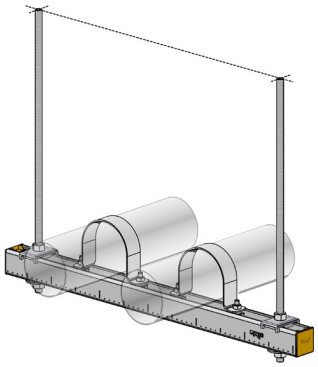


Parts list

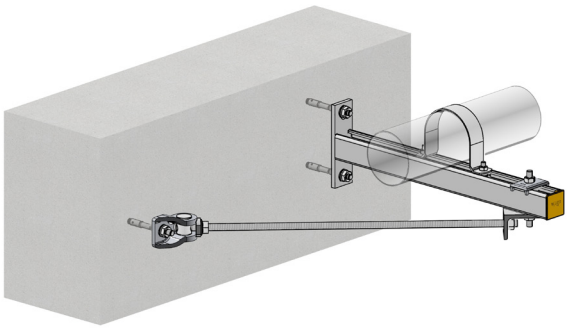
			
Item 1: RB-A	**Item 2: SG**	**Item 3: UG**	**Item 4: GST**
$Ø_{nom}$ [mm]	Type (Part no.)	Type (Part no.)	Dimension
18 - 49	M10-11 (115044)	M10 (198643)	M10
61 - 220	M10-13 (115045)	M10 (198643)	M10

Mounting - Channel/Threaded strut

Channel line

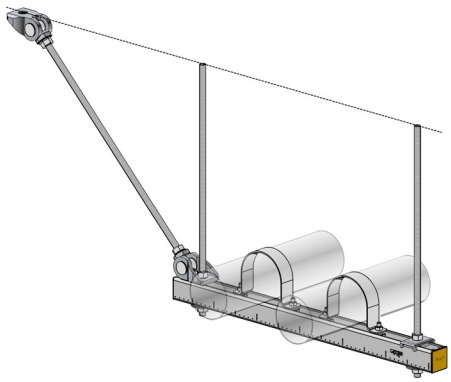


SCT

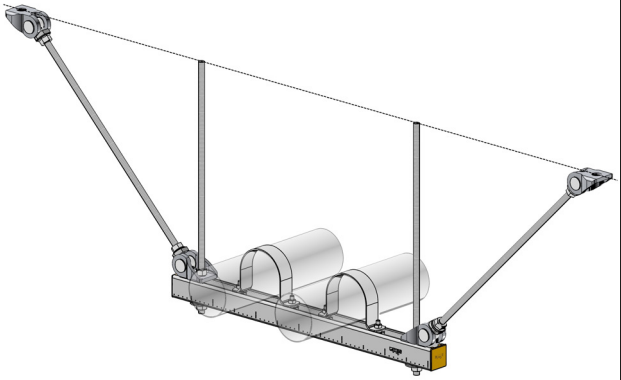


SC-TLoLa AK

Lateral bracing

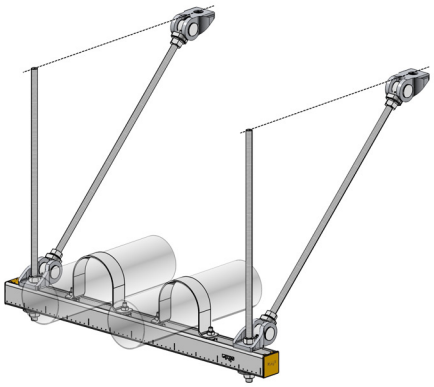


SC-TLa

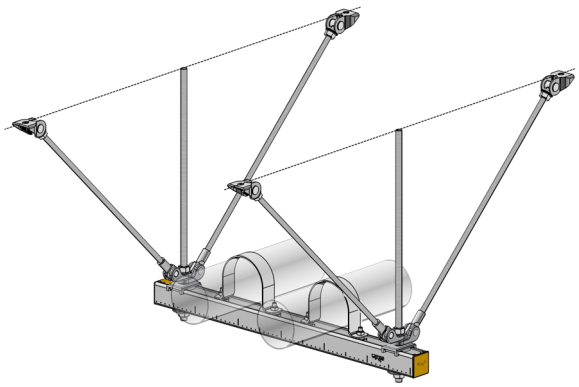


SC-T2La

Longitudinal bracing



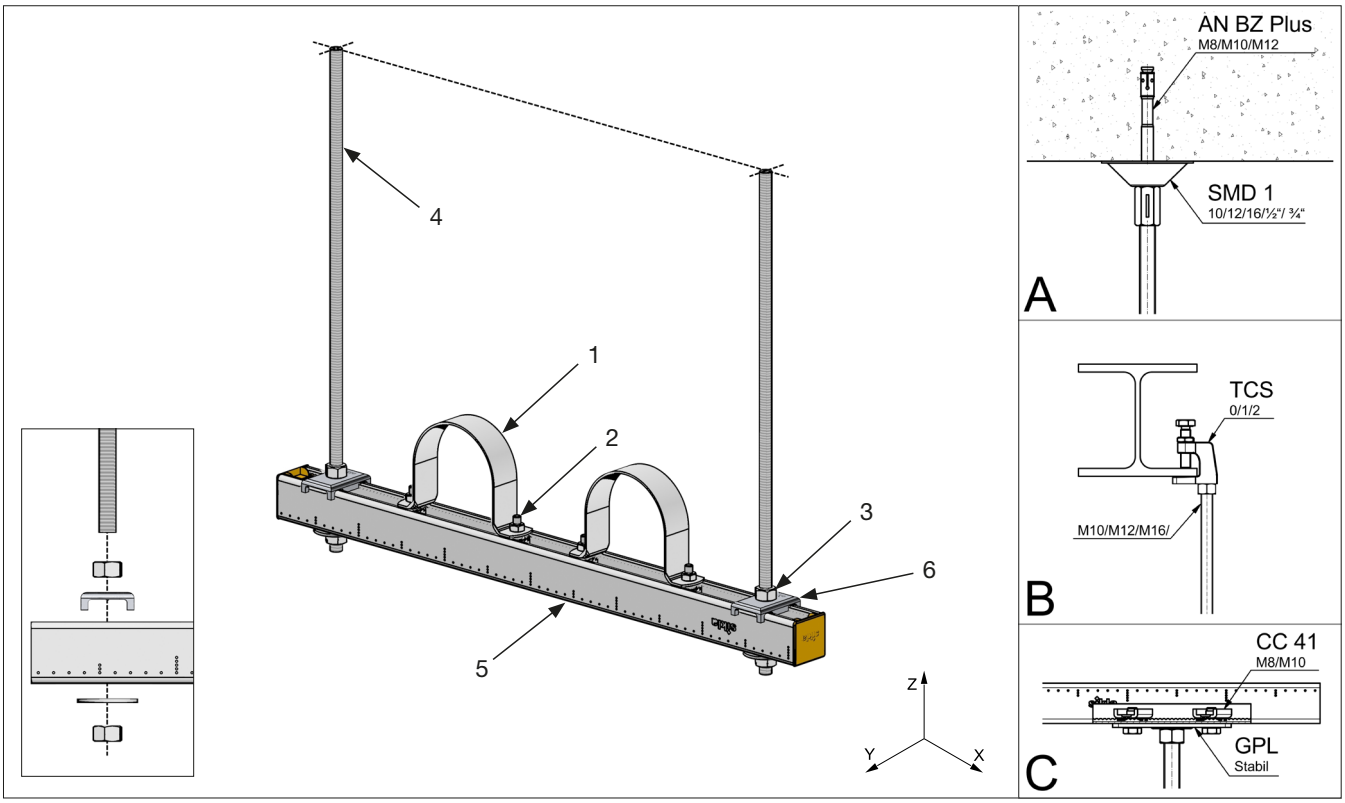
SC-T2Lo



SC-T4Lo2

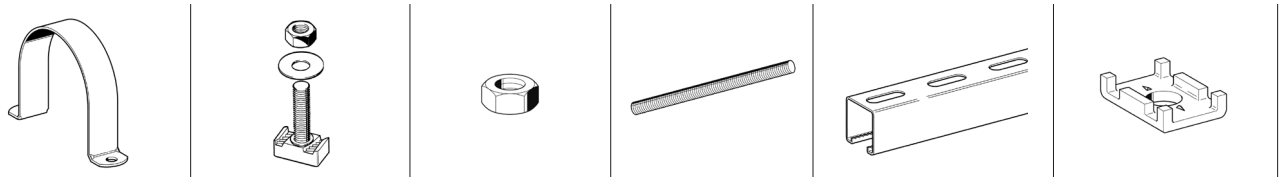
04/2019

SC channel line



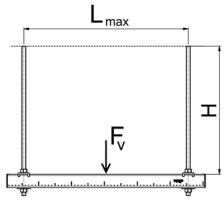
Application
Channel fixed with two vertical threaded rods.

Parts list



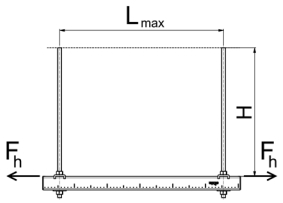
Item 1: RUC	Item 2: TBO HZ 41	Item 3: NT	Item 4: GST	Item 5: MS 41	Item 6: HK 41
Type (Part no.)	Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)	Dimension
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	M12 (114228)	M12 (143192)	from: 41/21/2.0 (193686)	41/12 (178256)
5“ (159119) - 12“ (159155)	M12x35 (152185)	M16 (114237)	M16 (110817)	to: 41-75/75/3.0 (173999)	41/16 (178265)

Permissible load values

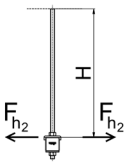


L_{max} [m]	F_v [kN] (2)		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

Permissible load according to type of mounting 1)



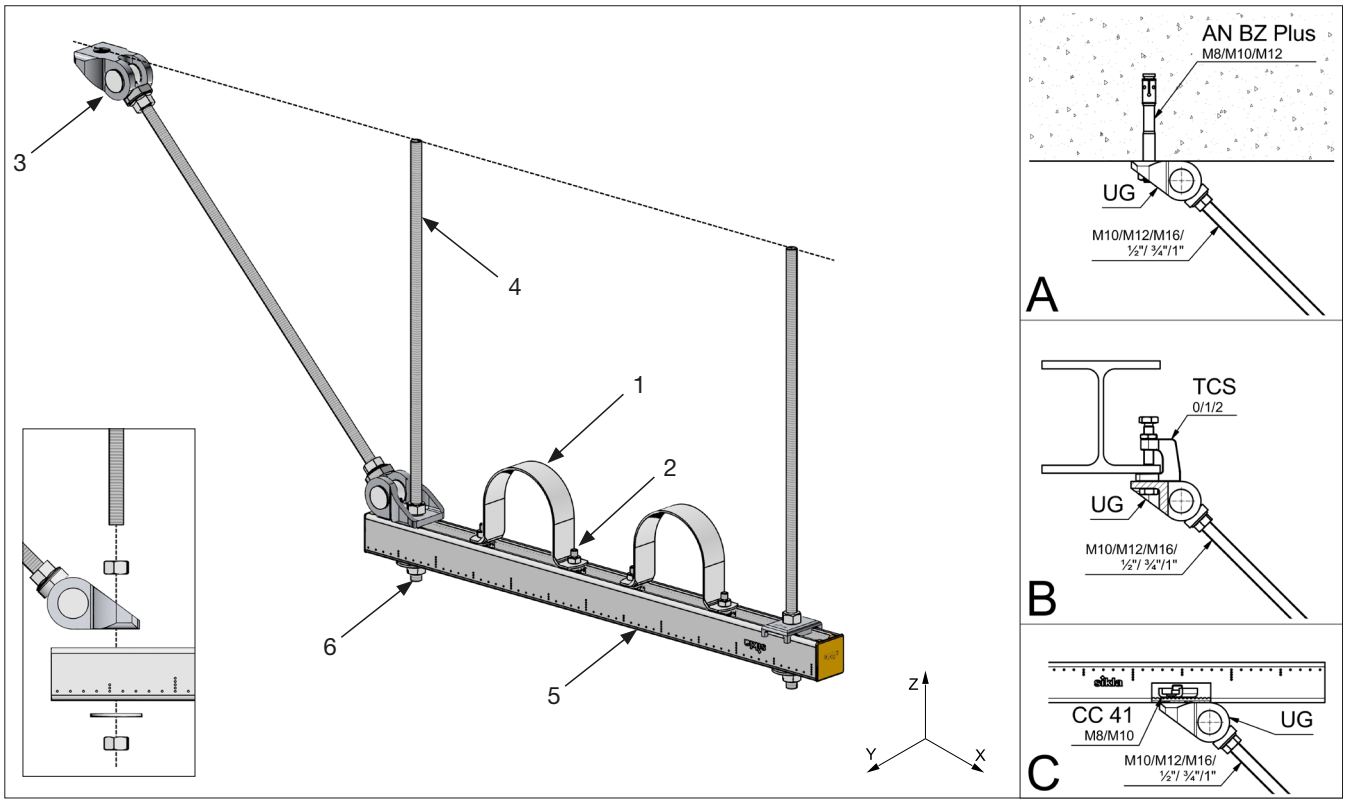
H_{max} [m]	F_h [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	0.44	0.30	0.44
0.4	0.22	0.15	0.22
0.6	0.15	0.10	0.15
0.8	0.11	0.08	0.11



H_{max} [m]	F_h 2 [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	0.44	0.30	0.44
0.4	0.22	0.15	0.22
0.6	0.15	0.10	0.15
0.8	0.11	0.08	0.11

1) Values valid for channel with threaded rods ≥ M12. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) Max. load for channel and threaded rods. The attachment to the building structure must be verified separately.

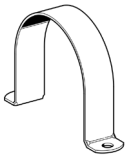
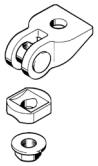
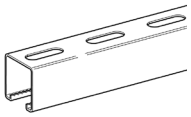
Channel line: SC-TLa



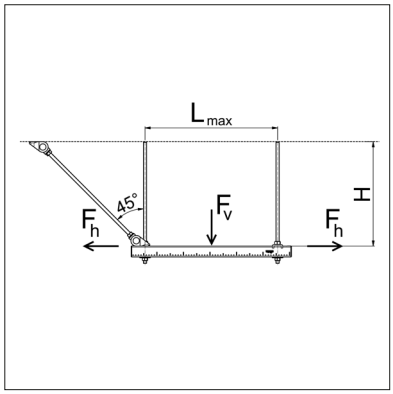
Application

Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list

					
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: UG**	**Item 4: GST**	**Item 5: MS 41**	**Item 6: NT**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	M12 (158075)	M12 (143192)	from: 41/21/2.0 (193686)	M12 (114228)
5“ (159119) - 12“ (159155)	M12x35 (152185)	M16 (158084)	M16 (110817)	to: 41-75/75/3.0 (173999)	M16 (114237)

Permissible load values



Permissible load according to type of mounting [1]

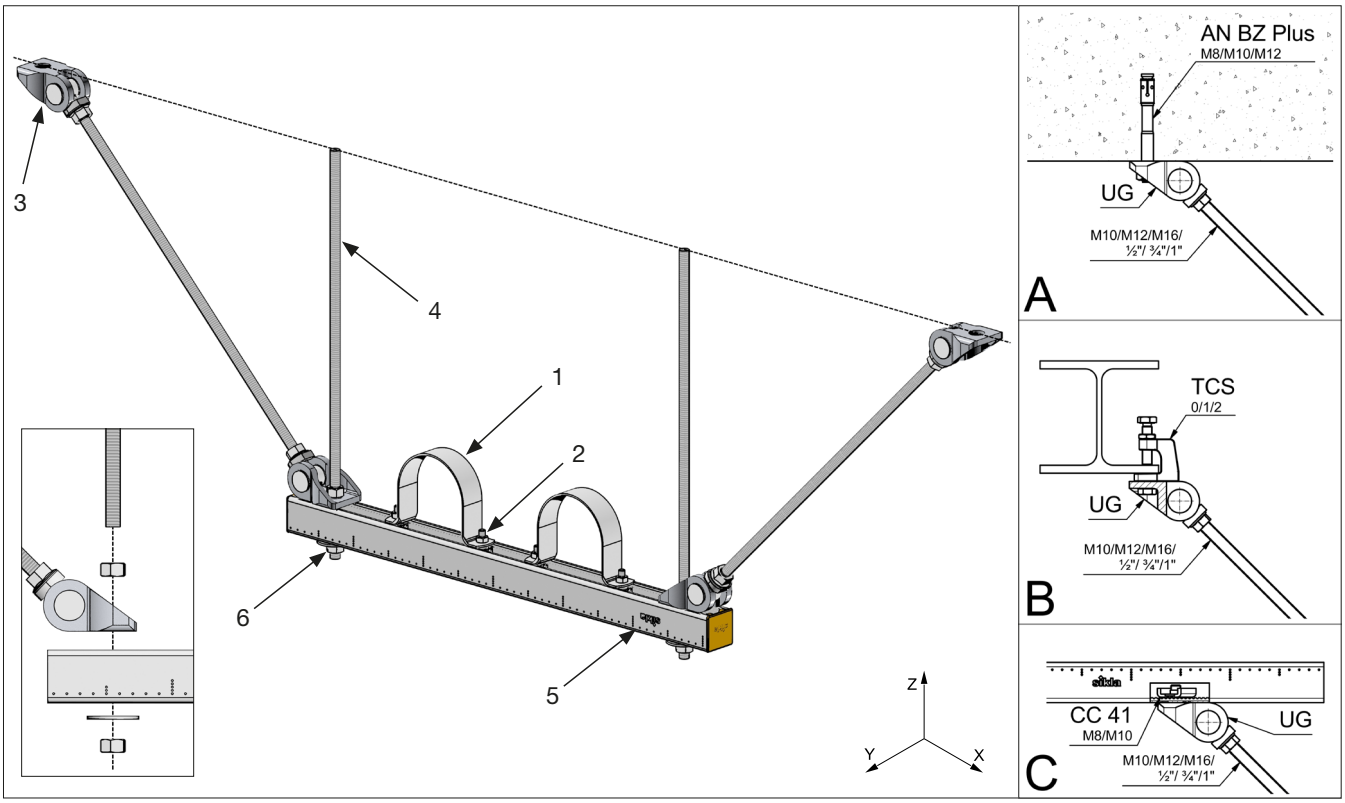
H_{max} [m]	F_h [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2 < H < 0.6	3.44	2.50	2.00
0.6 < H < 0.8	1.93	1.93	1.93

L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

1) Values valid for channel with threaded rods ≥ M12. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

04/2019

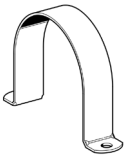
Channel line: SC-T2La



Application

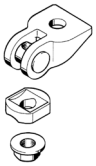
Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list



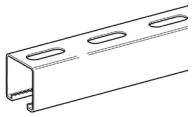
Item 1: RUC
Type (Part no.)
3/8“ (159012) - 4“ (159100)
5“ (159119) - 12“ (159155)

Item 2: TBO HZ 41
Type (Part no.)
M10x35 (152051)
M12x35 (152185)



Item 3: UG
Type (Part no.)
M12 (158075)
M16 (158084)

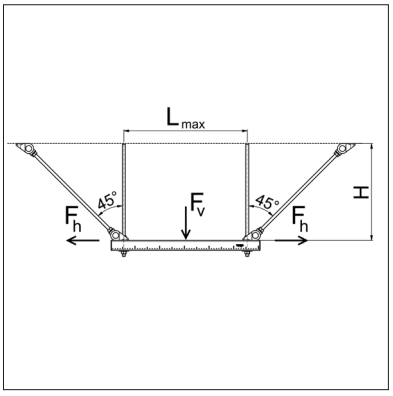
Item 4: GST
Dimension
M12 (143192)
M16 (110817)



Item 5: MS 41
Type (Part no.)
from: 41/21/2.0 (193686)
to: 41-75/75/3.0 (173999)

Item 6: NT
Type (Part no.)
M12 (114228)
M16 (114237)

Permissible load values



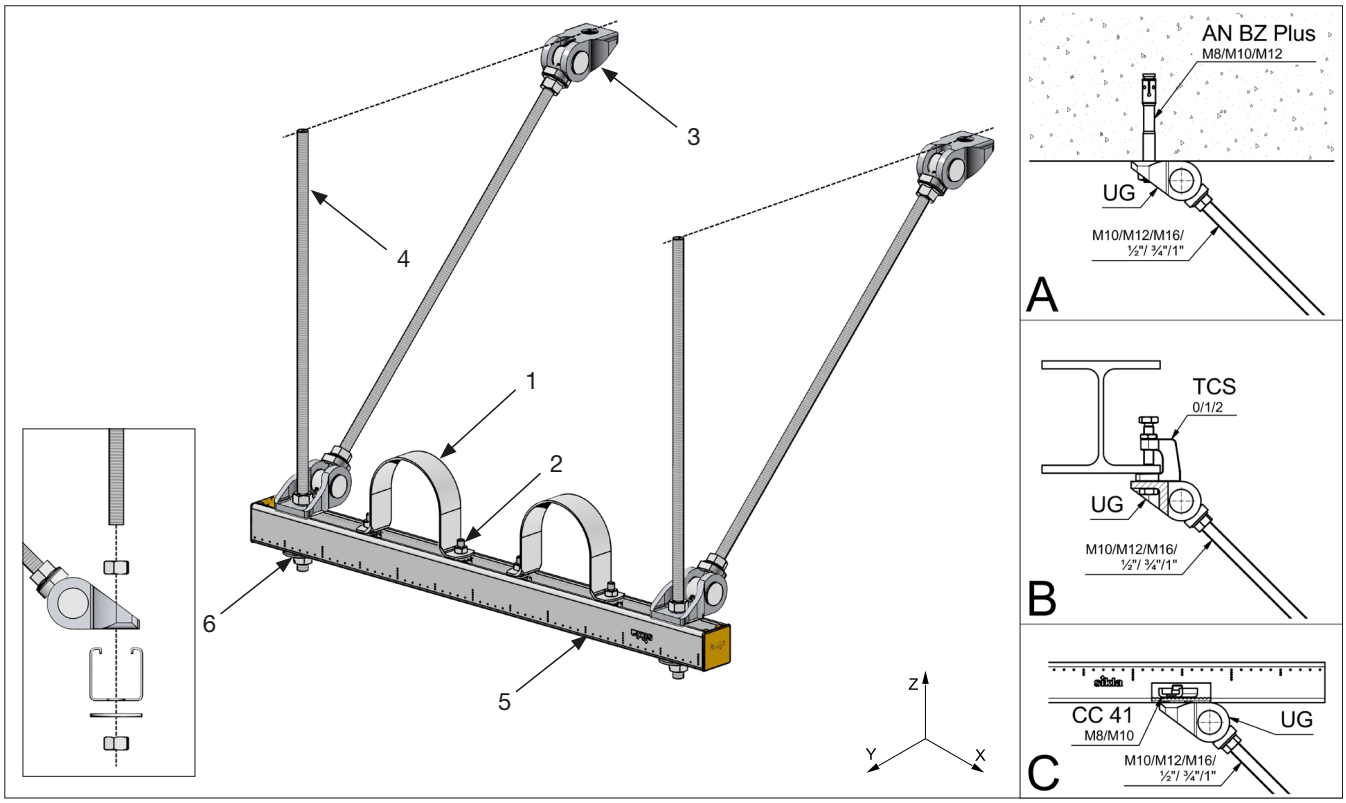
Permissible load according to type of mounting [1]

H_{max} [m]	F_h [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2 < H < 0.6	6.88	5.00	4.00
0.6 < H < 0.8	3.86	3.86	3.86

L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

1) Values valid for channel with threaded rods ≥ M12. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

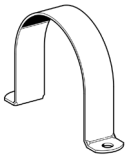
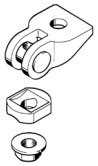
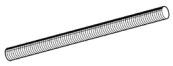
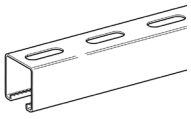
Channel line: SC-T2Lo



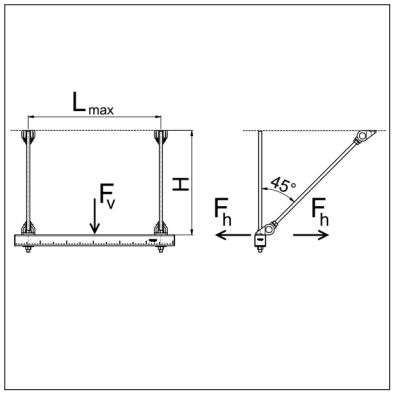
Application

Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list

					
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: UG**	**Item 4: GST**	**Item 5: MS 41**	**Item 6: NT**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	M12 (158075)	M12 (143192)	from: 41/21/2.0 (193686)	M12 (114228)
5“ (159119) - 12“ (159155)	M12x35 (152185)	M16 (158084)	M16 (110817)	to: 41-75/75/3.0 (173999)	M16 (114237)

Permissible load values



Permissible load according to type of mounting [1]

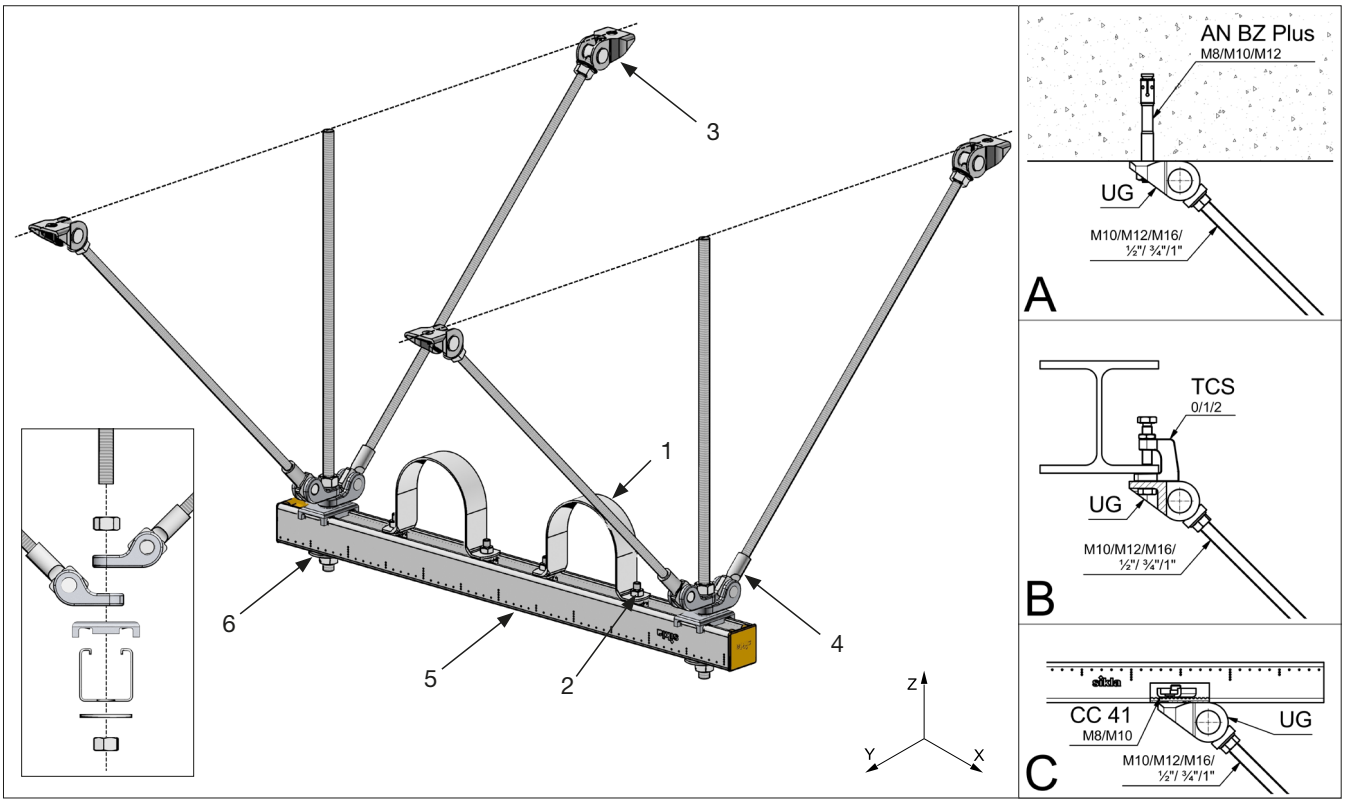
H_{max} [m]	F_h [kN] Concrete / Steel beams / MS 41 L_{max} [m]			
	0.5	1.0	1.5	2.0
0.4	4.00	4.00	3.19	2.39
0.6	4.00	4.00	3.19	2.39
0.8	3.86	3.86	3.19	2.39

L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

1) Values valid for channels ≥ 41/41/2.0 with threaded rods ≥ M12. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

04/2019

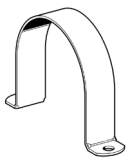
Channel line: SC-T4Lo 2

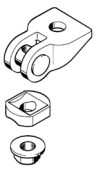


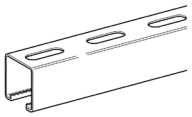
Application

Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list

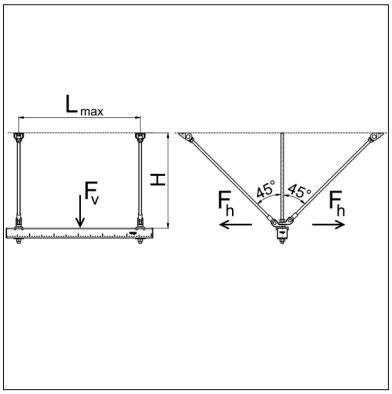







Item 1: RUC	Item 2: TBO HZ 41	Item 3: UG	Item 4: SG	Item 5: MS 41	Item 6: NT
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	M10 (198643)	M10-13 (115045)	from: 41/21/2.0 (193686)	M12 (114228)
5“ (159119) - 12“ (159155)	M12x35 (152185)	M10 (198643)	M10-17 (115046)	to: 41-75/75/3.0 (173999)	M16 (114237)

Permissible load values



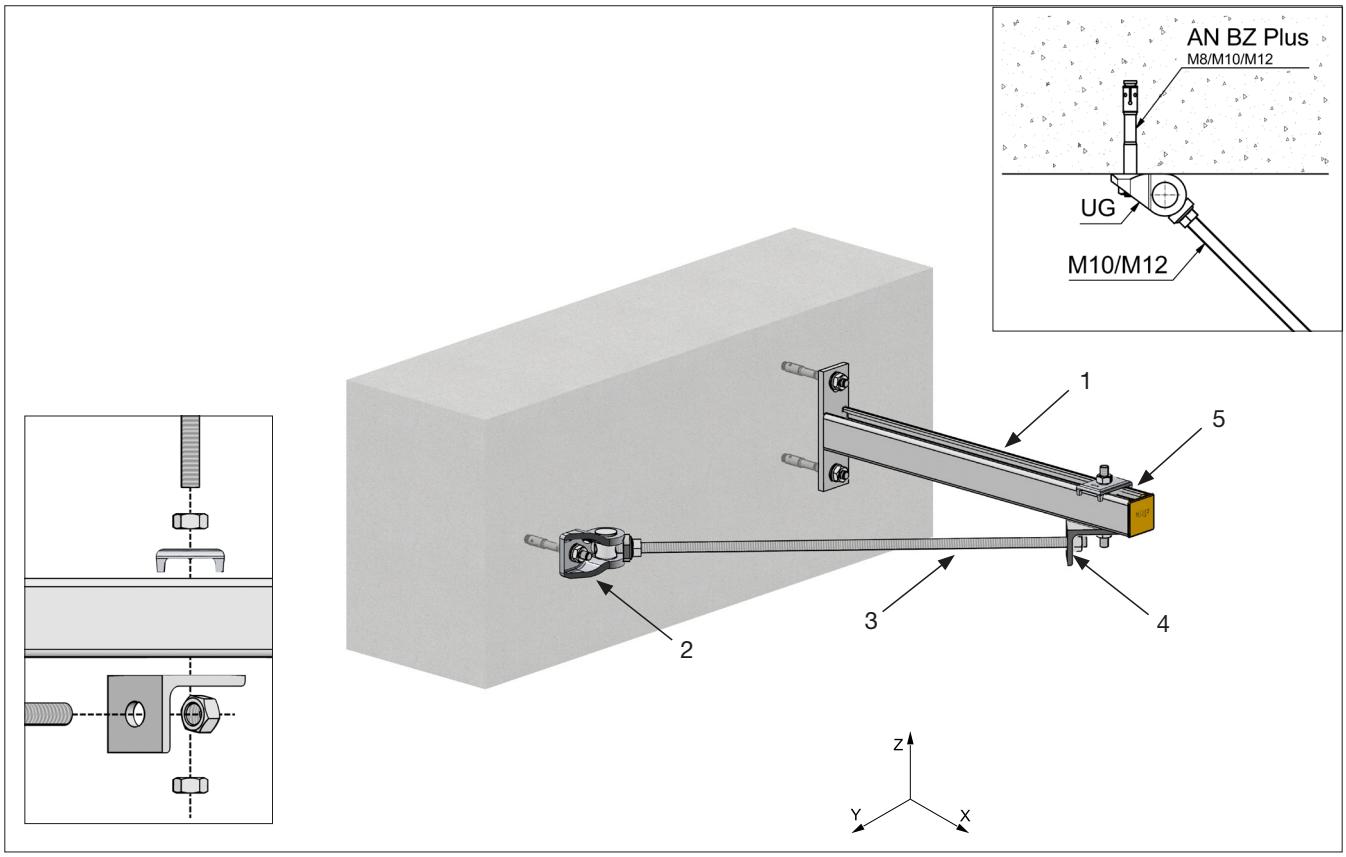
Permissible load according to type of mounting [1]

H_{max} [m]	F_h [kN] Concrete / Steel beams / MS 41 L_{max} [m] 0.5	1.0	1.5	2.0
0.4	7.33	4.78	3.19	2.39
0.6	3.25	3.25	3.19	2.39
0.8	1.84	1.84	1.84	1.84

L_{max} [m]	F_v [kN] [2] for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

1) Values valid for channels ≥ 41/41/2.0 with threaded rods ≥ M12. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

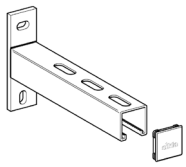
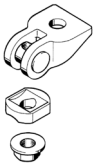
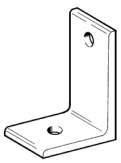
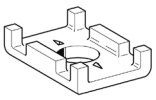
Cantilever bracket on concrete: SC-TLoLa AK



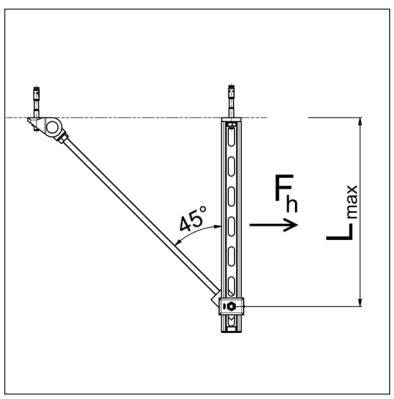
Application

Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation.

Parts list

				
Item 1: AK 41	**Item 2: UG**	**Item 3: GST**	**Item 4: MW S**	**Item 5: HK 41**
Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)	Type (Part no.)
from 41/41 - 820 (149268)	M12 (158075)	M12 (143192)	60/40/90° (115399)	41/10 (178247)
to 41/62 - 1010 (113300)	M16 (158084)	M16 (110817)	60/40/90° (115399)	41/10 (178247)

Permissible load values



Permissible load for connection to concrete	
L_{max} [m]	Cracked concrete C20/25
	F_h [kN] (1)
0.4	8.60
0.6	7.97
0.8	5.98

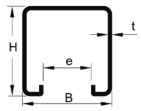
1) Values valid for cantilever bracket AK ≥41/41/2.0 with strut M12. The maximum permissible load capacity as well as the permissible torsion moment of the AK (channel) must be observed. Contact Sikla Application Technician for further mounting types.

2) The attachment to the building structure must be verified separately.

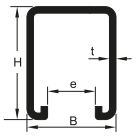
04/2019

Components: Technical information

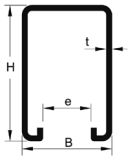
MS channels



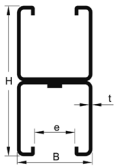
41/41/2.0



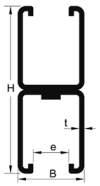
41/52/2.5



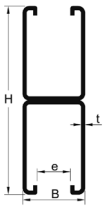
41/62/2.5



41/41/2.0 D



41/52/2.5 D



41/62/2.5 D

Type	Section modulus		Moment of inertia		Radius of inertia	
B/H/s [mm]	[cm³]		[cm⁴]		[cm]	
41/41/2.0	W_y: 2.43	W_z: 3.65	I_y: 5.16	I_z: 7.48	i_y: 1.46	i_z: 1.75
41/52/2.5	W_y: 4.16	W_z: 5.37	I_y: 11.20	I_z: 11.00	i_y: 1.79	i_z: 1.77
41/62/2.5	W_y: 5.54	W_z: 6.27	I_y: 17.70	I_z: 12.86	i_y: 2.10	i_z: 1.79
41/41/2.0 D	W_y: 7.16	W_z: 7.30	I_y: 29.34	I_z: 14.96	i_y: 2.45	i_z: 1.75
41/52/2.5 D	W_y: 12.79	W_z: 10.73	I_y: 66.50	I_z: 22.00	i_y: 3.08	i_z: 1.77
41/62/2.5 D	W_y: 17.38	W_z: 12.54	I_y: 107.75	I_z: 25.71	i_y: 3.66	i_z: 1.79
Materials: Steel 1.0350, strip galvanised as per DIN EN 10346						

Max. permissible seismic load for channels:

MS 41/21/2.0

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	2.35	527	1.21	0.05
610	24	1.76	395	2.15	0.08
914	36	1.17	263	4.84	0.19
1219	48	0.88	197	8.60	0.34

MS 41/21/2.0 D

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	6.73	1512	0.65	0.03
610	24	5.05	1134	1.15	0.05
914	36	3.36	756	2.59	0.10
1219	48	2.52	567	4.60	0.18
1524	60	2.02	453	7.19	0.28
1829	72	1.68	378	10.35	0.41
2434	96	1.26	283	18.40	0.72

MS 41/41/2.0

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	6.96	1564	0.64	0.03
610	24	5.22	1173	1.14	0.04
914	36	3.48	782	2.56	0.10
1219	48	2.61	586	4.55	0.18
1524	60	2.09	469	7.10	0.28
1829	72	1.74	391	10.23	0.40
2134	84	1.49	335	13.92	0.55

MS 41/41/2.0 D

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	20.50	4608	0.33	0.01
610	24	15.38	3456	0.59	0.02
914	36	10.25	2304	1.32	0.05
1219	48	7.69	1728	2.36	0.09
1524	60	6.15	1382	3.68	0.14
1829	72	5.13	1152	5.30	0.21
2134	84	4.39	987	7.21	0.28

MS 41-75/75/3.0

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	29.52	6636	3.15	0.12
610	24	22.14	4977	5.60	0.22
914	36	14.76	3318	12.60	0.50
1219	48	11.07	2488	22.41	0.88
1524	60	8.86	1990	35.01	1.38
1829	72	7.38	1659	50.42	1.98
2134	84	6.33	1422	68.63	2.70

MS 41-75/75/3.0 D

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	87.96	19774	1.81	0.07
610	24	65.97	14830	3.22	0.13
914	36	43.98	9887	7.24	0.29
1219	48	32.98	7415	12.87	0.51
1524	60	26.39	5932	20.11	0.79
1829	72	21.99	4943	28.96	1.14
2134	84	18.85	4237	39.41	1.55

Threaded rod GST

Thread	Item no.	$F_{Rd,s,eq}$ * [kN]
M10	124568	17.0
M12	143192	20.0
M16	110817	20.0

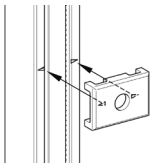
Material: Steel class 4.8, electro-galv.; *system limit

Threaded tube GR

Screw thread as per DIN EN ISO 228	Item no.
G ½“	151102
G ¾“	151111
G 1“	151120

Material: Steel, electro-galvanised

Holding bracket HK 41



Type	Item no.	Bore [mm]
41/10	178247	11
41/12	178256	13
41/16	178265	17

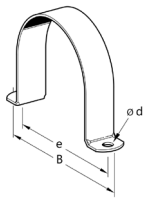
Material: Cast iron, electro-galv.

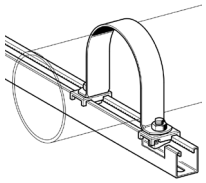
Hexagon nut NT

Type	Item no.
M10	137546
M12	114228
M16	114237

Material: Steel, electro-galvanised

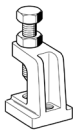
U clamp RUC





Type	For pipe	Material [mm]	B [mm]	L [mm]	Ø D [mm]	Item no.
18	3/8“	30 x 2.5	69	49	9	159012
22	1/2“	30 x 2.5	73	53	9	159021
28	3/4“	30 x 2.5	79	59	9	159030
34	1“	30 x 2.5	85	65	9	159049
43	1 1/4“	30 x 2.5	94	74	9	159058
49	1 1/2“	30 x 2.5	100	80	9	159067
61	2“	30 x 2.5	112	92	9	159076
77	2 1/2“	30 x 2.5	128	108	9	159085
90	3“	30 x 2.5	141	121	9	159094
115	4“	40 x 3.0	183	155	13	159100
141	5“	40 x 3.0	209	181	13	159119
169	6“	40 x 3.0	236	207	13	159128
221	8“	40 x 3.0	289	261	13	159137
275	10“	50 x 5.0	375	325	17	159146
326	12“	50 x 5.0	426	373	17	159155

Beam Clamp HK 41



Type	Item no.	$F_{Rd,s,eq}$ (V) [kN]
TCS1-M10-M10	116150	15.57
TCS1-M10-M12	167332	12.22
TCS2-M12-M12	174224	30.10
TCS2-M12-M16	174215	31.71

Material: Cast iron, electro-galv.

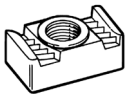
Fixing bracket MW S

Type	Item no.	$F_{Rd,s,eq}$ (V) [kN]	$F_{Rd,s,eq}$ (H) [kN]
45/30/90°	115380	9.7	4.2
60/40/90°	115399	26.3	8.8

Material: Steel, electro-galvanised

04/2019

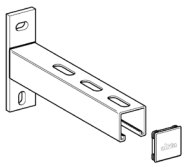
Channel nut NT 41 + NT HZ 41



Type	Item no.	$F_{Rd,s,eq}$ (V) [kN]	$F_{Rd,s,eq}$ [1] (H) [kN]
Hz41 M8/MS1.5	151935	4.5	7.0
Hz41 M8/MS2.0	151935	12.5	7.0
Hz41 M8/MS2.5	151935	13.5	7.0
Hz41 M8/MS3.0	151935	14.0	7.0
Hz41 M10/MS1.5	151944	4.5	7.0
Hz41 M10/MS2.0	151944	12.5	7.0
Hz41 M10/MS2.5	151944	13.5	7.0
Hz41 M10/MS3.0	151944	16.0	7.0
Hz41 M12/MS1.5	182288	4.5	12.0
Hz41 M12/MS2.0	182288	12.5	12.0
Hz41 M12/MS2.5	182288	14.0	12.0
Hz41 M12/MS3.0	182288	20.0	12.0
Hz41 M16/MS1.5	182297	4.5	9.0
Hz41 M16/MS2.0	182297	12.5	9.0
Hz41 M16/MS2.5	182297	14.0	9.0
Hz41 M16/MS3.0	182297	20.0	9.0
NT41 M8/MS1.5	174170	4.5	7.0
NT41 M8/MS2.0	174170	12.5	7.0
NT41 M8/MS2.5	174170	13.5	7.0
NT41 M8/MS3.0	174170	14.0	7.0
NT41 M10/MS1.5	147179	17.0	7.0
NT41 M10/MS2.0	147179	17.0	7.0
NT41 M10/MS2.5	174179	17.0	7.0
NT41 M10/MS3.0	174179	17.0	7.0

Material: Steel, electro-galvanised, [1] Type with holding bracket HK 41

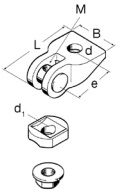
Cantilever bracket AK 41



Type	Item no.	$F_{Rd,s,eq}$ (V)	
		Distance [mm]	[kN]
41/41-320	115618	140	11.73
41/41/445	115627	203	6.89
41/62-320	113296	300	8.29
41/62-445	113297	223	4.80
41/62-570	113298	285	8.75
41/62-445	113297	425	2.52

Material: Steel, electro-galvanised

Universal joint UG

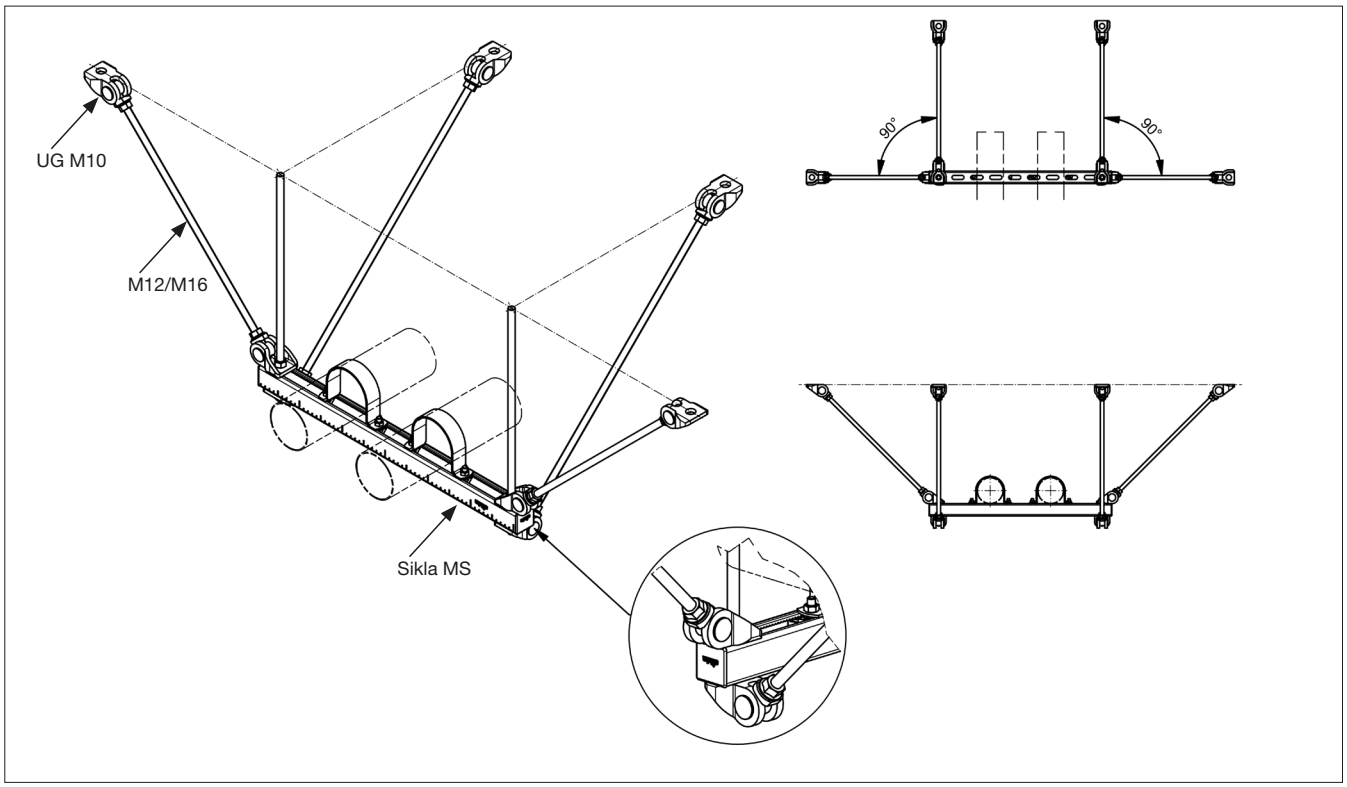


Type	Item no.	Pivot bolt	A [mm]	B [mm]	D [mm]	L [mm]	$F_{Rd,s,eq}$ (V) [kN]	$F_{Rd,s,eq}$ (H) [kN]	Maintenance unit
UG M10	198643	M10	26	40	10.5	51	14.77	5.0	Flange nut
UG M12	158075	M12	33	50	17	71	23.66	-	Flange nut
UG FP M12	158093	M16	33	50	17	71	14.73	-	Flange nut

Material: Steel, electro-galv. (M10);
Cast iron, electro-galv. (UG M12 + FP M12)

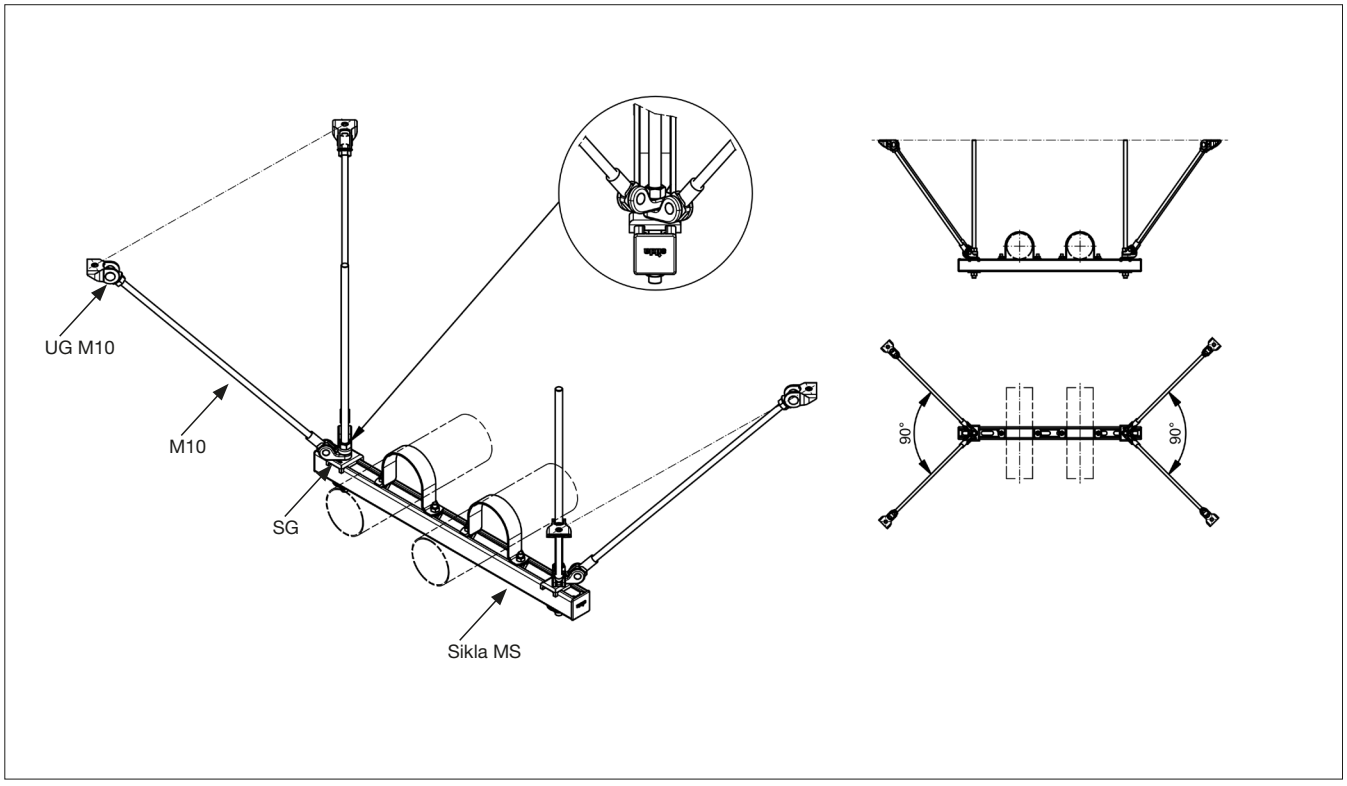
Alternative solutions

1. Channel line: SC-T2LoT2La



*For load information contact Sikla Application Technician

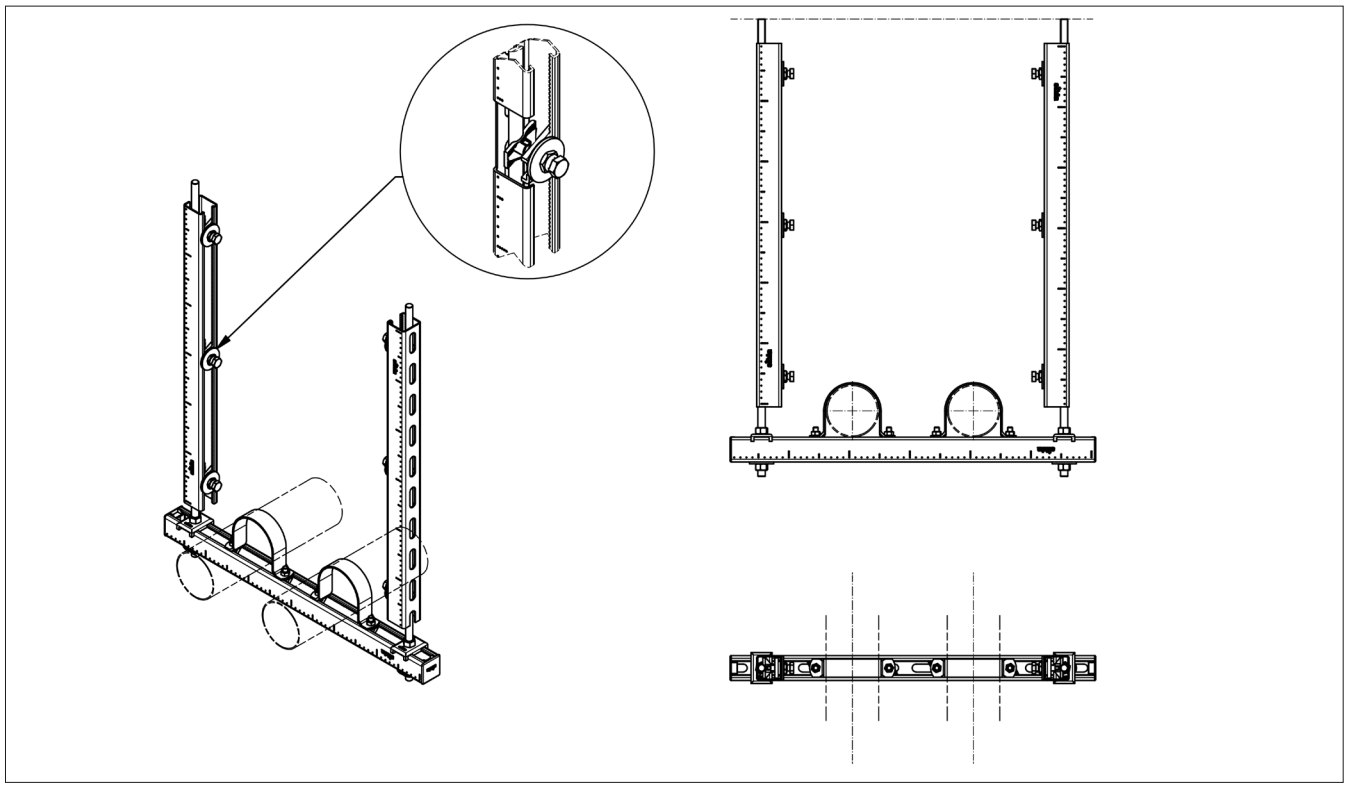
2. Channel line: SC-T4LoLa 45°



*For load information contact Sikla Application Technician

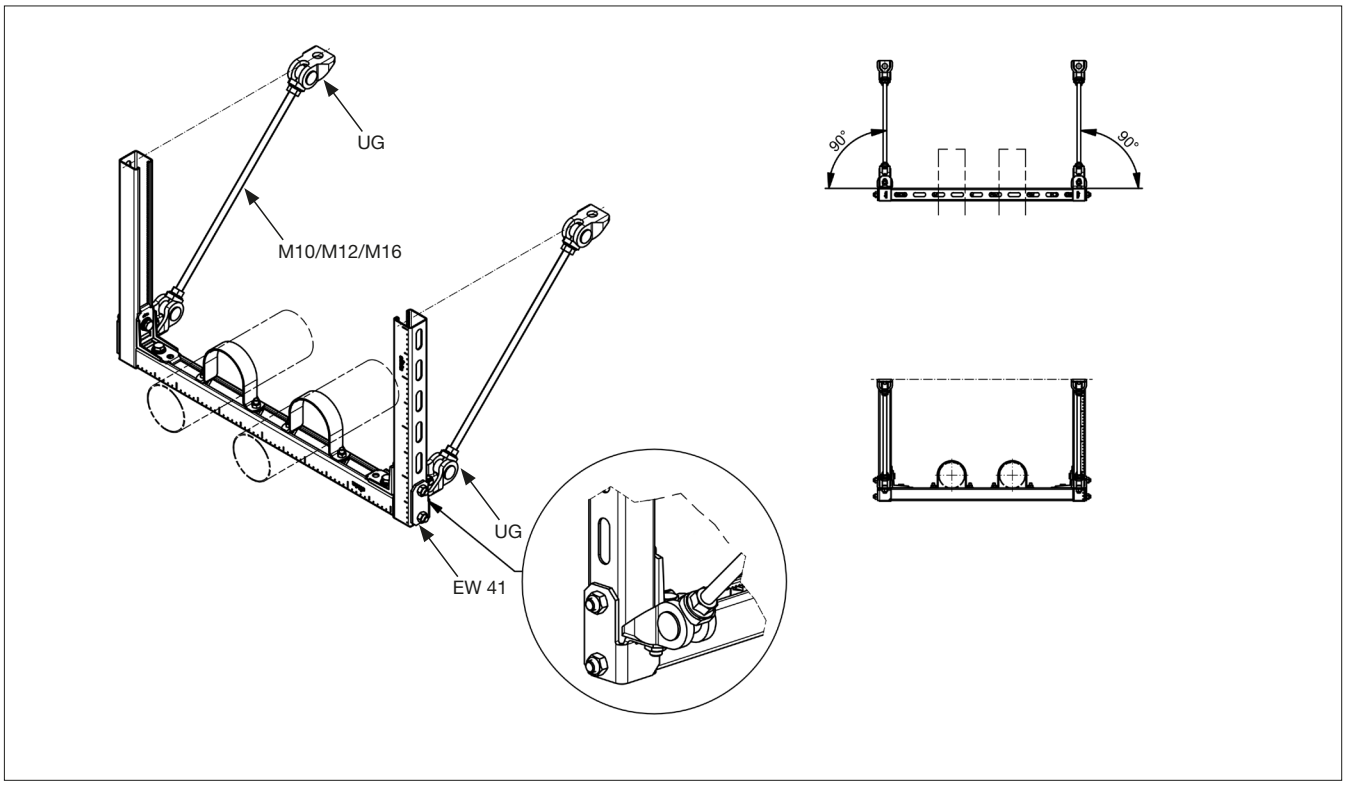
04/2019

3. Channel line: SCC-T2Lo RST (rod stiffener)



*For further information contact Sikla Application Technician

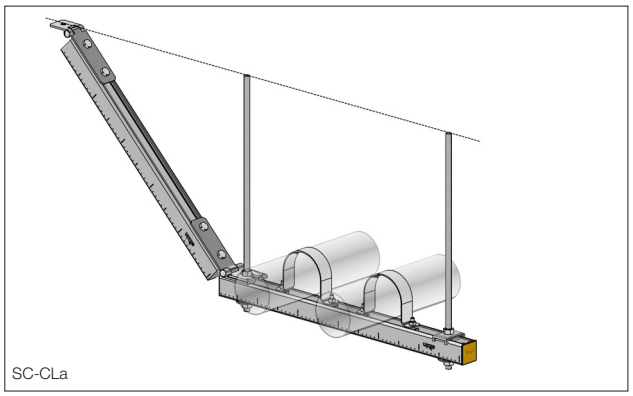
4. Channel line: SCC-T2Lo EW (corner bracket)

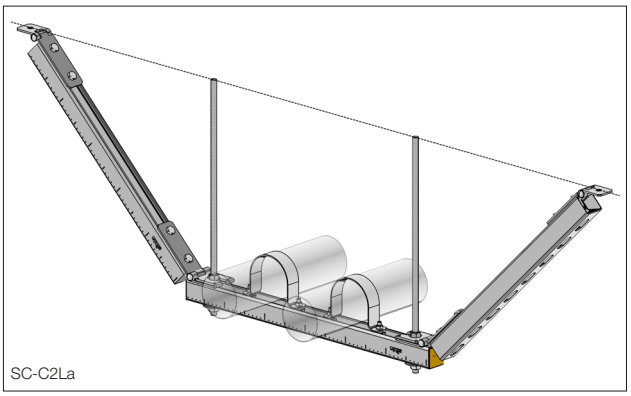


*For load information contact Sikla Application Technician

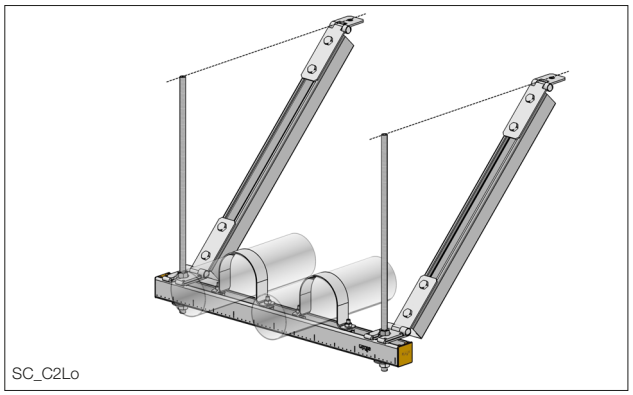
Mounting - Channel /MS strut

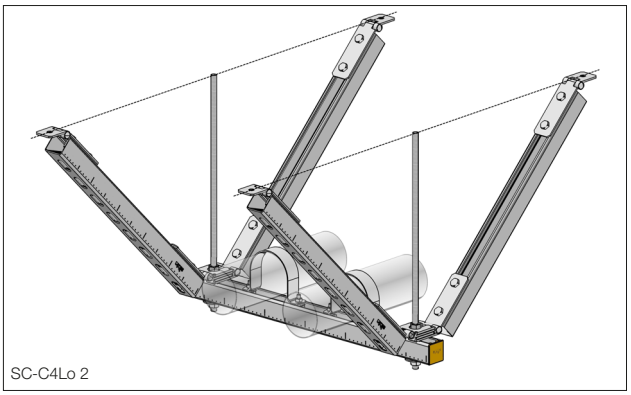
SC - Lateral bracing


SC-CLa

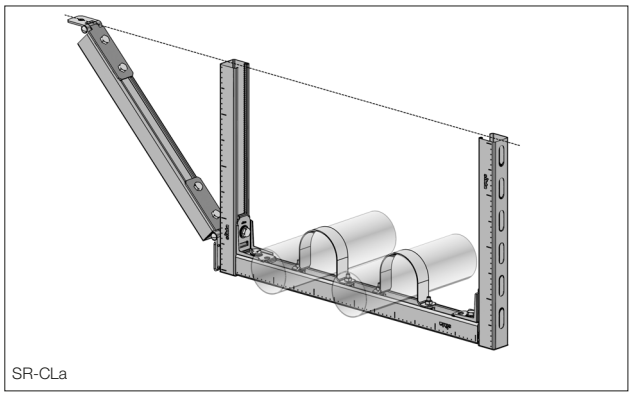

SC-C2La

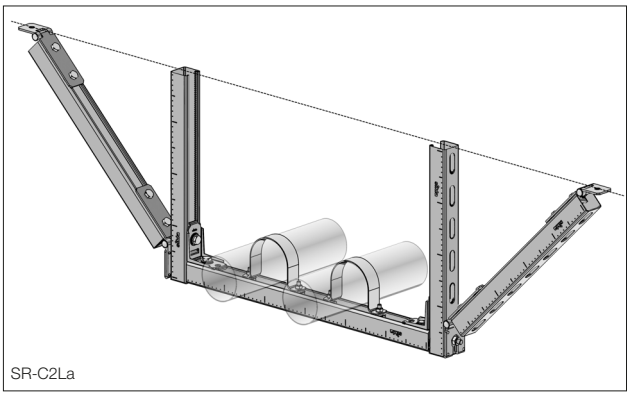
SC - Longitudinal bracing


SC_C2Lo

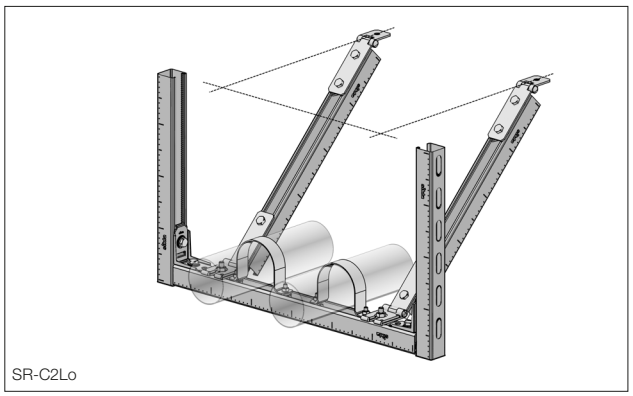

SC-C4Lo 2

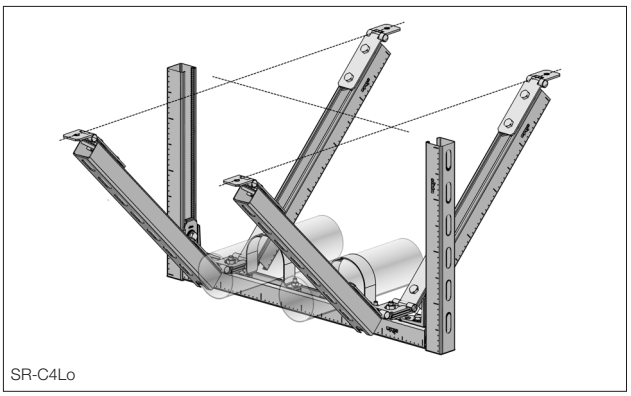
SR - Lateral bracing


SR-CLa


SR-C2La

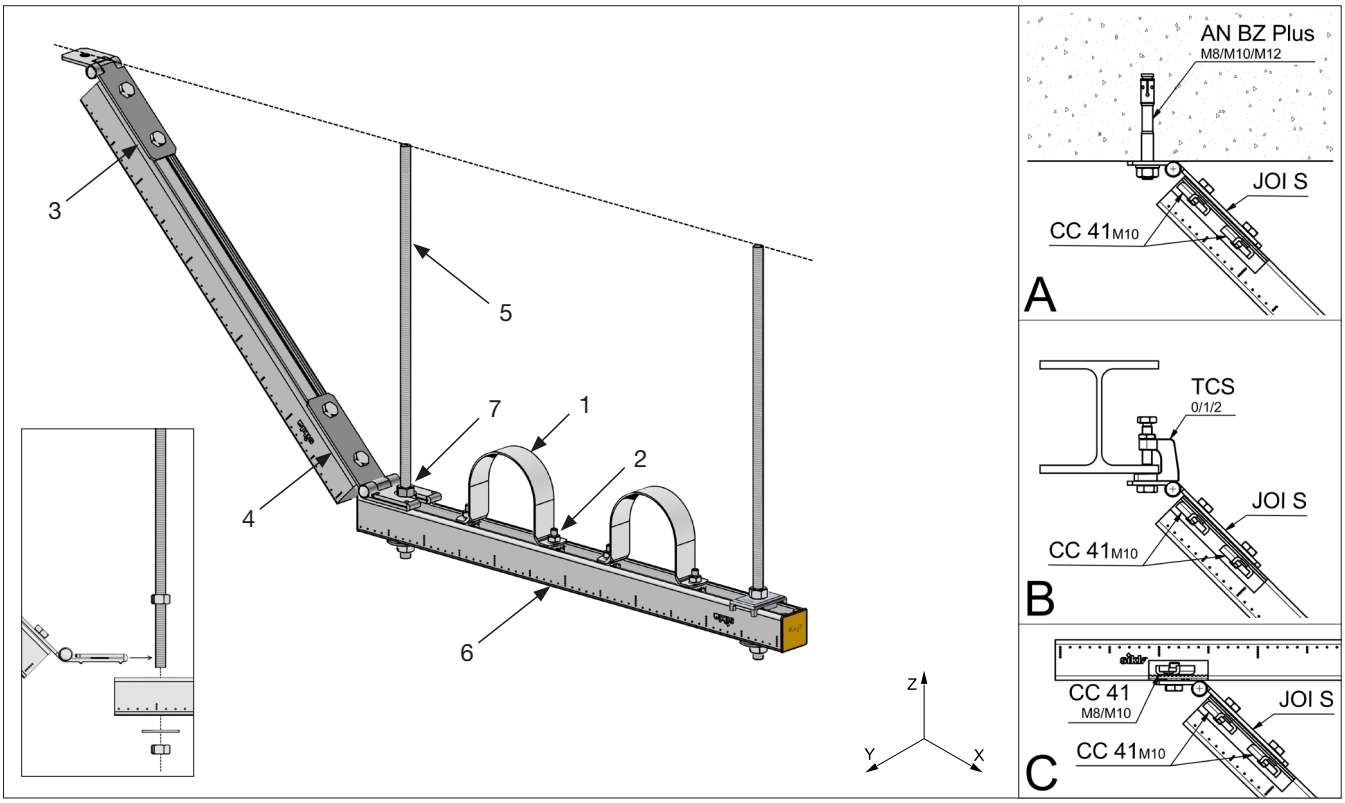
SR - Longitudinal bracing


SR-C2Lo


SR-C4Lo

04/2019

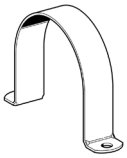
Channel line: SC-CLa

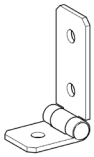


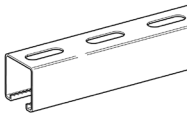
Application

Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation. Possibility of connection after assembly.

Parts list

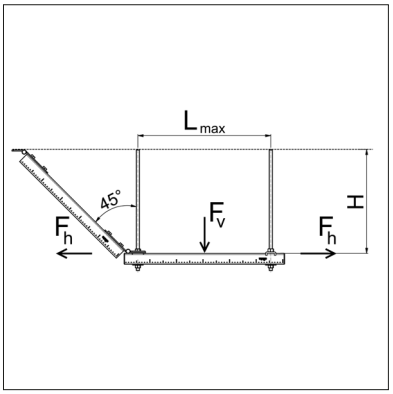





Item 1: RUC	Item 2: TBO HZ 41	Item 3: JOI S	Item 4: JOI R	Item 5: GST	Item 6: MS 41	Item 7: NT
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	S (116577)	23 (116809)	M12 (143192)	from: 41/21/2.0 (193686)	M12 (114228)
5“ (159119) - 12“ (159155)	M12x35 (152185)	S (116577)	23 (116809)	M16 (110817)	to: 41-75/75/3.0 (173999)	M16 (114237)

Permissible load values



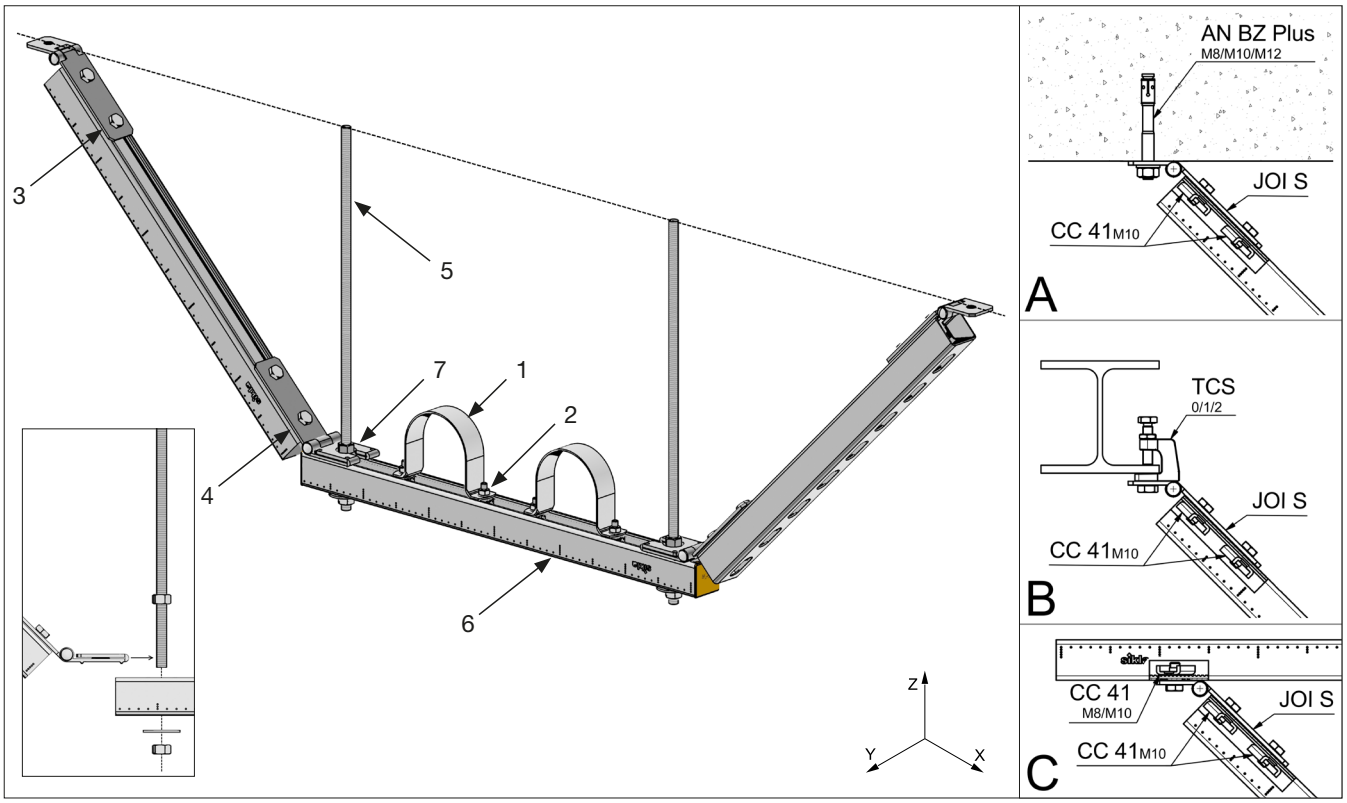
Permissible load according to type of mounting [1]

H_{max} [m]	F_h [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2 < H < 0.6	3.44	2.50	2.00
0.6 < H < 0.8	1.93	1.93	1.93

L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

1) Values valid for channels ≥ 41/41/2.0 with threaded rods ≥ M12. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

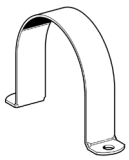
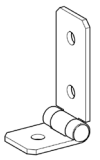
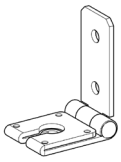
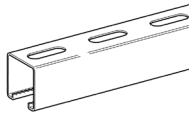
Channel line: SC-C2La



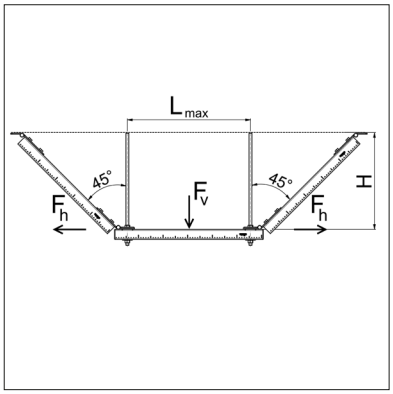
Application

Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation. Possibility of connection after assembly.

Parts list

						
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: JOI S**	**Item 4: JOI R**	**Item 5: GST**	**Item 6: MS 41**	**Item 7: NT**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	S (116577)	23 (116809)	M12 (143192)	from: 41/21/2.0 (193686)	M12 (114228)
5“ (159119) - 12“ (159155)	M12x35 (152185)	S (116577)	23 (116809)	M16 (110817)	to: 41-75/75/3.0 (173999)	M16 (114237)

Permissible load values



Permissible load according to type of mounting [1]

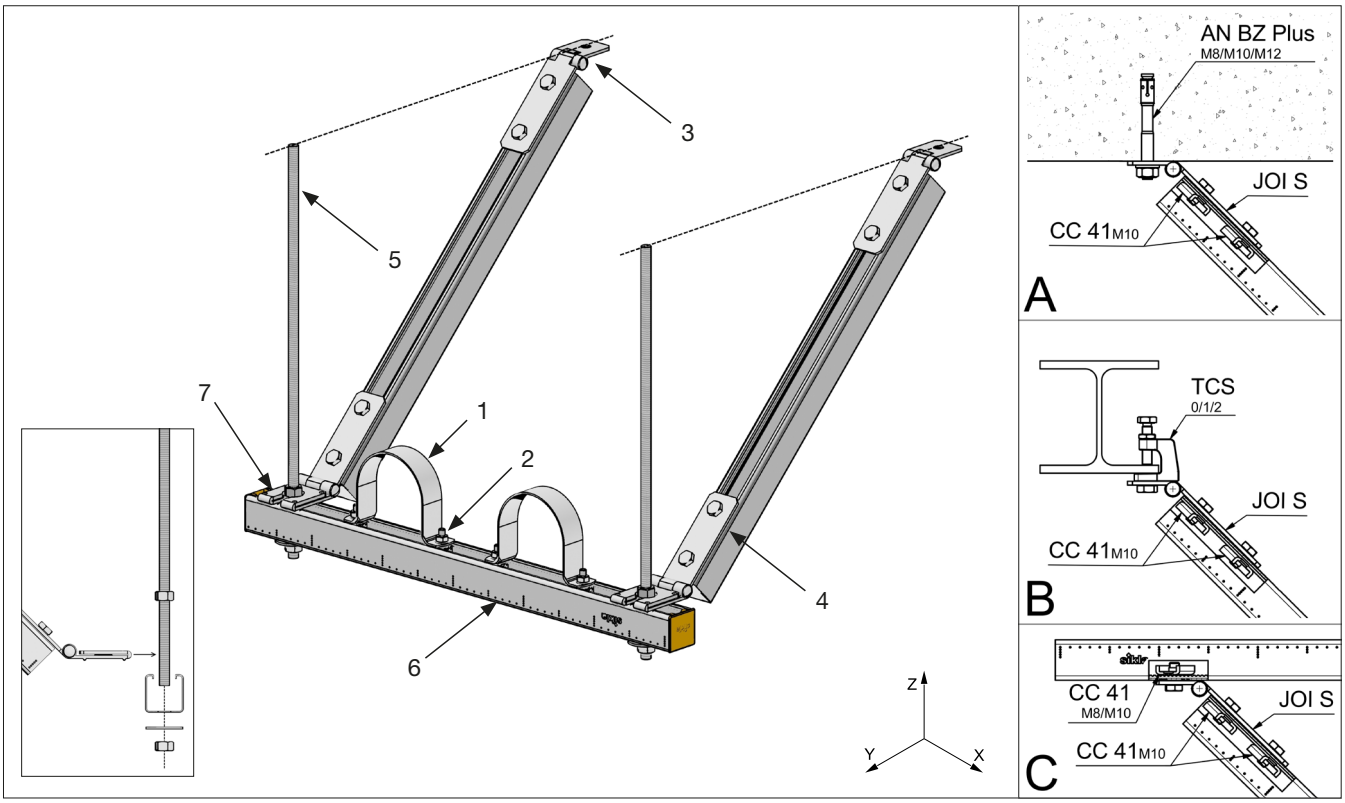
H_{max} [m]	F_h [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2 < H < 0.6	6.88	5.00	4.00
0.6 < H < 0.8	3.86	3.86	3.86

L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

1) Values valid for channels ≥ 41/41/2.0 with threaded rods ≥ M12. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

04/2019

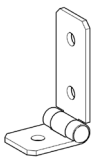
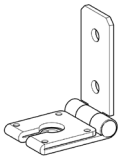
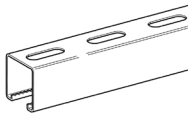
Channel line: SC-C2Lo



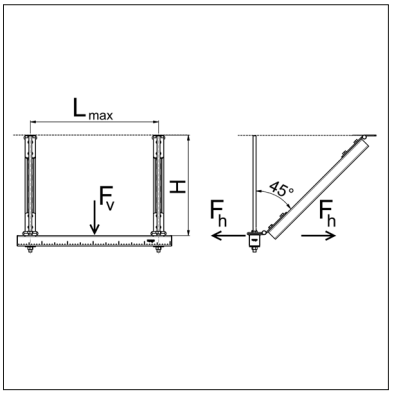
Application

Assembly for absorbing longitudinally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation. Possibility of connection after assembly.

Parts list

						
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: JOI S**	**Item 4: JOI R**	**Item 5: GST**	**Item 6: MS 41**	**Item 7: NT**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	S (116577)	23 (116809)	M12 (143192)	from: 41/21/2.0 (193686)	M12 (114228)
5“ (159119) - 12“ (159155)	M12x35 (152185)	S (116577)	23 (116809)	M16 (110817)	to: 41-75/75/3.0 (173999)	M16 (114237)

Permissible load values



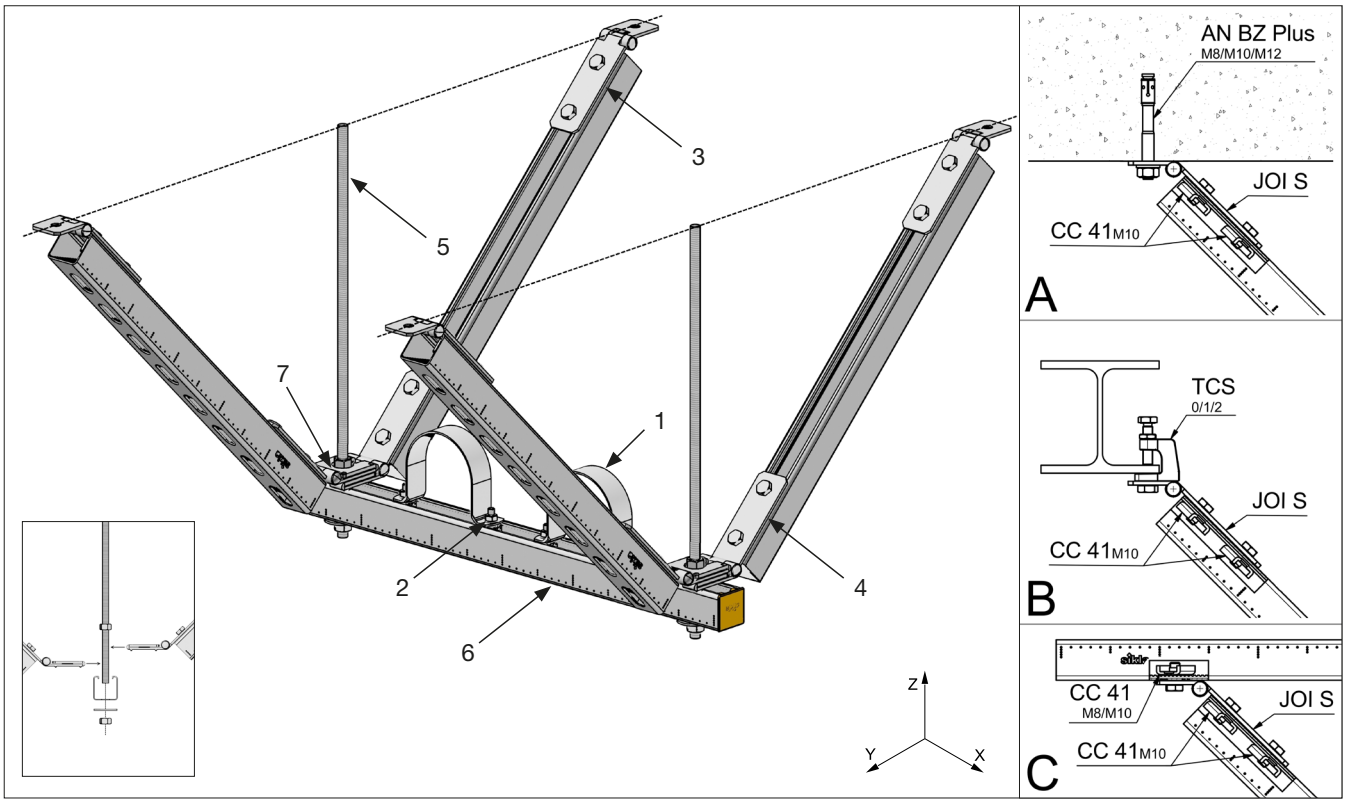
Permissible load according to type of mounting [1]

H_{max} [m]	F_h [kN] Concrete / Steel beams / MS 41 L_{max} [m]			
	0.5	1.0	1.5	2.0
0.4	4.00	4.00	3.19	2.39
0.6	4.00	4.00	3.19	2.39
0.8	3.86	3.86	3.19	2.39

L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

1) Values valid for channels ≥ 41/41/2.0 with threaded rods ≥ M12. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

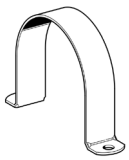
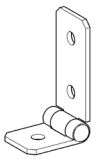
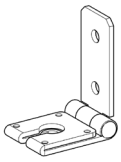
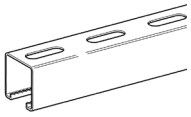
Channel line: SC-C4Lo 2



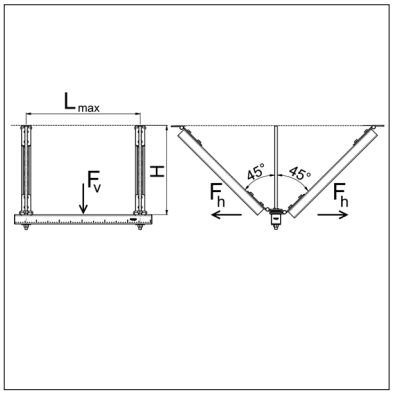
Application

Assembly for absorbing longitudinally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation. Possibility of connection after assembly.

Parts list

						
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: JOI S**	**Item 4: JOI R**	**Item 5: GST**	**Item 6: MS 41**	**Item 7: NT**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Dimension	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	S (116577)	23 (116809)	M12 (143192)	from: 41/21/2.0 (193686)	M12 (114228)
5“ (159119) - 12“ (159155)	M12x35 (152185)	S (116577)	23 (116809)	M16 (110817)	to: 41-75/75/3.0 (173999)	M16 (114237)

Permissible load values



Permissible load according to type of mounting [1]

H_{max} [m]	F_h [kN] Concrete / Steel beams / MS 41 L_{max} [m]			
	0.5	1.0	1.5	2.0
0.4	4.00	4.00	3.19	2.39
0.6	4.00	4.00	3.19	2.39
0.8	3.86	3.86	3.19	2.39

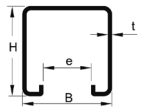
L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

1) Values valid for channels ≥ 41/41/2.0 with threaded rods ≥ M12. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

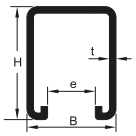
04/2019

Components: Technical information

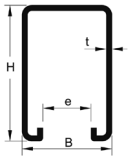
MS channels



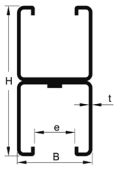
41/41/2.0



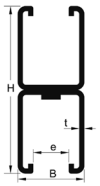
41/52/2.5



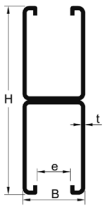
41/62/2.5



41/41/2.0 D



41/52/2.5 D



41/62/2.5 D

Type	Section modulus		Moment of inertia		Radius of inertia	
B/H/s [mm]	[cm³]		[cm⁴]		[cm]	
41/41/2.0	W_y: 2.43	W_z: 3.65	I_y: 5.16	I_z: 7.48	i_y: 1.46	i_z: 1.75
41/52/2.5	W_y: 4.16	W_z: 5.37	I_y: 11.20	I_z: 11.00	i_y: 1.79	i_z: 1.77
41/62/2.5	W_y: 5.54	W_z: 6.27	I_y: 17.70	I_z: 12.86	i_y: 2.10	i_z: 1.79
41/41/2.0 D	W_y: 7.16	W_z: 7.30	I_y: 29.34	I_z: 14.96	i_y: 2.45	i_z: 1.75
41/52/2.5 D	W_y: 12.79	W_z: 10.73	I_y: 66.50	I_z: 22.00	i_y: 3.08	i_z: 1.77
41/62/2.5 D	W_y: 17.38	W_z: 12.54	I_y: 107.75	I_z: 25.71	i_y: 3.66	i_z: 1.79
Materials: Steel 1.0350, strip galvanised as per DIN EN 10346						

Max. permissible seismic load for channels:

MS 41/21/2.0

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	2.35	527	1.21	0.05
610	24	1.76	395	2.15	0.08
914	36	1.17	263	4.84	0.19
1219	48	0.88	197	8.60	0.34

MS 41/21/2.0 D

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	6.73	1512	0.65	0.03
610	24	5.05	1134	1.15	0.05
914	36	3.36	756	2.59	0.10
1219	48	2.52	567	4.60	0.18
1524	60	2.02	453	7.19	0.28
1829	72	1.68	378	10.35	0.41
2434	96	1.26	283	18.40	0.72

MS 41/41/2.0

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	6.96	1564	0.64	0.03
610	24	5.22	1173	1.14	0.04
914	36	3.48	782	2.56	0.10
1219	48	2.61	586	4.55	0.18
1524	60	2.09	469	7.10	0.28
1829	72	1.74	391	10.23	0.40
2134	84	1.49	335	13.92	0.55

MS 41/41/2.0 D

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	20.50	4608	0.33	0.01
610	24	15.38	3456	0.59	0.02
914	36	10.25	2304	1.32	0.05
1219	48	7.69	1728	2.36	0.09
1524	60	6.15	1382	3.68	0.14
1829	72	5.13	1152	5.30	0.21
2134	84	4.39	987	7.21	0.28

MS 41-75/75/3.0

Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	29.52	6636	3.15	0.12
610	24	22.14	4977	5.60	0.22
914	36	14.76	3318	12.60	0.50
1219	48	11.07	2488	22.41	0.88
1524	60	8.86	1990	35.01	1.38
1829	72	7.38	1659	50.42	1.98
2134	84	6.33	1422	68.63	2.70

MS 41-75/75/3.0 D

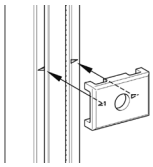
Max. length		$F_{Rd,s,eq}$		Deformation	
mm	inch	kN	lbs	mm	inch
457	18	87.96	19774	1.81	0.07
610	24	65.97	14830	3.22	0.13
914	36	43.98	9887	7.24	0.29
1219	48	32.98	7415	12.87	0.51
1524	60	26.39	5932	20.11	0.79
1829	72	21.99	4943	28.96	1.14
2134	84	18.85	4237	39.41	1.55

Threaded rod GST

Thread	Item no.	$F_{Rd,s,eq}$ * [kN]
M10	124568	17.0
M12	143192	20.0
M16	110817	20.0

Material: Steel class 4.8, electro-galv.; *system limit

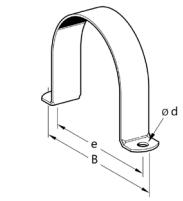
Holding bracket HK 41

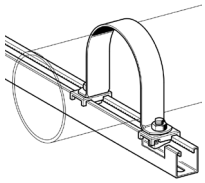


Type	Item no.	Bore [mm]
41/10	178247	11
41/12	178256	13
41/16	178265	17

Material: Cast iron, electro-galv.

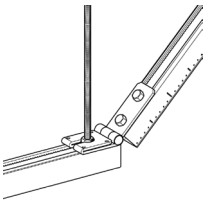
U clamp RUC





Type	For pipe	Material [mm]	B [mm]	L [mm]	Ø D [mm]	Item no.
18	3/8“	30 x 2.5	69	49	9	159012
22	1/2“	30 x 2.5	73	53	9	159021
28	3/4“	30 x 2.5	79	59	9	159030
34	1“	30 x 2.5	85	65	9	159049
43	1 1/4“	30 x 2.5	94	74	9	159058
49	1 1/2“	30 x 2.5	100	80	9	159067
61	2“	30 x 2.5	112	92	9	159076
77	2 1/2“	30 x 2.5	128	108	9	159085
90	3“	30 x 2.5	141	121	9	159094
115	4“	40 x 3.0	183	155	13	159100
141	5“	40 x 3.0	209	181	13	159119
169	6“	40 x 3.0	236	207	13	159128
221	8“	40 x 3.0	289	261	13	159137
275	10“	50 x 5.0	375	325	17	159146
326	12“	50 x 5.0	426	373	17	159155

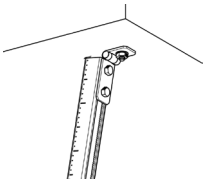
Joint JOI R



Type	Item no.	Load direction	$F_{Rd,s,eq}$ (V) [kN]	Tightening torque [Nm]	suitable for
20	116576	45°	5.98	50	Hexagon nut M10 and 3/8"-UNC
		90°	5.66		
		0°	5.22		
23	116809	45°	5.98	50	Flange nut M10, hexagon nut M12 and 1/2"-UNC
		90°	5.66		
		0°	5.22		

Material: Steel, electro-galvanised

Joint JOI S



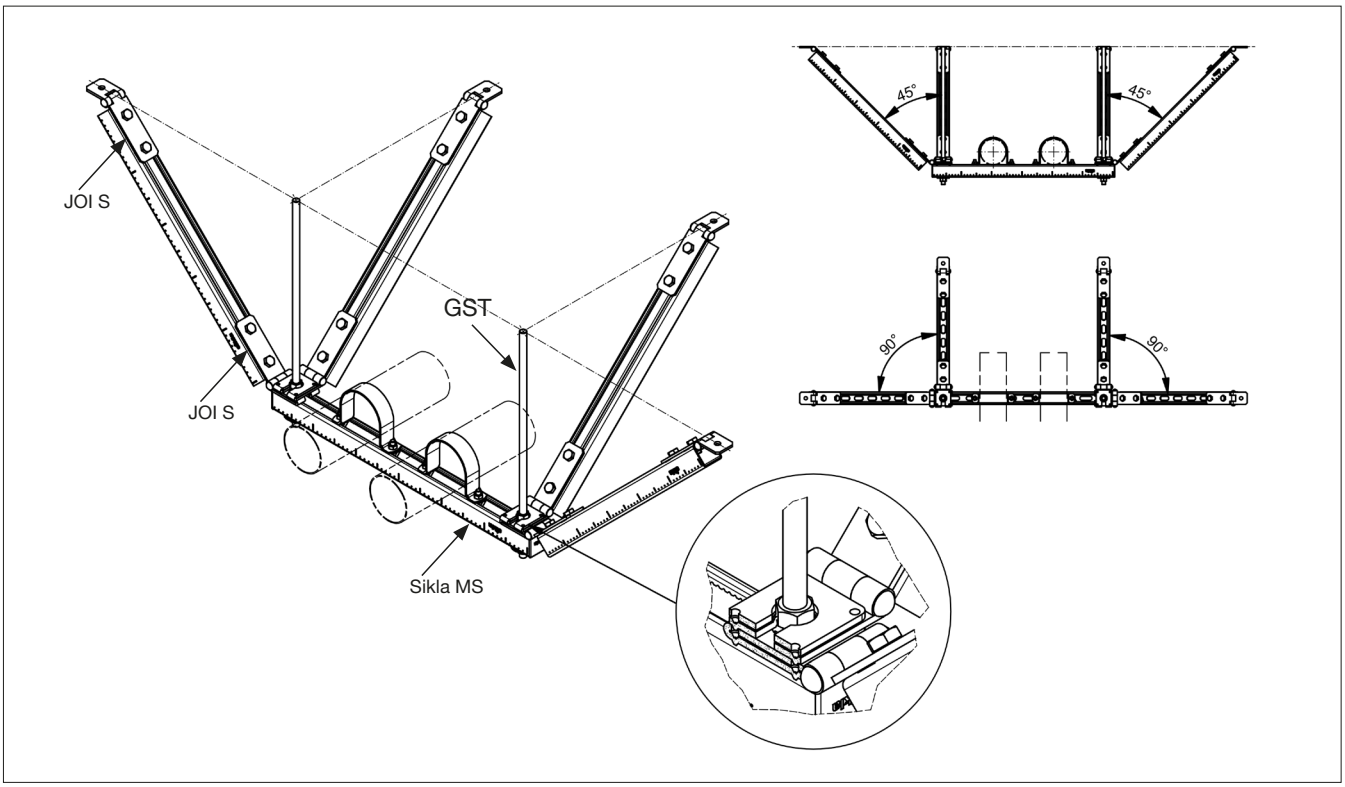
Type	Item no.	Load direction	$F_{Rd,s,eq}$ (V) [kN]	Tightening torque [Nm]
S	116577	45°	5.98	50
		90°	5.66	
		0°	5.22	

Material: Steel, electro-galvanised

04/2019

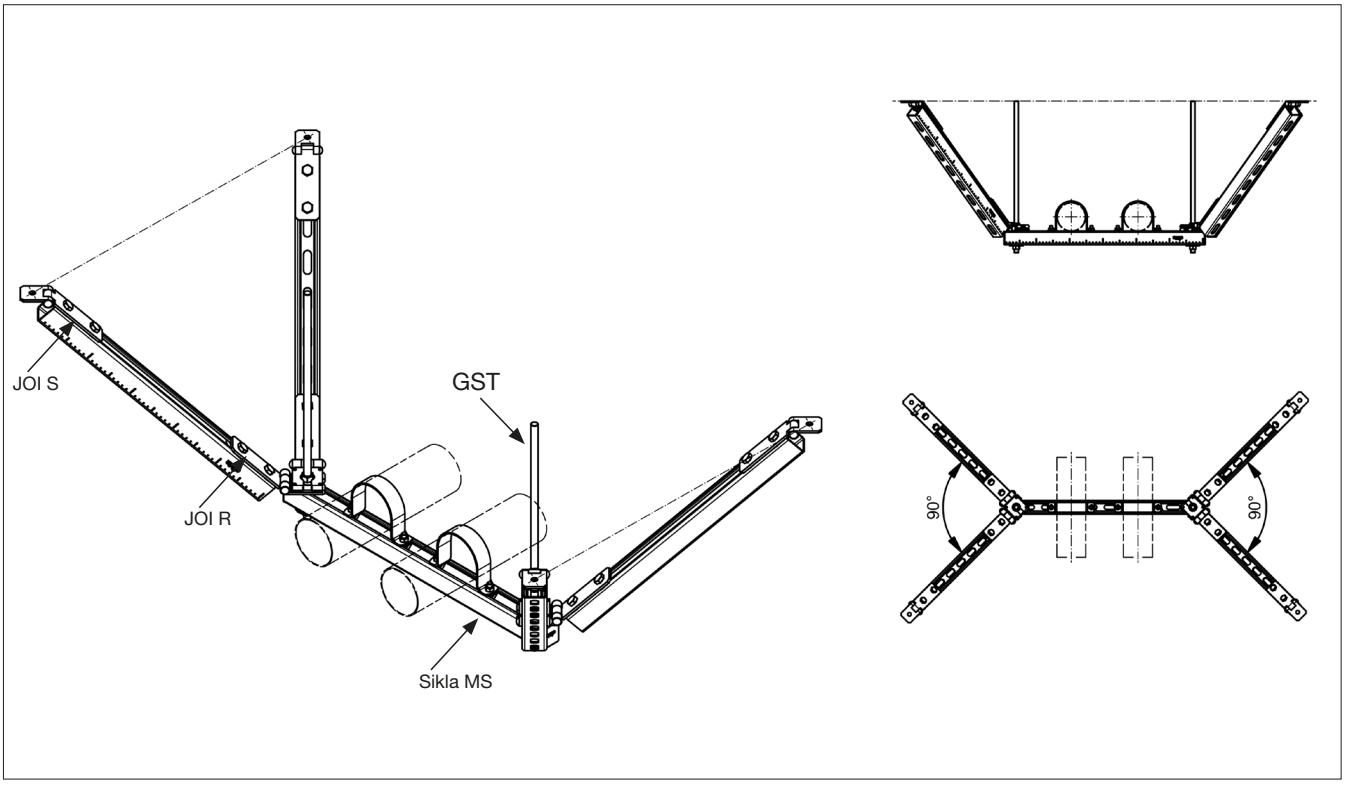
Alternative solutions

1. Channel line: SC-C2LoT2La



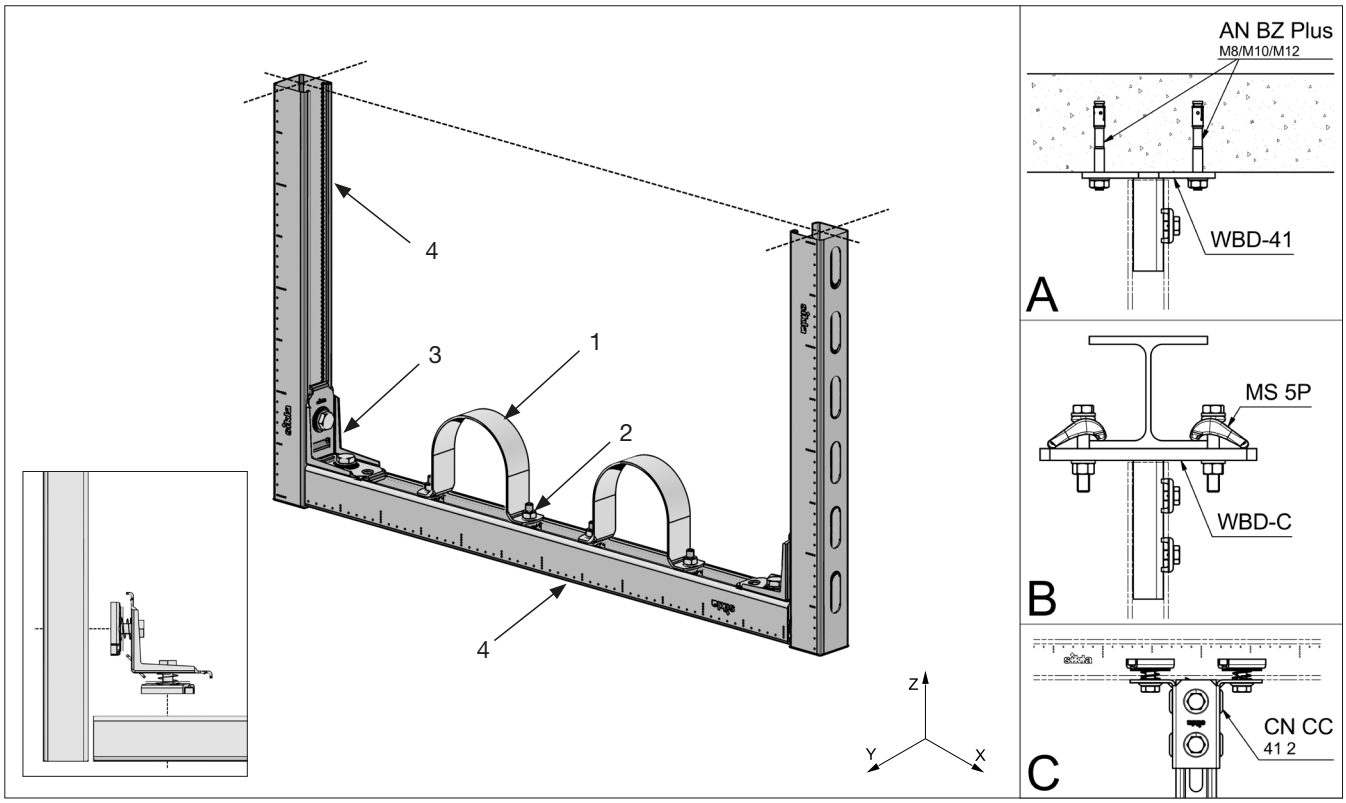
*For load information contact Sikla Application Technician

2. Channel line: SC-C4LoLa 45°



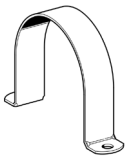
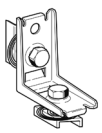
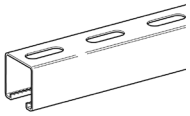
*For load information contact Sikla Application Technician

SR channel line



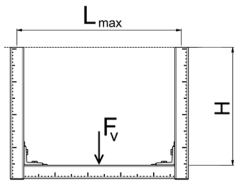
Application
Channel fixed with two vertical channels.

Parts list

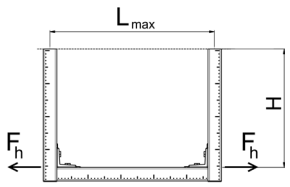
			
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: CC 41-90° Stabil**	**Item 4: MS 41**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	CC 41-90° Stabil (191675)	from: 41/21/2.0 (193686)
5“ (159119) - 12“ (159155)	M12x35 (152185)	CC 41-90° Stabil (191675)	to: 41-75/75/3.0 (173999)

Permissible load values

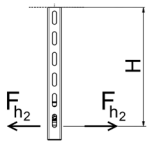
Permissible load according to type of mounting [1]



L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	6.64
1.0	1.07	3.18	6.64
1.5	0.72	2.12	6.64
2.0	0.54	1.59	6.64



H_{max} [m]	F_h [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	6.28	6.28	6.00
0.4	3.14	3.14	3.14
0.6	2.09	2.09	2.09
0.8	1.57	1.57	1.57

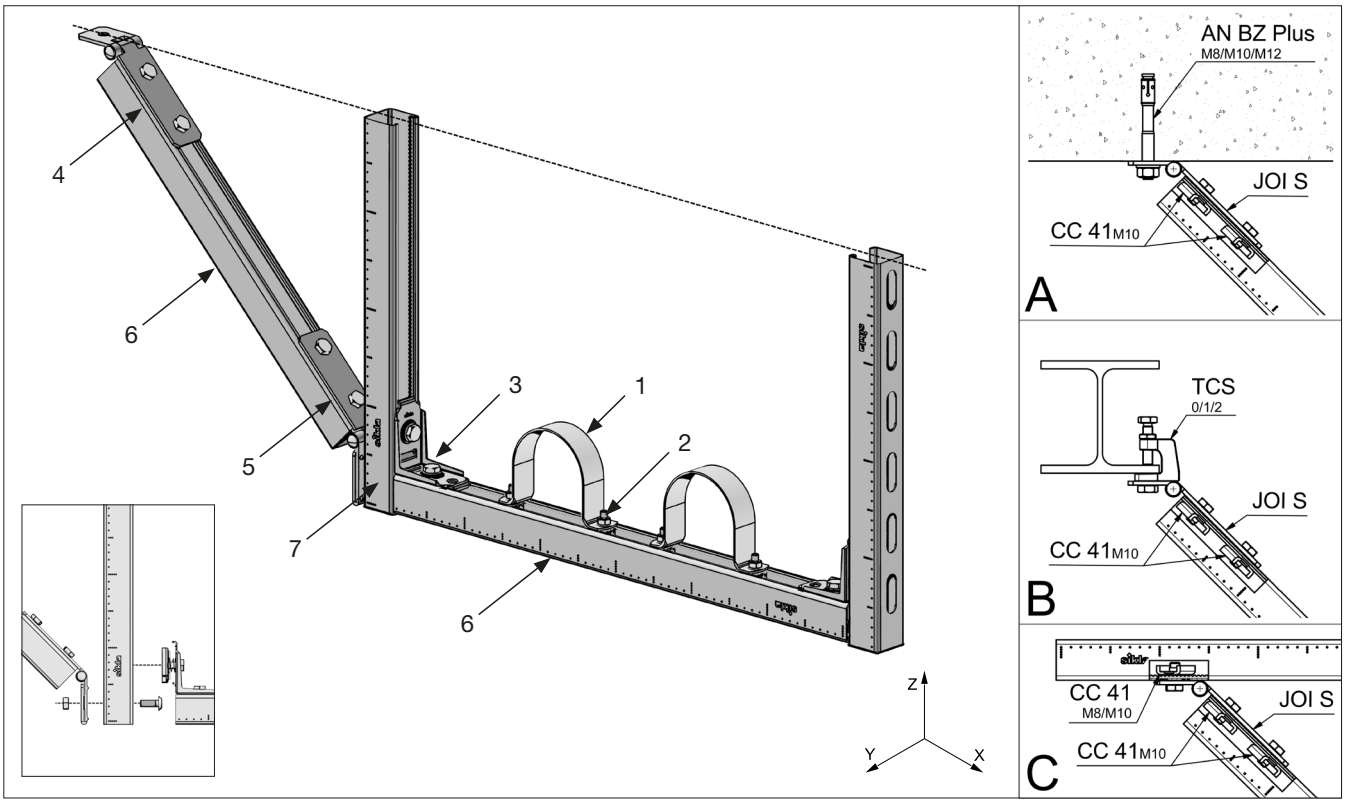


H_{max} [m]	F_h2 [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2	2.00	2.00	0.90
0.4	1.00	1.00	0.45
0.6	0.67	0.67	0.30
0.8	0.50	0.50	0.23

(1) Values valid for channel with vert. MS from 41/41/20. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) Max. load for channel and threaded rods. The attachment to the building structure must be verified separately.

04/2019

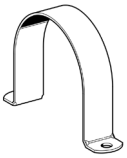
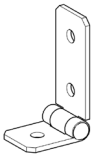
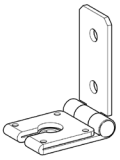
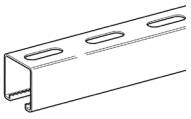
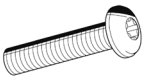
SR-CLa channel line



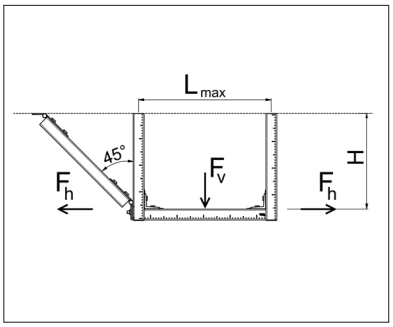
Application

Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation. Possibility of connection after assembly.

Parts list

						
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: CC 41-90° Stabil**	**Item 4: JOI S**	**Item 5: JOI R**	**Item 6: MS 41**	**Item 7: FLA**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	CC 41-90° Stabil (191675)	S (116577)	23 (116809)	from: 41/21/2.0 (193686)	M10x25 (198353)
5“ (159119) - 12“ (159155)	M12x35 (152185)	CC 41-90° Stabil (191675)	S (116577)	23 (116809)	to: 41-75/75/3.0 (173999)	M10x25 (198353)

Permissible load values



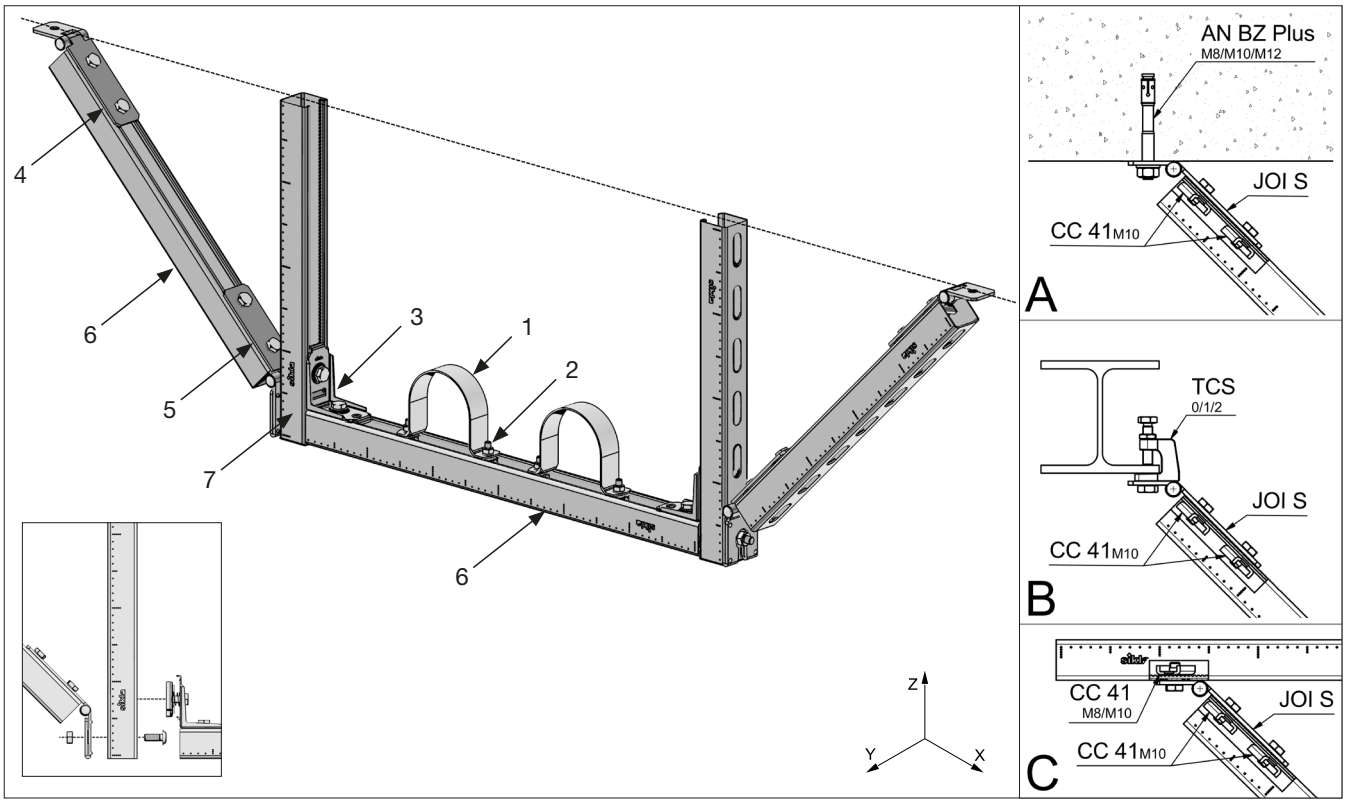
Permissible load according to type of mounting [1]

H_{max} [m]	F_h [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2 < H < 0.8	4.23	2.50	2.00

L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

(1) Values valid for channel with vert. MS from 41/41/2.0. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

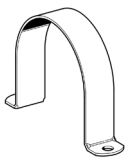
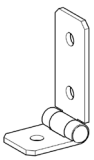
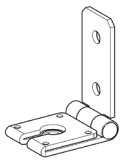
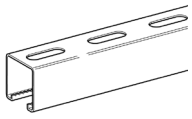
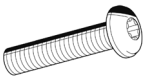
SR-C2La channel line



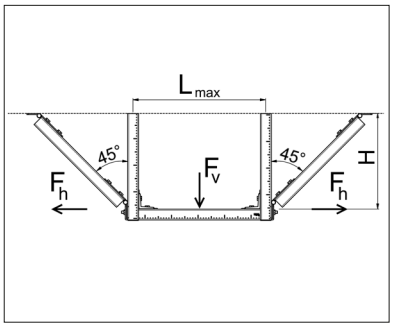
Application

Assembly for absorbing laterally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation. Possibility of connection after assembly.

Parts list

						
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: CC 41-90° Stabil**	**Item 4: JOI S**	**Item 5: JOI R**	**Item 6: MS 41**	**Item 7: FLA**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	CC 41-90° Stabil (191675)	S (116577)	23 (116809)	from: 41/21/2.0 (193686)	M10x25 (198353)
5“ (159119) - 12“ (159155)	M12x35 (152185)	CC 41-90° Stabil (191675)	S (116577)	23 (116809)	to: 41-75/75/3.0 (173999)	M10x25 (198353)

Permissible load values



Permissible load according to type of mounting [1]

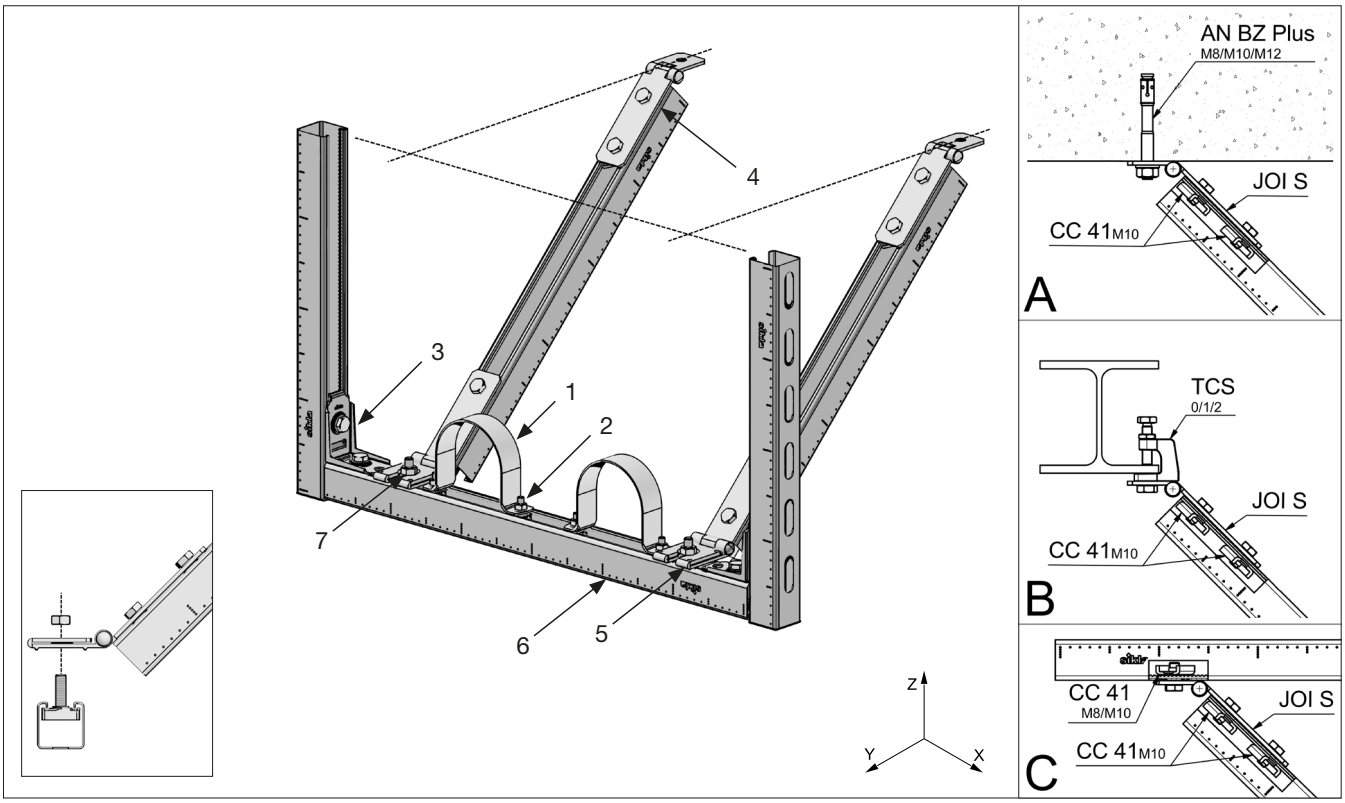
H_{max} [m]	F_h [kN]		
	A [concrete]	B [steel beams]	C [MS 41]
0.2 < H < 0.8	8.46	5.00	4.00

L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

(1) Values valid for channel with vert. MS from 41/41/2.0. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

04/2019

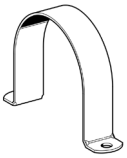
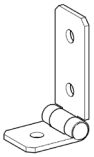
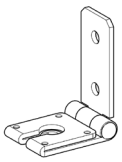
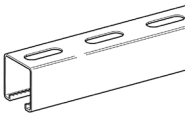
SR-C2Lo channel line



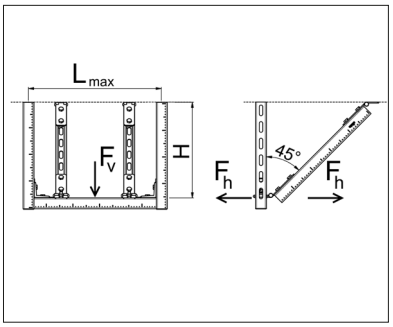
Application

Assembly for absorbing longitudinally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation. Possibility of connection after assembly.

Parts list

						
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: CC 41-90° Stabil**	**Item 4: JOI S**	**Item 5: JOI R**	**Item 6: MS 41**	**Item 7: NT**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	CC 41-90° Stabil (191675)	S (116577)	23 (116809)	from: 41/21/2.0 (193686)	M12 (114228)
5“ (159119) - 12“ (159155)	M12x35 (152185)	CC 41-90° Stabil (191675)	S (116577)	23 (116809)	to: 41-75/75/3.0 (173999)	M16 (114237)

Permissible load values

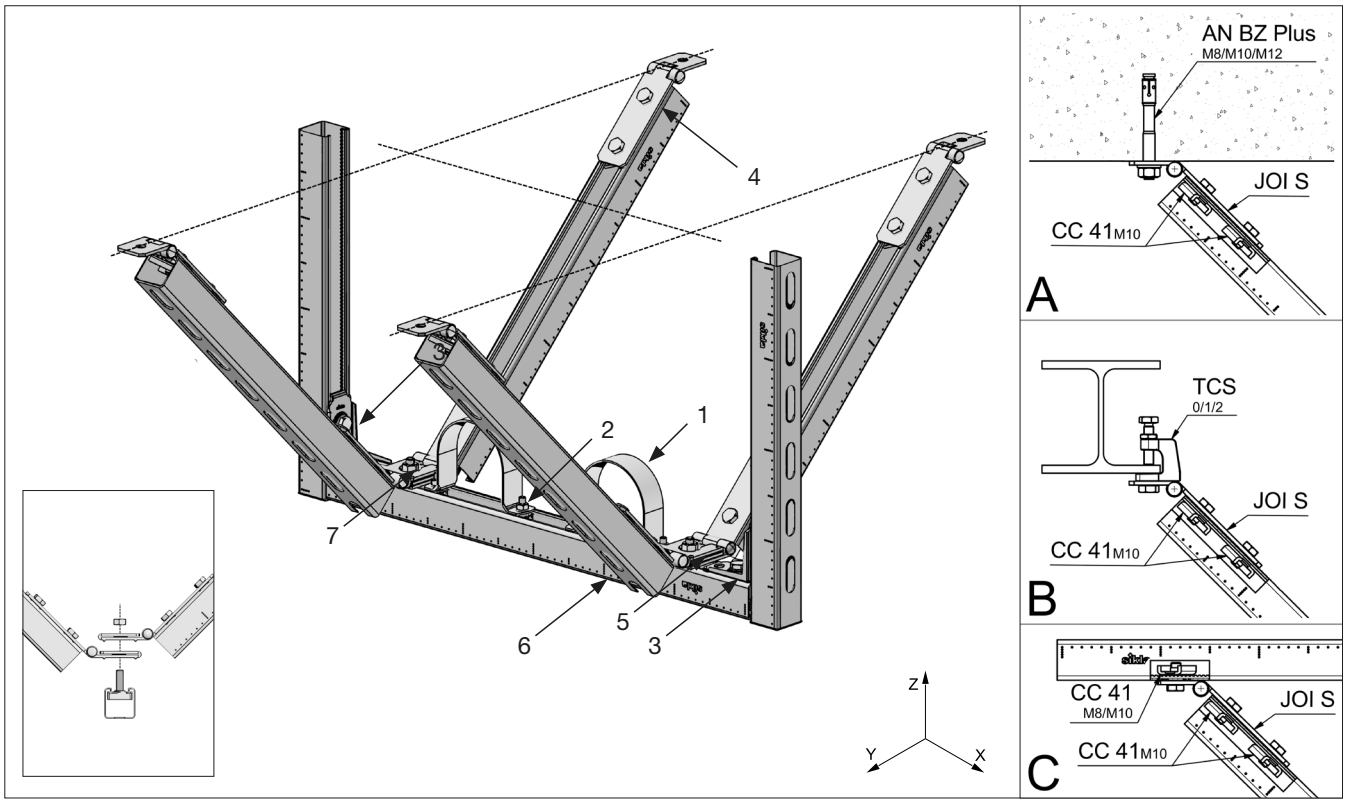


Permissible load according to type of mounting [1]

L_{max} [m]	F_y [kN] [2]		
	for MS 41/21/2.0	for MS 41/21/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

(1) Values valid for channel with vert. MS from 41/41/2.0. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

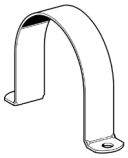
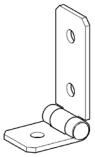
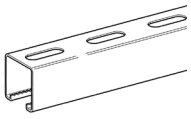
SR-C4Lo channel line



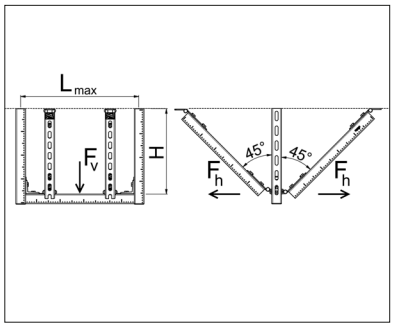
Application

Assembly for absorbing longitudinally occurring impacts. Flexible angle adjustment and radial alignment according to the given installation situation. Possibility of connection after assembly.

Parts list

						
Item 1: RUC	**Item 2: TBO HZ 41**	**Item 3: CC 41-90° Stabil**	**Item 4: JOI S**	**Item 5: JOI R**	**Item 6: MS 41**	**Item 7: NT**
Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)	Type (Part no.)
3/8“ (159012) - 4“ (159100)	M10x35 (152051)	CC 41-90° Stabil (191675)	S (116577)	23 (116809)	from: 41/21/2.0 (193686)	M12 (114228)
5“ (159119) - 12“ (159155)	M12x35 (152185)	CC 41-90° Stabil (191675)	S (116577)	23 (116809)	to: 41-75/75/3.0 (173999)	M16 (114237)

Permissible load values



Permissible load according to type of mounting [1]

Concrete / Steel beams / MS 41				
H_{max} [m]	L_{max} [m]			
	0.5	1.0	1.5	2.0
0.2 < H < 0.8	4.00	4.00	3.19	2.39

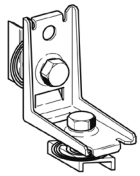
L_{max} [m]	F_v [kN] [2]		
	for MS 41/21/2.0	for MS 41/41/2.0	for MS 41-75/75/3.0
0.5	2.15	6.37	27.01
1.0	1.07	3.18	13.51
1.5	0.72	2.12	9.00
2.0	0.54	1.59	6.75

(1) Values valid for channel with vert. MS from 41/41/2.0. The maximum permissible load capacity as well as the permissible torsion moment of the channel must be observed. Contact Sikla Application Technician for further mounting types.
(2) The attachment to the building structure must be verified separately.

04/2019

Components: Technical information

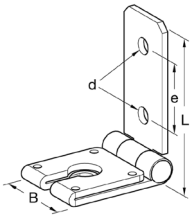
Connector CN CC 41 Stabil

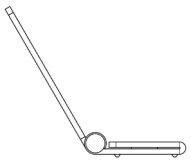


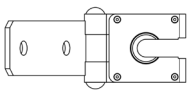
Type	Part no.	$F_{Rd,s,eq}$ [+Vz] [kN]	$F_{Rd,s,eq}$ [-Vz] [kN]	$F_{Rd,s,eq}$ [Vy] [kN]	$F_{Rd,s,eq}$ [My] [kNm]	$F_{Rd,s,eq}$ [Mz] [kNm]
CC 41-90° Stabil	191675	3.32	2.40	1.82	0.05	0.08
CC 41-90° W Stabil	191684	2.20	2.40	-	0.05	

Material: Steel, electro-galvanised

Joint JOI R







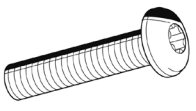
Application:
The joint JOI R is used for bracing mounting systems, which are of central importance especially in case of seismic stress. Due to its keyhole design the joint can be installed subsequently. When mounted directly on a channel 41 the four pins and two fixing points guarantee a reliable rotation lock. The joint JOI R can also be stacked with two struts. The rotation lock when attaching to existing brackets depends on the components already in use. In case of the application of a block PB 41 a rotation lock is provided. In case of the application of a holding bracket or a washer a rotation lock is only available to a limited extent.

Technical data:

Type	Part No.	a [mm]	b [mm]	d [mm]	l [mm]	Load direction	$F_{Rd,s,eq}$ (N) [kN]	Tightening torque [Nm]	suitable for
20	116576	62.5	50	10.5	126	45°	5.98	50	Hexagon nut M10 and 3/8"-UNC
						90°	5.66		
						0°	5.22		
23	116809	62.5	50	10.5	126	45°	5.98	50	Flange nut M10, hexagon nut M12 and 1/2"-UNC
						90°	5.66		
						0°	5.22		

Material: Steel, electro-galvanised

Flange screw SCR FLA HCP



Technical data:
M10 x 15 and M10 x 25
Max. permissible tightening torque: 50 Nm
Drive: Hexagon socket SW 6

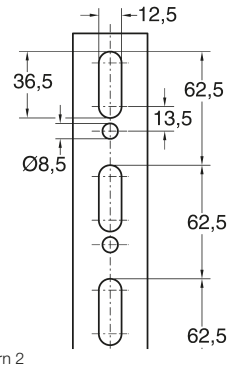
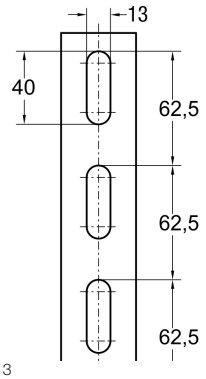
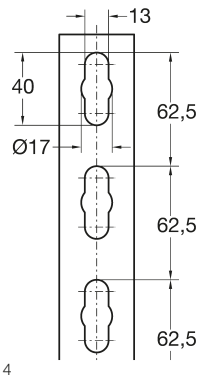
TT M10 x 25 and TT M10 x 30
Max. permissible tightening torque: 20 Nm
Drive: Torx-T50

Type	Part no.	Length [mm]
M10 x 15	199107	15
M10 x 25	198353	25
TT M10 x 25	110503	25
TT M10 x 30	116479	30

Material: Steel, HCP

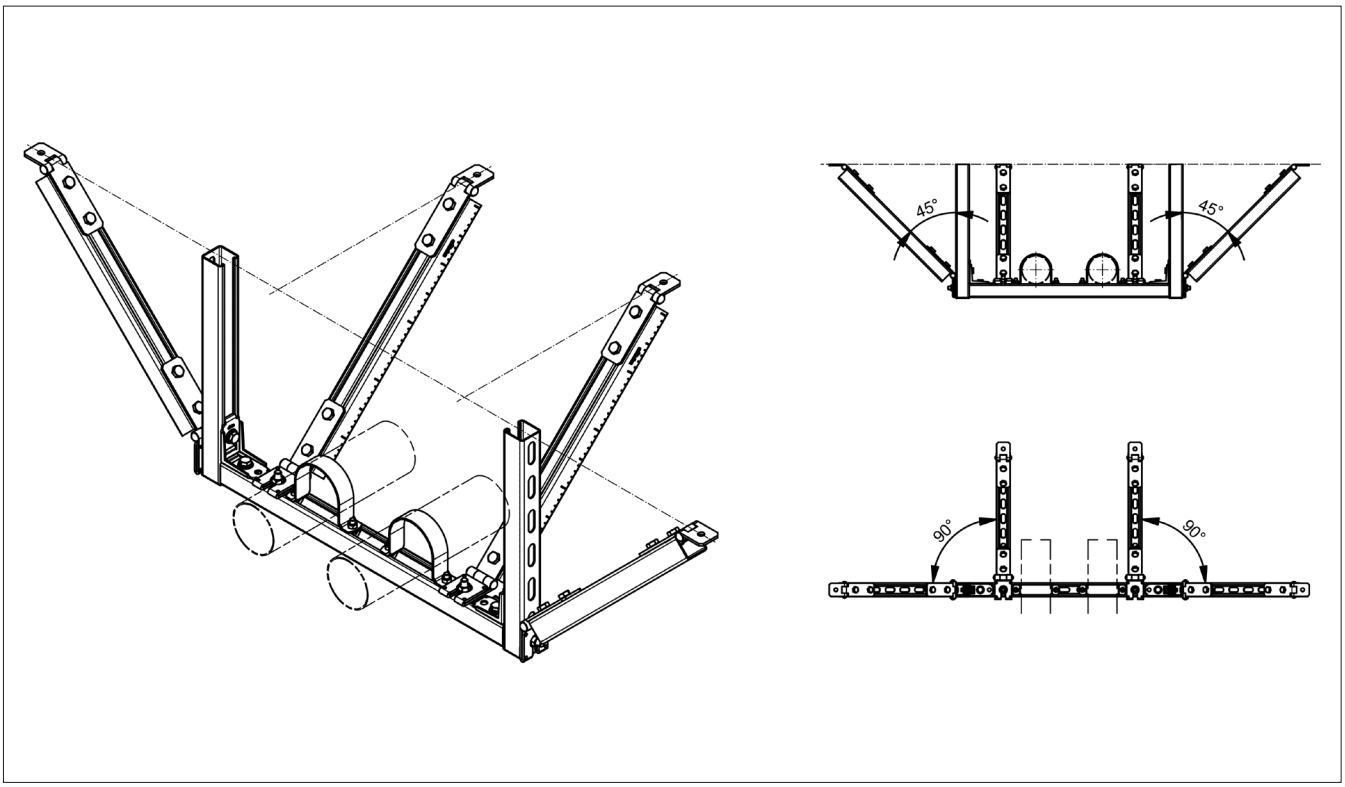
Channel MS 41

Type	Cross section	Section modulus	Moment of inertia	Radius of inertia
B/H/s [mm]	A [cm²]	[cm³]	[cm⁴]	[cm]
41/21/1.5	1.28	Wy: 0.72	Iy: 0.79	iy: 0.79
		Wz: 1.72	Iz: 3.52	iz: 1.66
41/21/2.0	1.61	Wy: 0.82	Iy: 0.92	iy: 0.76
		Wz: 2.12	Iz: 4.35	iz: 1.65
41/31/2.0	2.17	Wy: 1.60	Iy: 2.77	iy: 1.13
		Wz: 2.88	Iz: 5.90	iz: 1.65
41/41/2.0	2.43	Wy: 2.43	Iy: 5.16	iy: 1.46
		Wz: 3.65	Iz: 7.48	iz: 1.75
41/41/2.5	3.05	Wy: 2.96	Iy: 6.19	iy: 1.43
		Wz: 4.41	Iz: 9.05	iz: 1.72
41/45/2.5	3.16	Wy: 3.29	Iy: 7.70	iy: 1.56
		Wz: 4.73	Iz: 9.70	iz: 1.75
41/52/2.5	3.51	Wy: 4.16	Iy: 11.20	iy: 1.79
		Wz: 5.37	Iz: 11.00	iz: 1.77
41/62/2.5	4.01	Wy: 5.54	Iy: 17.70	iy: 2.10
		Wz: 6.27	Iz: 12.86	iz: 1.79
41-75/65/3.0	6.15	Wy: 8.46	Iy: 31.60	iy: 2.27
		Wz: 10.39	Iz: 39.23	iz: 2.53
41-75/75/3.0	6.95	Wy: 10.31	Iy: 44.41	iy: 2.53
		Wz: 11.59	Iz: 43.48	iz: 2.50
41/21/2.0 D	3.21	Wy: 2.35	Iy: 4.93	iy: 1.24
		Wz: 4.24	Iz: 8.70	iz: 1.65
41/41/2.0 D	4.87	Wy: 7.16	Iy: 29.34	iy: 2.45
		Wz: 7.30	Iz: 14.96	iz: 1.75
41/41/2.5 D	6.09	Wy: 9.02	Iy: 36.99	iy: 2.46
		Wz: 8.82	Iz: 18.10	iz: 1.72
41/45/2.5 D	6.33	Wy: 9.97	Iy: 44.87	iy: 2.66
		Wz: 9.47	Iz: 19.41	iz: 1.75
41/52/2.5 D	7.03	Wy: 12.79	Iy: 66.50	iy: 3.08
		Wz: 10.73	Iz: 22.00	iz: 1.77
41/62/2.5 D	8.03	Wy: 17.38	Iy: 107.75	iy: 3.66
		Wz: 12.54	Iz: 25.71	iz: 1.79
41-75/65/3.0 D	12.29	Wy: 24.18	Iy: 157.15	iy: 3.58
		Wz: 20.77	Iz: 78.45	iz: 2.53
41-75/75/3.0 D	13.9	Wy: 30.72	Iy: 230.40	iy: 4.07
		Wz: 23.07	Iz: 86.96	iz: 2.50

from MS 41/21/1.5 to 41/21/2.0	from MS 41/31/2.0 to 41/62/2.5	from MS 41-75/75/3.0 to 41-75/65/3.0
 Hole pattern 2	 Hole pattern 3	 Hole pattern 4

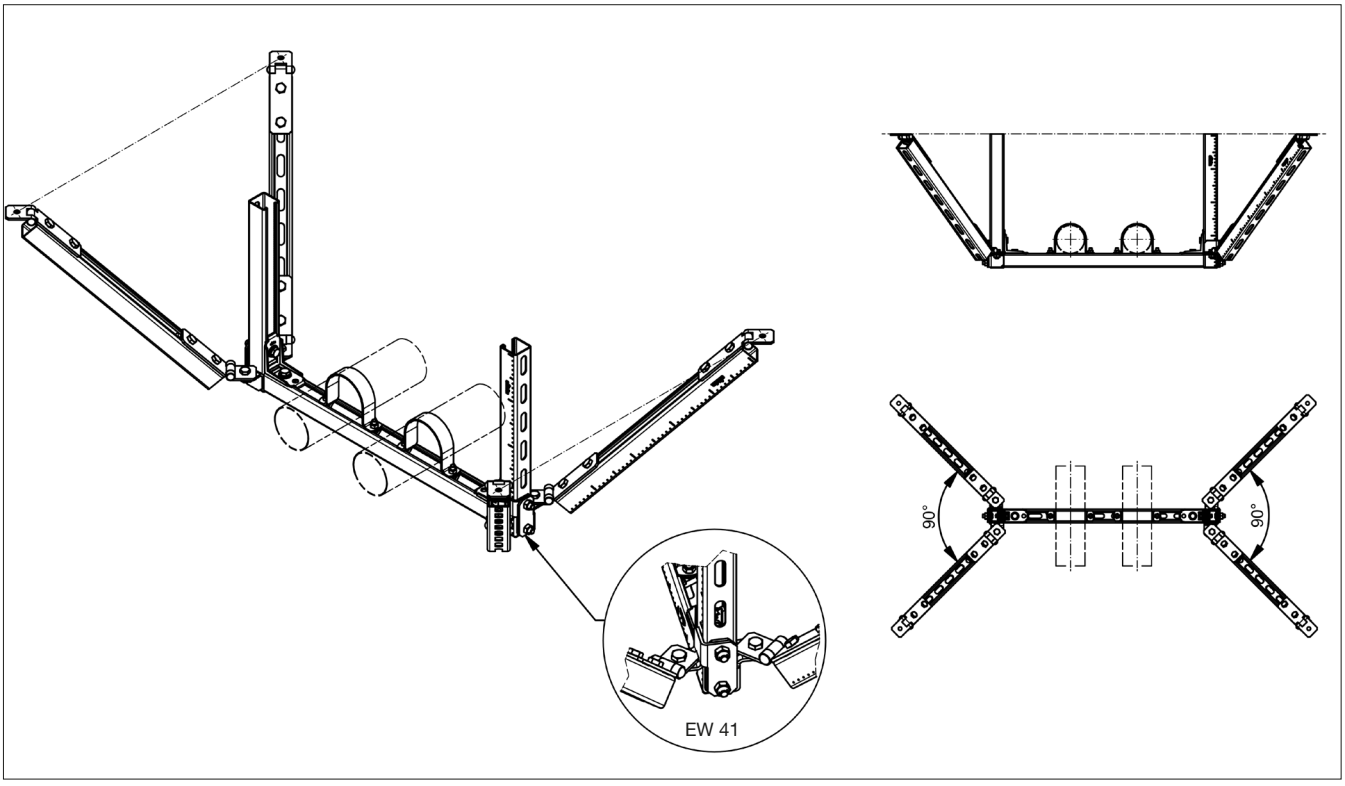
Alternative solutions

1. Channel line: SR-C2LoT2La



*For load information contact Sikla Application Technician

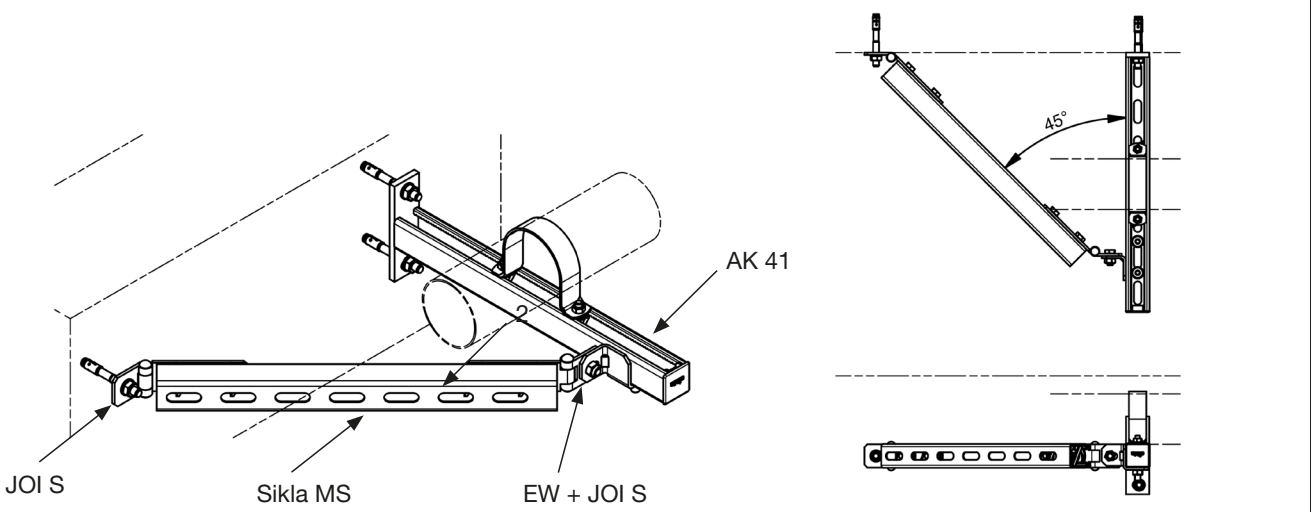
2. Channel line: SR-C4LoLa 45°



*For load information contact Sikla Application Technician

Alternative solutions

3. Cantilever bracket channel: SR-TLoTLa AK



*For load information contact Sikla Application Technician

04/2019

Mounting instructions

Universal joint UG

Application

Universal connection to inclined components due to infinitely variable angle adjustment. May be fixed directly to building surfaces, beam clamps, channels, etc., in particular as an angular support on brackets and for strutting sliding and fixed points (types UG FP for fixed point constructions for direct screwing to the flanges of the pipe clamp):

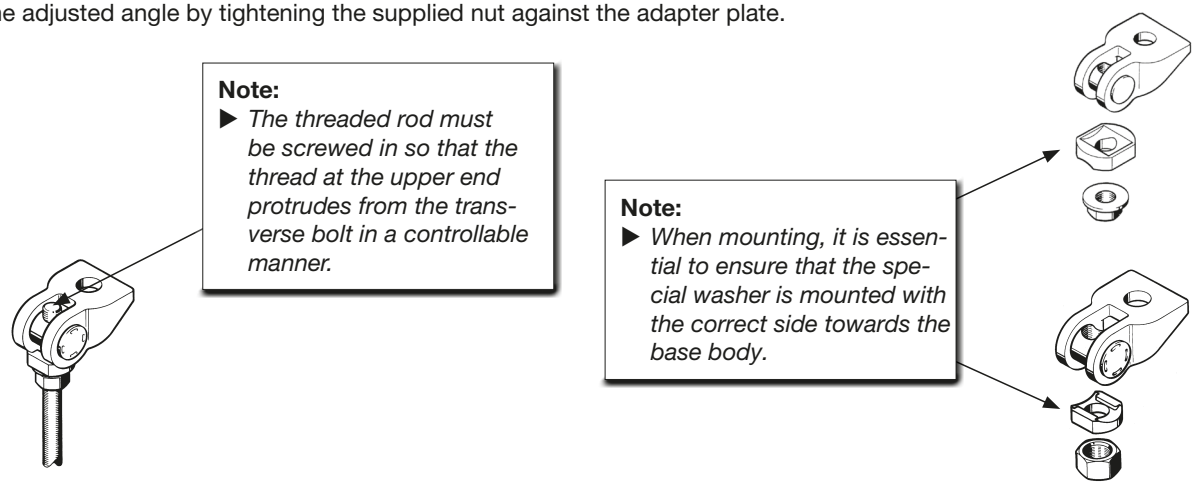
- Infinitely variable angle adjustment
- Length and height adjustment via rotation of the grub screw in the threaded pivot head
- Securely retained threaded pivot head
- Secure attachment of nut on the adapter plate.

Scope of delivery

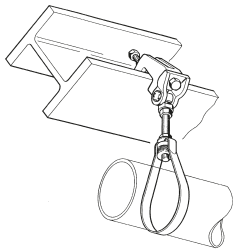
With adapter plate and nut.

Installation

Screw the grub screw completely into the pivot head (visual control).
Fix the adjusted angle by tightening the supplied nut against the adapter plate.

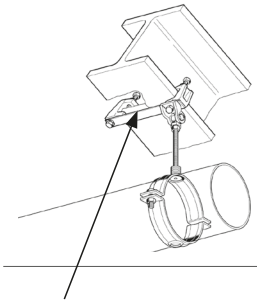


Mounting Instructions for use in VdS systems



a) For use with tilted beam 10° to 45°

Pipe size	Universal joint	Assembly distance max.	Pipe support connection	Beam clamp	Hexagon bolt + washer DIN 125
up to DN 50	UG M8	4 m	M 8	TCS 1 M10/M8	M8 x 25
DN 50 up to DN 100	UG M10	4 m	M10	TCS 1 M10/M10	M10 x 25
DN 100 up to DN 150	UG M12	4 m	M12	TCS 2 M12/M12	M12 x 30
DN 200	UG M16	4 m	M16	TCS 2 M12/M16	M16 x 30



b) For use with angled beam 10° to 45°

Pipe size	Universal joint	Safety strap	Assembly distance max.	Pipe support connection	Beam clamp	Hexagon bolt + washer DIN 125
up to DN 50	UG M8	Type 1 So	4 m	M 8	TCS 1 M10/M8	M8 x 25
DN 50 up to DN 100	UG M10	Type 1 So	4 m	M10	TCS 1 M10/M10	M10 x 25
DN 100 up to DN 150	UG M12	Type 2 So	4 m	M12	TCS 2 M12/M12	M12 x 30
DN 200	UG M16	Type 3 So	4 m	M16	TCS 2 M12/M16	M16 x 30

Type	Bore distance [mm]	Length of strap [mm]
Type 1 SO	B + 22	B + 46
Type 2 SO	B + 28	B + 58
Type 3 SO	B + 34	B + 74
B = flange width		

Beam clamp TCS

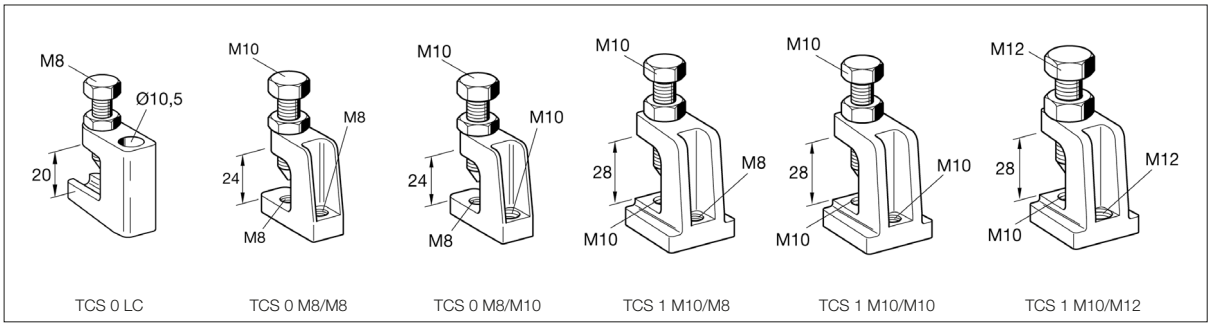
Application

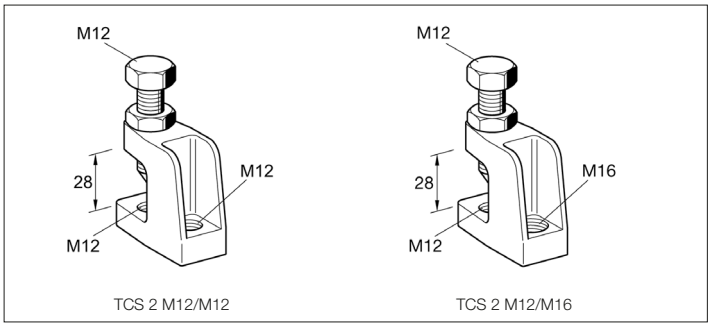
The beam clamp is a heavy-duty connection element and is suitable for mounting pipes, ducts and devices on steel profiles (I-, T-, U-beams and angle profiles).

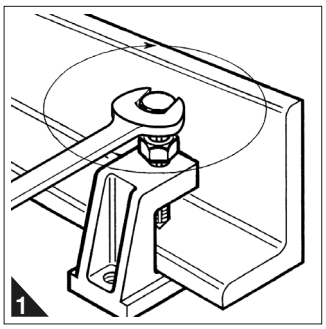
- The combination with the universal joint allows vertical alignment on inclined beams.
- Can be used as a single fastening or for mounting crossbars and cantilevered constructions.
- Beam clamps of group TCS 1 are particularly suitable for mounting in the rail slot of the Sikla 41 mm channels due to the special profile at their base.

Scope of delivery

Cast body with clamping bolt and locking nut completely pre-assembled.

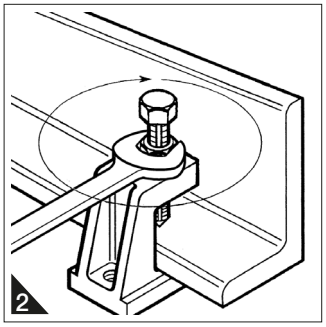






Installation

1. Position the beam clamp, tighten the clamping screw by hand (turn back the lock nut if necessary). Tighten the clamping screw:
   TCS 0: 1 revolution
   TCS 1 and 2: 1 to max. 1 1/2 revolutions
2. Tighten the locking nut.



Nominal load

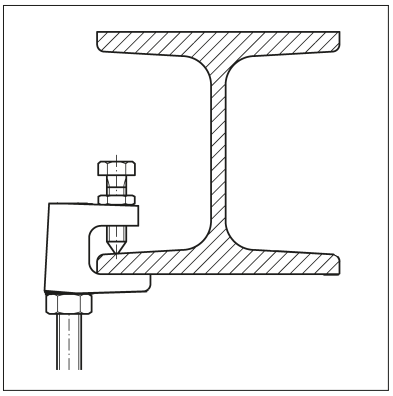
Group TCS 0: 3.5 kN
Group TCS 1: 5.0 kN
Group TCS 2: 8.5 kN

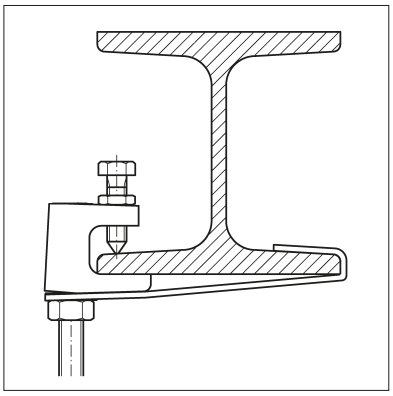
These nominal loads apply only to new TCS on the undamaged beam flange.

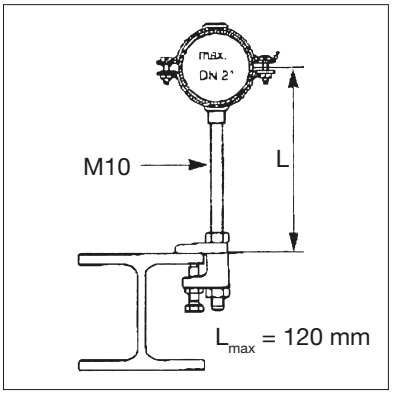
04/2019

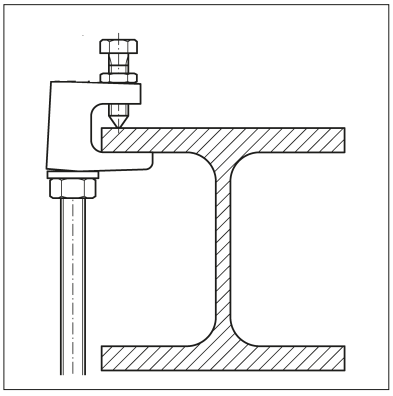
Application determination for sprinkler lines according to VdS / FM			
Nominal width	Beam clamp (group)	required threaded connection (tensile load)	required safety strap acc. to VDS
≤ DN 50 (VdS)	TCS 1 / TCS 0	M 8 (0 LC with flange nut)	
≤ DN 50 (FM)	TCS 1 / TCS 0	M10	
> DN 50 ≤ DN 100	TCS 1 / TCS 0	M10	Type 1 (> DN 65 only)
> DN 50 ≤ DN 100	TCS 1 / TCS 0	M12	Type 1
> DN 50 ≤ DN 100	TCS 1 / TCS 0	M12	Type 1
For FM installations only use thread ≥ M10			

Mounting examples

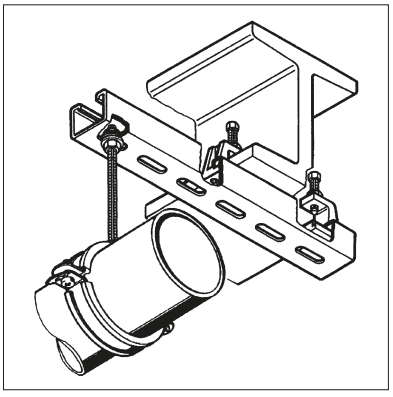


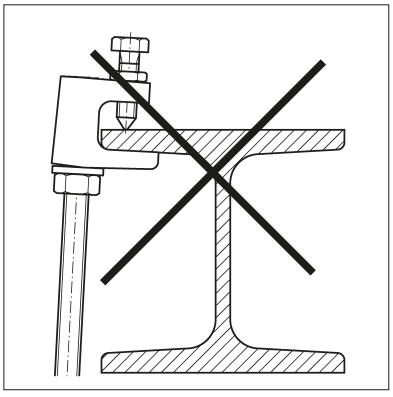






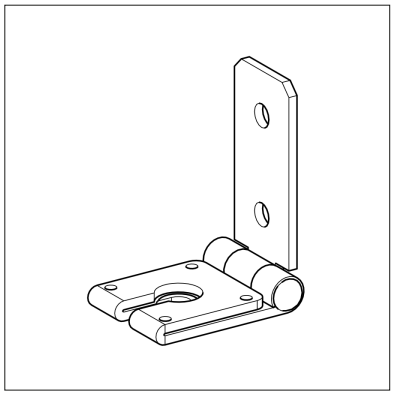
Caution!
▶ *Arrangement only permitted for parallel flange beams.*





Joint JOI R

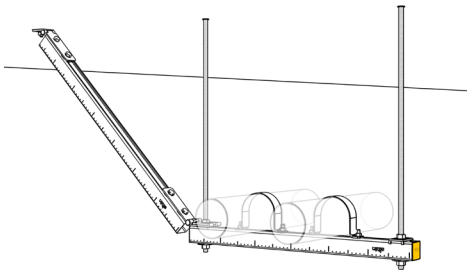
Application

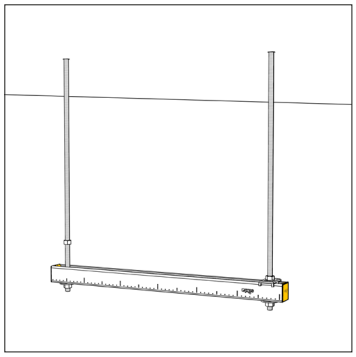


The joint JOI R is used for bracing mounting systems, which are of central importance especially in case of seismic stress. Due to its keyhole design the joint can be installed subsequently. When mounted directly on a channel 41 the four pins and two fixing points guarantee a reliable rotation lock. The joint JOI R can also be stacked with two struts. The rotation lock when attaching to existing brackets depends on the components already in use. In case of the application of a block PB 41 a rotation lock is provided. In case of the application of a holding bracket or a washer a rotation lock is only available to a limited extent.

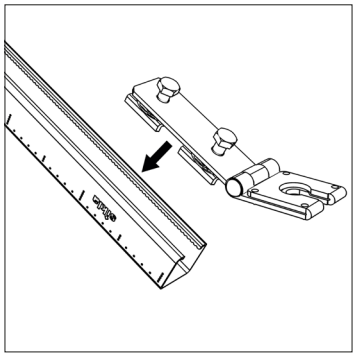
Type	suitable for
20	Hexagon nut M10 and 3/8"-UNC
23	Flange nut M10, hexagon nut M12 and 1/2"-UNC

a) New installation

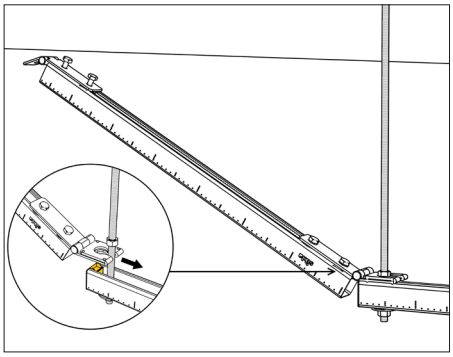




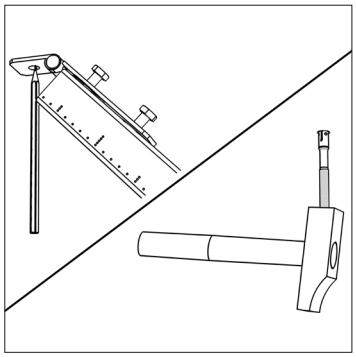
1. Mount the channel to the ceiling using threaded rods and nut/washer/holding bracket.



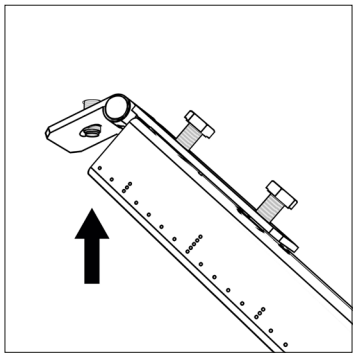
2. Fasten joint JOI R with 2 x M10 threaded plates to the channel for the strut.



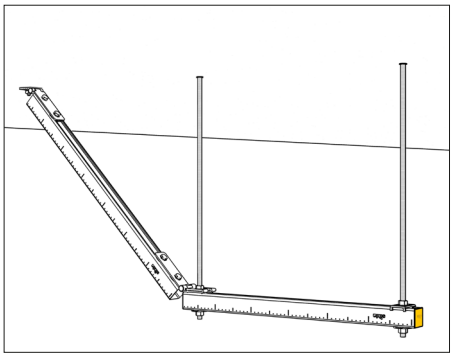
3. Mount joint JOI R on the channel to be braced. Fasten joint JOI S to the other end of the channel using 2 x M10 threaded plates (do not tighten the screws yet).



4. Determine the anchor position on the ceiling using a pre-fixed JOI S joint. Then set the bolt anchor AN BZplus.



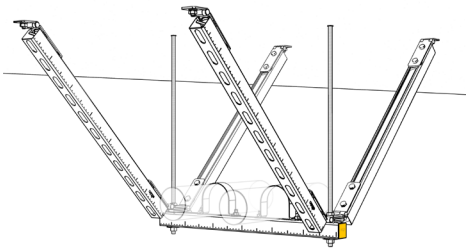
5. Mount joint JOI S on bolt anchor AN BZ and tighten the still loose M10 threaded plates.

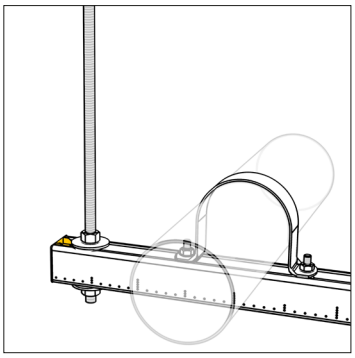


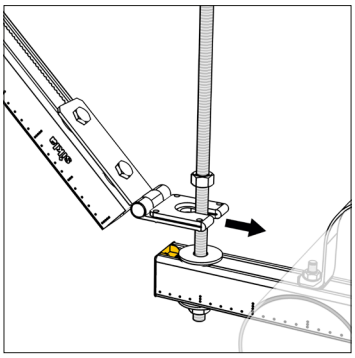
6. Fastening of pipes.

04/2019

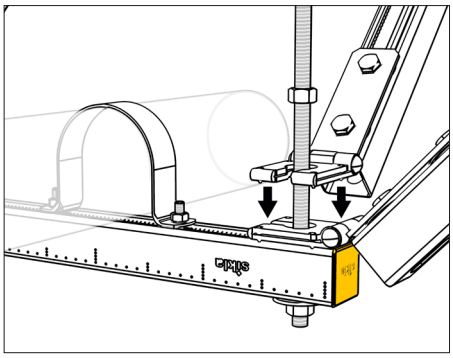
b) Subsequent mounting of the strut







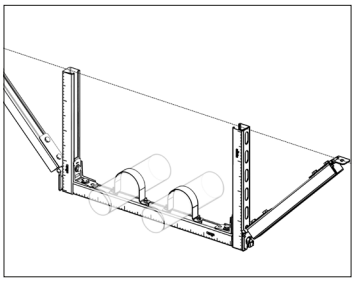
1. See installation steps 2 and 3 in "a) New installation". To fasten the JOI R joint, the existing nut on the threaded rod is unscrewed and then tightened again. The ceiling mounting is identical to steps 3 and 4 of a new installation.

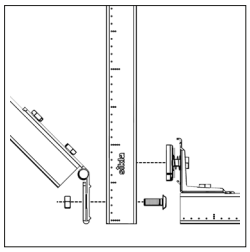


2. The stacking of several JOI R joints for bracing in different directions can be easily carried out.

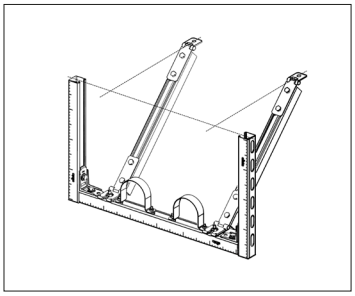
c) Frame mounting on back of channel

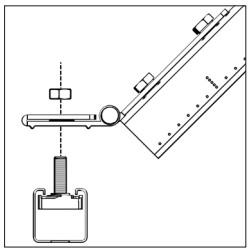
Lateral bracing:
Mount the joint JOI R using the appropriate flange screw SCR FLA HCP M10 on the back of the lateral channel.



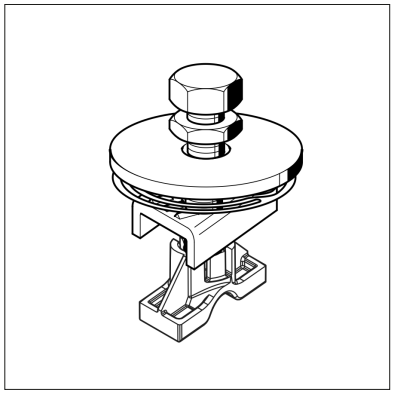


Longitudinal bracing:
Mount the joint JOI R on the horizontal channel by means of T-head bolt TBO HZ 41 M10 x 35





Rod Stiffener RST



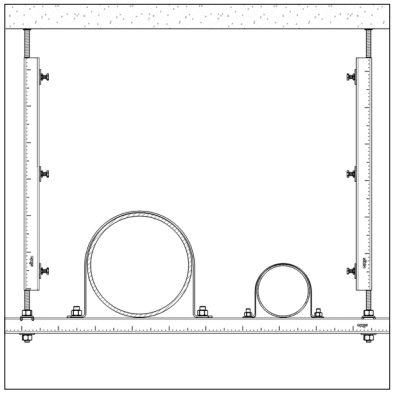
Application

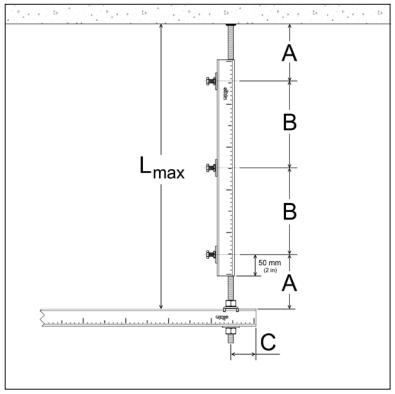
For stiffening the threaded hanger rods of trapeze bracket assemblies, to reinforce the bracket against seismic movement.

Distances to be observed						
Size	Allowable Tension of Compression		L_{max} [1]	A_{max}	B_{max} [2]	C
	[N]	[lbs.]	[cm]	[cm]	[cm]	[cm]
M8	1400	315	36.2	10	27.2	5
M10	2210	497	45.5	10	34.1	5
M12	3195	718	54.5	10	41.1	5
M16	5860	1317	74.1	10	55.6	5

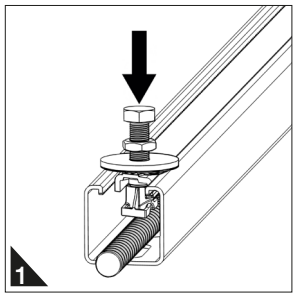
[1] Maximum Rod Length without Rod Stiffener

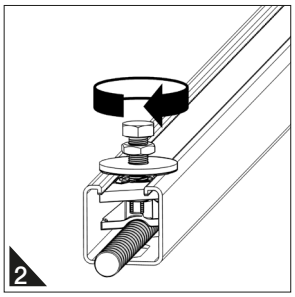
[2] Maximum spacing between two Rod Stiffener. Use of minimum two rod stiffeners per threaded rod.

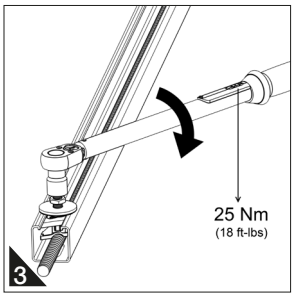


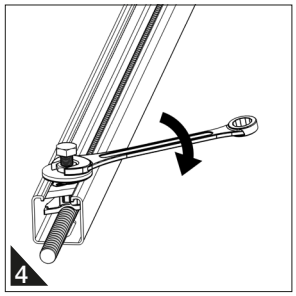


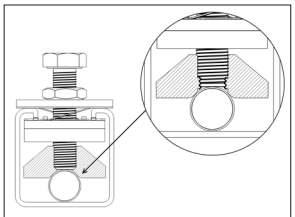
Assembly steps











During the assembly of the Rod Stiffener the material in this area will be supressed by the end of the screw, so a direct contact of steel-to-steel will be realised.

Installation

1. Screw hexagon bolt*) into M10 or M12 threaded plate NT CC (Part no.: 180218;182252).
2. Click Rod Stiffener onto the end of the screw.
3. Clamp the threaded rod by inserting the Rod Stiffener assembly into the MS 41/41/2.5 channel (Part no.: 173909; 166720) and fix the screw with the specified tightening torque.

*) In conjunction with MS 41/41/2.5 a screw length of 40 mm is recommended.

04/2019

Annex A

Calculation method according to DIN EN 1998-1:2010-12 / EN 1998-1:2004 + AC:2009 (D)

The stress values resulting from the seismic effect may be determined by applying a horizontal force Fa to the non-structural element that is defined as follows:

$$F_a = (S_a \cdot W_a \cdot \gamma_a) / q_a$$

where

- F_a is the horizontal seismic force, acting at the centre of mass of the non-structural element in the most unfavourable direction
- W_a is the weight of the element
- γ_a is the importance factor of the element, see below
- q_a is the behaviour factor of the element, see table below
- S_a is the seismic coefficient applicable to non-structural elements

  The seismic coefficient S_a may be calculated using the following expression:

$$S_a = \alpha \cdot S \cdot [3 (1 + z/H) / (1 + (1 - T_a/T_1)^2) - 0.5]$$

where

- α is the ratio of the design ground acceleration on type A ground, ag, to the acceleration of gravity g
- S is the soil factor
- T_a is the fundamental vibration period of the non-structural element;
- T_1 is the fundamental vibration period of the building in the relevant direction;
- Z is the height of the non-structural element above the level of application of the seismic action (foundation or top of a rigid basement);
- H is the building height measured from the foundation or from the top of a rigid basement.

The value of the seismic coefficient S_a must not be less than $\alpha \cdot S$.

Importance factors

[1] For the following non-structural elements, the importance factor γ_a shall not be less than 1.5:

- anchorage elements of machinery and equipment required for life safety systems;
- tanks and vessels containing toxic or explosive substances considered to be hazardous to the safety of the general public.

[2] In all other cases, the importance factor γ_a of non-structural elements may be assumed to be $\gamma_a = 1.0$.

Table 4.4 - Values of q_a for non-structural elements

Type of non-structural element	q_a
Cantilevering parapets or ornamentations Signs and billboards Chimneys, masts and tanks on legs acting as unbraced cantilevers along more than one half of their total height	1.0
Exterior and interior walls Partitions and facades Chimneys, masts and tanks on legs acting as unbraced cantilevers along less than one half of their total height, or braced or guyed to the structure at or above their centre of mass Anchorage elements for permanent cabinets and book stacks supported by the floor Anchorage elements for false (suspended) ceilings and light fixtures	2.0

Calculation method according to ASCE 7-05

13.3 Seismic demands on non-structural components

13.3.1 Seismic Design Force.

The horizontal seismic design force (F_p) shall be applied at the component's centre of gravity and distributed relative to the component's mass distribution and shall be determined in accordance with Eg. 13.3-1:

$$F_p = \frac{0.4 a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)} \left(1 + 2\frac{z}{h}\right) \qquad (13.3\text{-}1)$$

where

F_p = Seismic design force

S_{DS} = Spectral acceleration, short period, as determined from Section 11.4.4

a_p = Component amplification factor that varies from 1.00 to 2.50 (select appropriate value from Table 13.5-1 or 13.6-1)

I_p = Component importance factor that varies from 1.00 to 1.50 (see Section 13.1.3)

W_p = Component operating weight

R_p = Component response modification factor that varies from 1.00 to 12 (select appropriate value from Table 13.5-1 or 13.6-1)

z = Height in structure of point of attachment of component with respect to the base. For items at or below the base, z shall be taken as 0. The value of z/h need not exceed 1.0.

h = Average roof height of structure with respect to the base.

The force (F_p) shall be applied independently in at least two orthogonal horizontal directions in combination with service loads associated with the component, as appropriate. For vertically cantilevered systems, however, the force (F_p) shall be designed for a concurrent vertical force ± 0.2 $S_{DS}W_p$. The redundancy factor, ρ, is permitted to be taken equal to 1 and the overstrength factor Ω_0 does not apply.

Exception: The concurrent vertical seismic force need not to be considered for lay-in access floor and lay-in ceiling panels.

Where nonseismic loads on nonstructural components exceed F_p, such loads shall govern the strength design, but the detailing requirements and limitations prescribed in this chapter shall apply.

In lieu of the forces determined in accordance with Eq. 13.3-1, accelerations at any level are permitted to be determined by the modal analysis procedures of Section 12.9 with R = 1.0. Seismic forces shall be in accordance with Eq. 13.3-4:

$$F_p = \frac{a_i a_p W_p}{\left(\frac{R_p}{I_p}\right)} A_x \qquad (13.3\text{-}4)$$

11.4 Seismic Ground Motion Values

11.4.1 Mapped Acceleration Parameters.

The parameters S_S and S_1 shall be determined from the 0.2 and 1.0 s spectral response accelerations shown on Figs. 22-1 through 22-14, respectively. Where S_1, is less than or equal to 0.04 and S_S is less than or equal to 0.15, the structure is permitted to be assigned to Seismic Design Category A and is only required to comply with Section 11.7.

11.4.2 Site Class.

Based on the site soil properties, the site shall be classified as Site Class A, B, C, D, E, or F in accordance with Chapter 20. Where the soil properties are not known in sufficient detail to determine the site class, Site Class D shall be used unless the authority having jurisdiction or geotechnical data determines Site Class E or F soils are present at the site.

11.4.3 Site Coefficients and Adjusted Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameters

The MCE spectral response acceleration for short periods (S_{MS}) and at 1 s (S_{M1}), adjusted for Site Class effects, shall be determined by Eqs. 11.4-1 and 11.4-2, respectively.

$$S_{MS} = F_a S_S \qquad (11.4\text{-}1)$$

$$S_{M1} = F_v S_1 \qquad (11.4\text{-}2)$$

where

S_S = the mapped MCE spectral response acceleration at short periods as determined in accordance with Section 11.4.1, and

S_1 = the mappedMCEspectral response acceleration at a period of 1 s as determined in accordance with Section 11.4.1

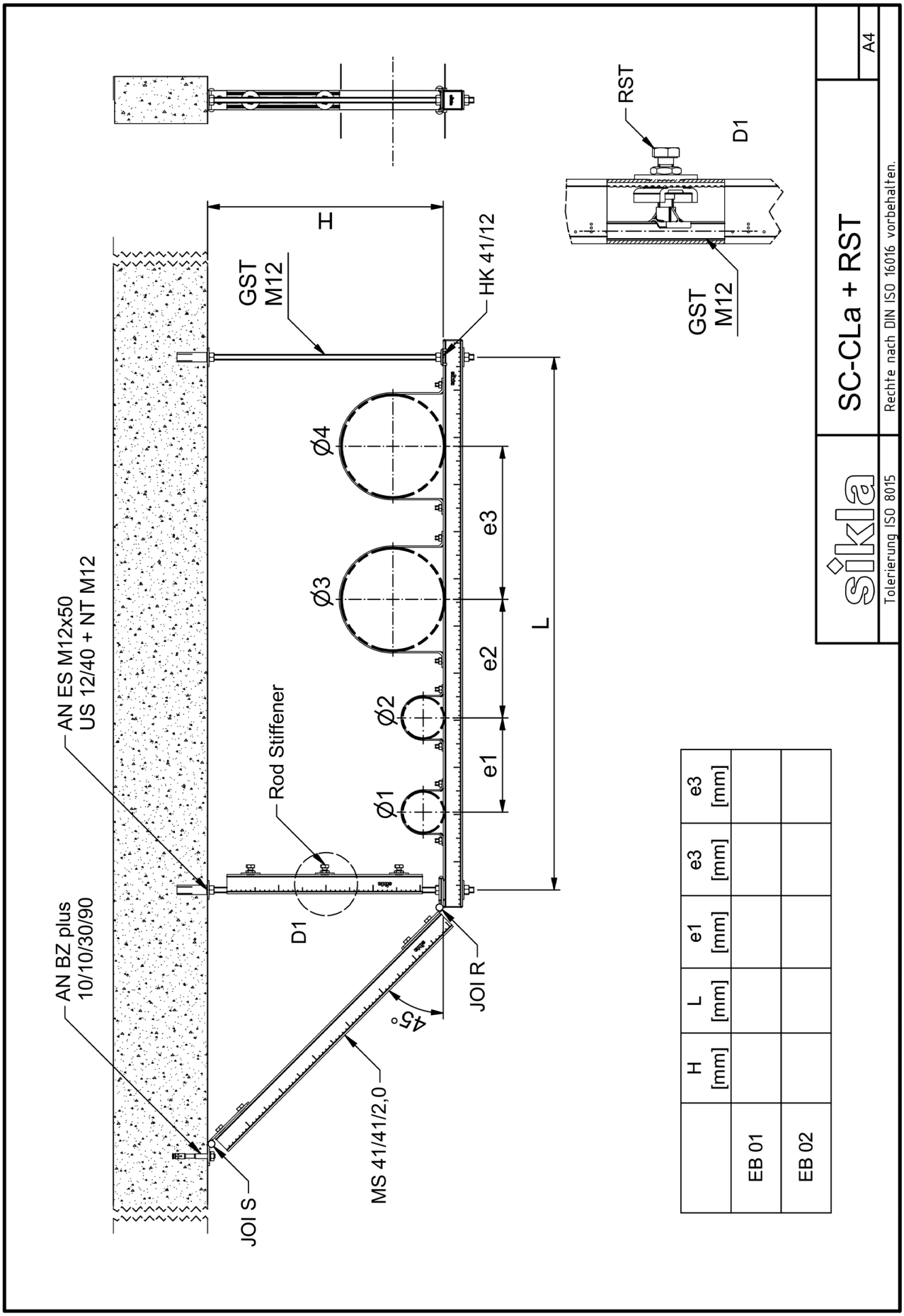
where site coefficients F_a and F_v are defined in Tables 11.4-1 and 11.4-2, respectively. Where the simplified design procedure.

TABLE 11.4-1 SITE COEFFICIENT, F_a

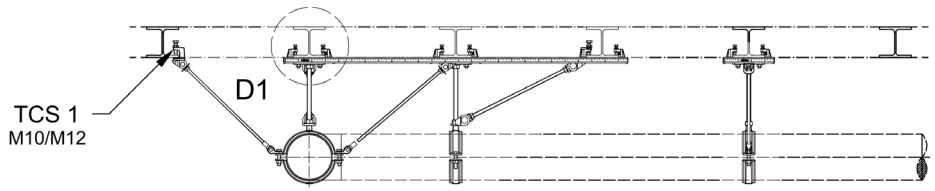
Site class	Mapped Maximum Considered Earthquake Spectral Response Acceleration Parameter at Short Period				
	$S_S \le 0.25$	$S_S = 0.5$	$S_S = 0.75$	$S_S = 1.0$	$S_S \le 0.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7				

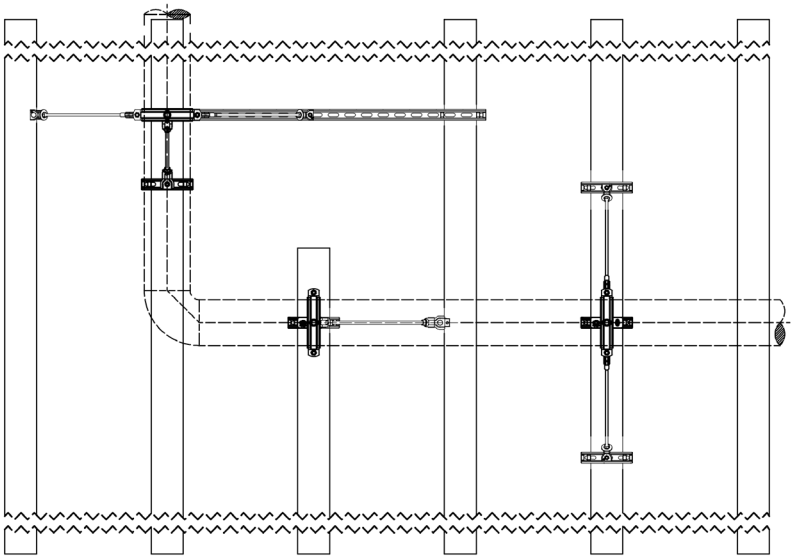
NOTE: Use straight-line interpolation for intermediate values of S_S.

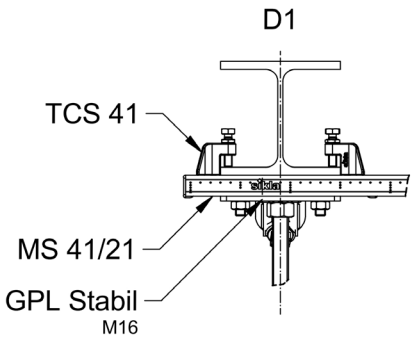
Annex B

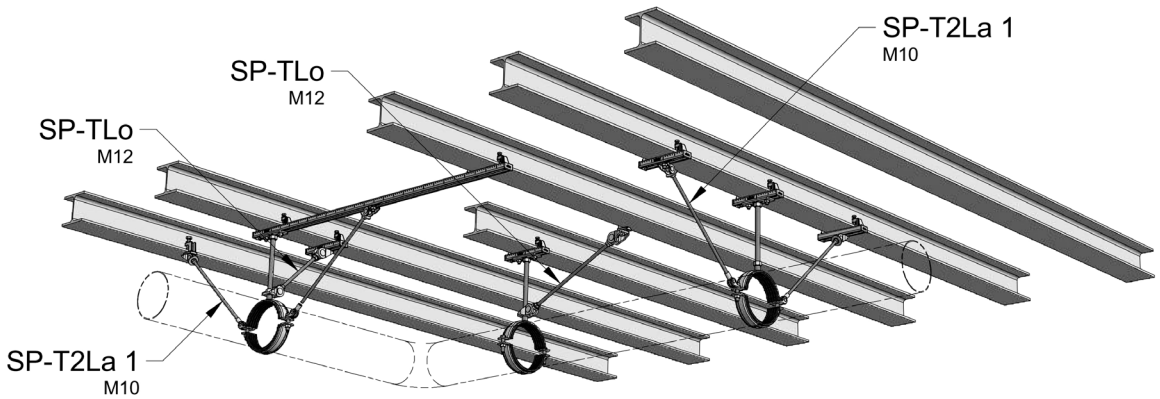


	H [mm]	L [mm]	e1 [mm]	e3 [mm]	e3 [mm]
EB 01					
EB 02					

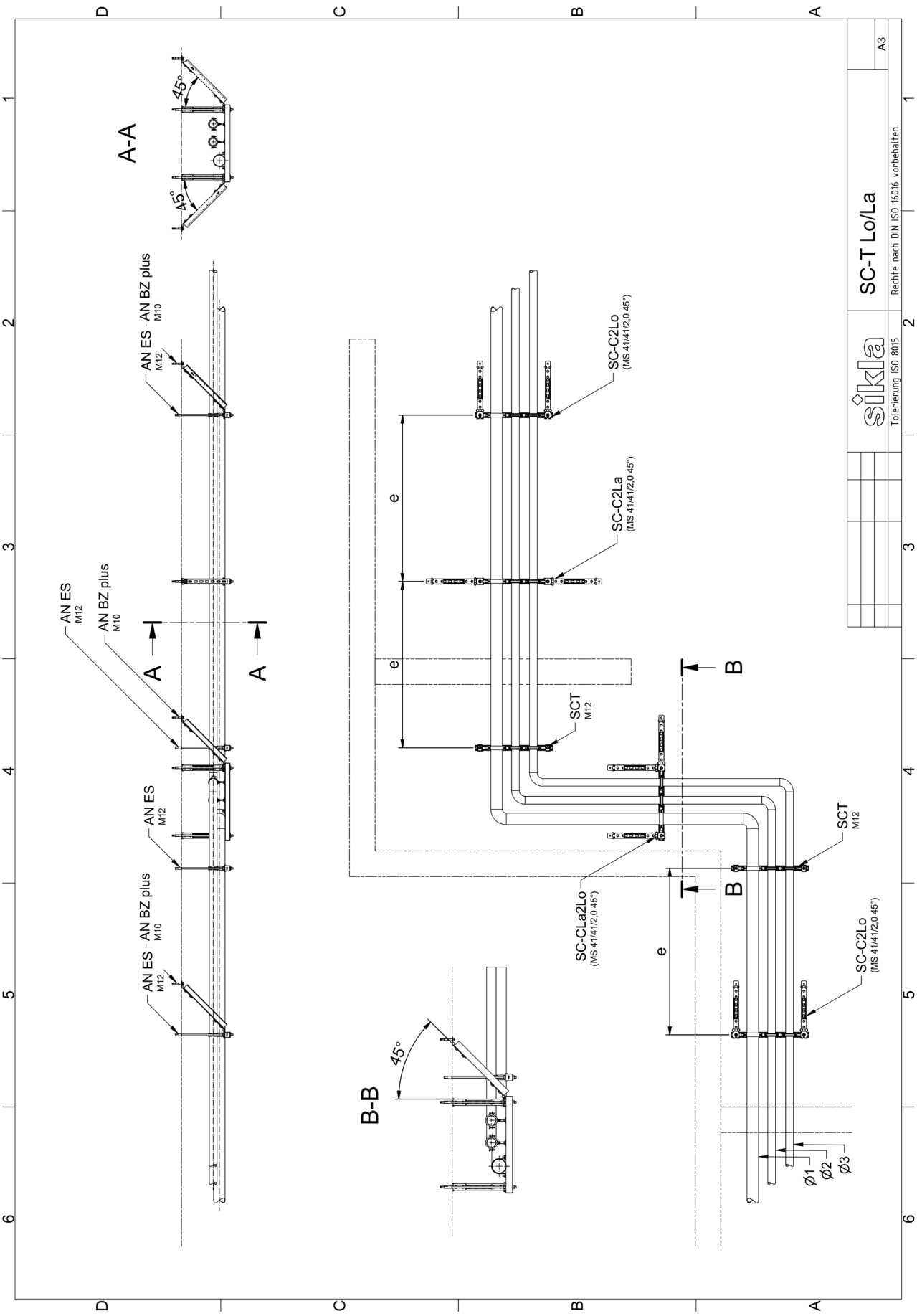


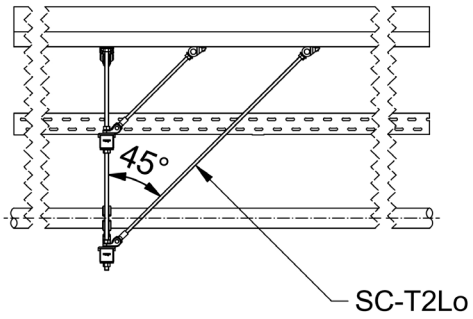


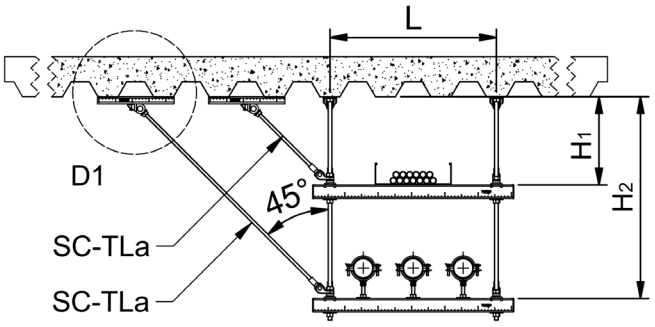


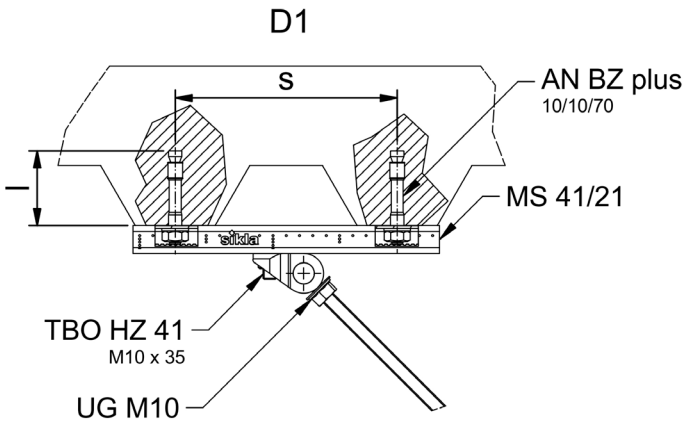


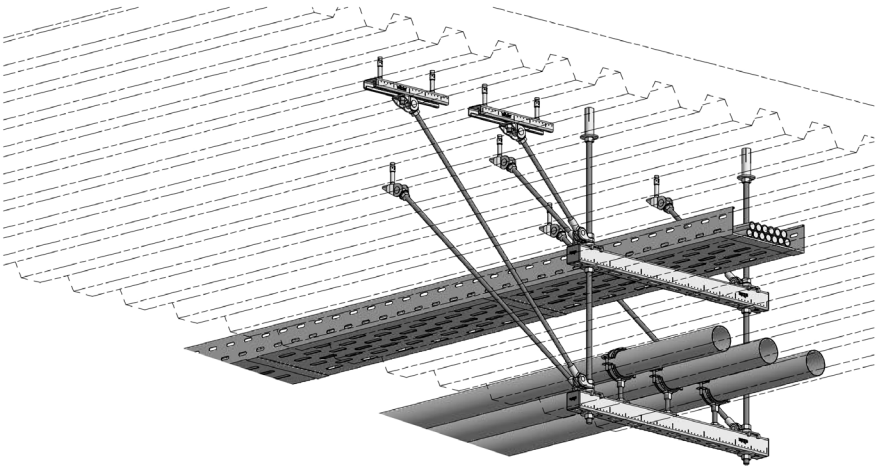
				sikla	SP-T Lo/La	
						A4
				Tolerierung ISO 8015	Rechte nach DIN ISO 16016 vorbehalten.	


A-A
45°
45°
AN ES - AN BZ plus
M10
M12
AN ES
M12
AN BZ plus
M10
A
A
AN ES
M12
AN ES - AN BZ plus
M10
M12
SC-C2Lo
(MS 41/41/2,0 45°)
SC-C2La
(MS 41/41/2,0 45°)
e
e
SCT
M12
B
B
SCT
M12
SC-CLa2Lo
(MS 41/41/2,0 45°)
e
SC-C2Lo
(MS 41/41/2,0 45°)
B-B
45°
Ø1
Ø2
Ø3
sikla
SC-T Lo/La
A3
Toleranzen ISO 8015
Rechte nach DIN ISO 16016 vorbehalten.









				sikla	2 x SC-TLa + SC-TLo	
						A4
				Tolerierung ISO 8015	Rechte nach DIN ISO 16016 vorbehalten.	

04/2019